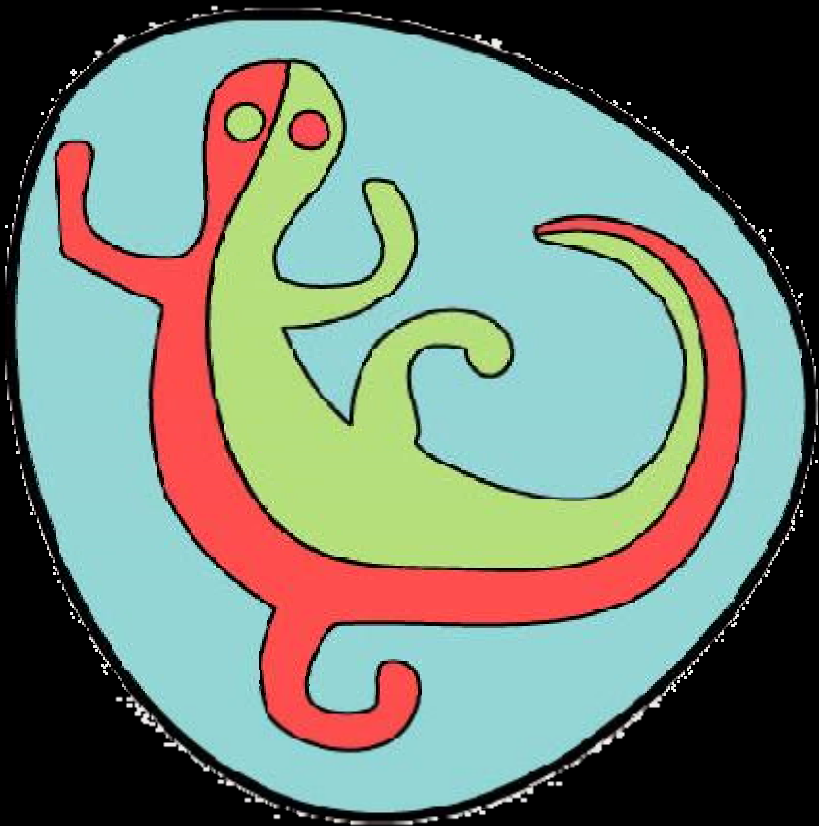


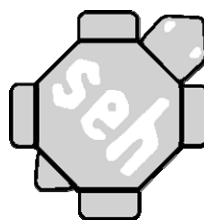
14th european congress
of herpetology
and SEH ordinary general meeting

19-23 september 2007
porto, portugal





programme & abstracts



19-23 September, 2007
Fundação Dr. António Cupertino de Miranda
Porto - Portugal

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14th European Congress of Herpetology, Porto (Portugal), 19-23 September 2007. *Abstract Book*.

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LEGAL DEPOSIT

September 2007

Welcome

Welcome Herpetologists!

Two years ago, after the very successful 13th meeting of the European herpetologists held in Bonn where we were simple participants, the venue for the next congress was still uncertain. Three months later, our group decided to propose Porto as the venue for the 2007 meeting and found a warm support from the SEH Council. Not without a feeling of responsibility, now, the CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos (Research Centre in Biodiversity and Genetic Resources) is very happy to host the 14th European Congress of Herpetology, including the Ordinary General Meeting of Societas Europaea Herpetologica. Because you are many and CIBIO is small, the congress venue will be the Cupertino Miranda Foundation (Porto).

Our group, mostly composed of young, enthusiastic Portuguese students developing their MSc and PhD theses at CIBIO, reinforced with the contribution of foreign researchers, will be at your disposal in the different organisation tasks. The University of Porto, the Fundação para a Ciência e Tecnologia (FCT), and several private institutions including Fundação Dr. António Cupertino de Miranda, Chimaira Verlag, Brill Publishers, Porto Turismo, Sogrape Vinhos and the Comissão de Viticultura da Região dos Vinhos Verdes, among others, are providing the necessary economic and material support. All of them make this event possible.

So, we welcome you most cordially and hope that the congress in our city will be scientifically successful, intellectually stimulant and personally enjoyable. So, we wish.

Miguel A. Carretero and José C. Brito
(The Organizing Committee)



GENERAL INFORMATION

Venue

The 14th European Congress of Herpetology will be held at:

Fundação Dr. António Cupertino de Miranda (Cupertino Miranda Foundation),
Avenida da Boavista, 4245. PT-4100-140 Porto (Portugal)

Tel.: (+351) 226101189; Fax: (+351) 226103412; Site: www.facm.pt

Registration

The registration desk is situated at Cupertino Miranda Foundation. It will be open:

- ◆ On Tuesday 18, September: 17:00-19:00 h;
- ◆ From Wednesday 19 to Saturday 22, September: 8:30-19:00 h;
- ◆ On Sunday 23 September, the desk will be closed (field excursion).

Updated information and eventual changes in the programme will be posted in a board be near the registration desk.

Participants are expected to pay their fees in cash upon arrival if they have not done it previously. They will also be asked to book the excursion and to register for the farewell party.

Full registration includes:

- ◆ admission to all the sessions;
- ◆ congress bag and tourist information;
- ◆ programme and abstract book;
- ◆ proceedings volume of the 14th ECH to appear in 2008;
- ◆ cruise in river Douro and visit to Porto Wine cave.

For the accompanying persons there will be a special programme including the cruise in river Douro and the visit to Porto Wine caves.

Meals

For lunch, Cupertino Miranda Foundation has a convenient restaurant for 260 people, which participants are encouraged to use. Organisation will provide discount lunch tickets for all the participants. Several other restaurants are available in the surroundings. For dinner, the city has plenty to offer. Please visit: <http://www.portoturismo.pt/index.php?m=3&s=5>

Transports

Please visit: <http://www.portoturismo.pt/index.php?m=3&s=8> and also the congress site: http://webpages.icav.up.pt/pessoas/herpmeeting/Herpmeeting_home.htm

Changes in the programme

Eventual changes will be announced in the information board next to the registration desk. Please, check.

Congress photo

A picture of all participants will be taken and put in the congress web-site to be downloaded.

Posters

Authors are requested to fix their posters (100 x 150 cm) at the Cupertino Miranda Foundation in the marked panels. Fixation materials will be provided.

Oral presentations

Speakers should provide a copy of their presentations (CD or USB flash disk) at least two hours before the presentation. It should be delivered at the congress PC room and tested the proper working. No private computers will be allowed. Technical advice will be available. Oral communications will last 10 minutes maximum, with additional 5 minutes for discussion.

CALL FOR PAPERS: PROCEEDINGS VOLUME

A Proceeding volume containing peer-reviewed papers presented to the 14th ECH will be published. The articles will be limited to 8 printed pages including tables and figures (maximum 20,000 characters including spaces minus 4000 characters by each figure). For other details including the text arrangement and the file formats, please, consult the instructions to the authors of *Amphibia-Reptilia* (<http://www.brill.nl/AuthorsInstructions/AMRE.pdf>).






Manuscripts are to be submitted electronically to: herpmeeting@mail.icav.up.pt

Deadline for submission is November 30, 2007.

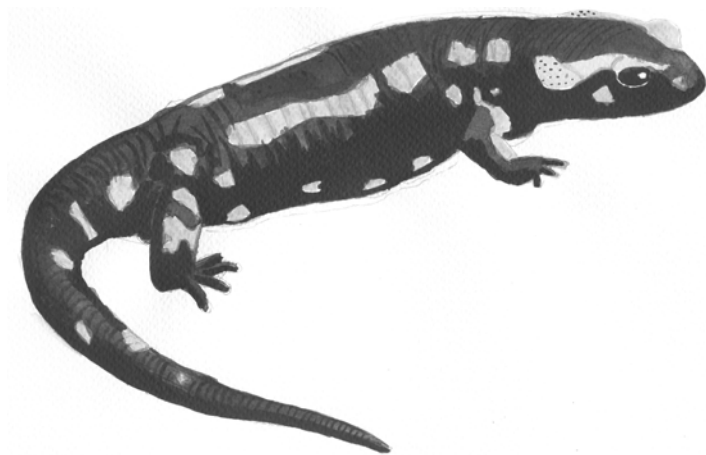




Table of Contents

| | | |
|---|------------------------------------|-----|
|  | 1. PROGRAMME OVERVIEW | 9 |
|  | 2. DETAILED PROGRAMME | 11 |
|  | 3. PLENARY LECTURES & SPECIAL TALK | 35 |
|  | 4. ORAL PRESENTATIONS | 41 |
|  | 5. POSTER PRESENTATIONS | 164 |
|  | 6. LIST OF PARTICIPANTS | 324 |
|  | 7. AUTHOR INDEX | 334 |





1. Programme Overview



| | Wednesday 19 September | Thursday 20 September | Friday 21 September | Saturday 22 September | Sunday 23 September |
|-------|--|--|---|-----------------------------------|----------------------------|
| 08:30 | Arrival and registration | | | | |
| 09:00 | | Plenary Lecture (N.Ferrand) | Plenary Lecture (R.Murphy & N.L.Orlov) | Plenary Lecture (P.Lymberakis) | Departure for excursion |
| 09:30 | Opening Ceremony | | | | |
| 10:00 | Plenary Lecture (E.N.Arnold) | Coffee break | Coffee break | Coffee break | |
| 10:20 | | Session 3a: Ecology & Physiology | Session 4a: Life History | Session 5a: Distribution | |
| 11:00 | Coffee break | Workshop: Phylogeogr. | Workshop: Monitoring | Workshop: Conservation | |
| 11:20 | Session 1a: Morphology & Systematics | | | | |
| | Workshop: Insular Snakes | | | | |
| 12:20 | Lunch break | Lunch break | Lunch break | Lunch break | Lunch |
| 14:00 | Session 1b: Morphology & Systematics | Session 3b: Ecology & Physiology | Workshop: Monitoring | Session 5b: Distribution | |
| 16:00 | Coffee break | Coffee break | Session 4b: Life History | Coffee break | |
| 16:20 | Session 1c: Morphology & Systematics | Workshop: Ecotoxicology | Workshop: Phylogeogr. | Special talk (W.Böhme) | |
| 17:00 | Session 2: Behaviour | Workshop: Phylogeogr. | Workshop: Conservation | 14th OGM SEH | |
| 17:00 | Roundtable: Indiv.identification | | Workshop: Sea Turtles | | |
| 18:00 | | | | Reception in Porto Wine cave | |
| 19:00 | | Cruise in river Douro | | | Return from excursion |
| 20:00 | | | | Farewell party | |



2. Detailed Programme



Wednesday, 19 September (morning)

| Arrival and registration | | | |
|--------------------------|---|---------------|--|
| 08:30 – 09:30 | ROOM 1 | ROOM 2 | |
| 09:30 – 10:00 | Opening Ceremony | | |
| 10:00 – 11:00 | Plenary Lecture: Transmarine colonisation by reptiles and its consequences <u>E. N. Arnold</u> | | |
| 11:00 – 11:20 | Coffee break | | |
| 11:20 – 12:20 | Session 1a: Morphology & Systematics Chairpersons: W. Böhme, J. Hallermann | 11:20 – 12:20 | Workshop: Insular Snakes Chairpersons: M. Martins, G. Nilson |
| 11:20 – 11:40 | Comparative analysis of taxonomic and morphological diversity of agamids (Agamidae, Aerodonta, Sauria, Reptilia) of China, southeast Asia and north Eurasia <u>N. Ananjeva & Y. Wang</u> | 11:20 – 11:35 | Seasonal and sexual patterns of microhabitat use by the golden lancehead, <i>Bothrops insularis</i> <u>M. Martins & O. A. V. Marques</u> |
| 11:40 – 12:00 | Comparison of mitochondrial DNA, morphological and skeletal muscle protein data between island and mainland populations of the green toad, <i>Bufo viridis</i> , in Giresun, Turkey <u>Ü. Bulbul, B. Kutrup, E. Çakır, Z. Çolak- Yılmaz & H. Onay-Karaoğlu</u> | 11:35 – 11:50 | Does a gigantic insular snake grow faster or live longer to be gigantic? Evidence from a long-term field study <u>M. Hasegawa & A. Mori</u> |
| 12:00 – 12:20 | Age and sex based differences in the head shape of Moorish geckos: a geometric morphometric approach <u>F. Pupin, R. Sacchi, M.A. Zuffi & P. Galeotti</u> | 11:50 – 12:05 | A cost to adaptive plasticity: Prey size and head shape in young Tigersnakes, <i>Notechis scutatus</i> <u>F. Aubret & R. Shine</u> |
| | | 12:05 – 12:20 | Discussion |
| 12:20 – 14:00 | Lunch break | | |

Wednesday, 19 September (afternoon)

| | ROOM 1 | | ROOM 2 | |
|---------------|---|---------------|--|--|
| 14:00 – 16:00 | Session 1b: Morphology & Systematics Chairpersons: E. N. Arnold, N. Ananjeva | 14:00 – 16:00 | Workshop: Insular Snakes Chairpersons: M. Martins, G. Nilson | |
| 14:00 – 14:20 | Morphological differentiation of mainland populations of the kotschy's gecko (<i>Cyrtopodion kotschy</i>) from the Balkans and Asia Minor <u>R. Ajtić</u> , L. Tomović, & J. Crnobrnja-Isailović | 14:00 – 14:15 | Trophic ecology of insular cottonmouth snakes <u>H. B. Lillywhite</u> | |
| 14:20 – 14:40 | Geographic patterns of morphological and genetic variability of <i>Podarcis vaucheri</i> in Morocco <u>A. Kallontzopoulou</u> , C. Pinho., J. C. Brito., M. A. Carretero., D. J. Harris. & G. A. Lorente | 14:15 – 14:30 | Reproductive consequences of a changing prey base in island watersnakes <u>R. B. King</u> , K. M. Stanford & J. M. Ray | |
| 14:40 – 15:00 | First results on the taxonomy of the <i>Lamprophis fuliginosus</i> complex in Africa <u>J. Hallermann</u> & A. Schmitz | 14:30 – 14:45 | Conservation of Milos Viper, <i>Macrovipera schweizeri</i> (Werner, 1935) on Milos Island: A review of the last 15 years <u>Y. Ioannidis</u> , M. Dimaki, G. Nilson & C. Andr  n | |
| 15:00 – 15:20 | Using digital images to reconstruct the 3D carapace shape of tortoises: a new tool for morphometric studies <u>Y. Chiari</u> , B. Wang, H. Rushmeier & A. Caccone | 14:45 – 15:00 | The genetics of isolation: island speciation, gene flow, and population structure in the <i>Bothrops jararaca</i> complex <u>R. J. Sawaya</u> , K. R. Zamudio, F. G. Grazziotin & M. Martins | |
| 15:20 – 15:40 | The fossil snake <i>Falseryx</i> : The last European dwarf boa <u>Z. Szyndlar</u> & J. C. Rage | 15:00 – 15:15 | Molecular genetic analysis of the captive and natural populations of an endemic vulnerable species, the Jamaican boa (<i>Epicrateres subflavus</i>) <u>A. Tzika</u> , S. Koenig, C. Remy & M. C. Milinkovitch | |
| 15:40 – 16:00 | Fossil chelonians of the Oulad Abdoun phosphates Basin (Maastrichtian-Ypresian, Khouribga, Morocco) <u>F. Ouannaimi</u> , N-E. Jalil, B. Baadi & M. Amaghazaz | 15:15 – 15:30 | Recent advances to the molecular systematics of Malagasy snakes <u>Z.T. Nagy</u> , F. Glaw, M. Wink, U. Joger & M. Vences | |
| | | 15:30 – 16:00 | General discussion | |
| 16:00 – 16:20 | Coffee break | | | |





Wednesday, 19 September (afternoon) (continued)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|---|
| 16:20 – 19:00 | Session 1c: Morphology & Systematics Chairperson: E. Roitberg | 16:20 – 19:00 | Session 2: Behaviour Chairpersons: E. Font, M. A. Carretero |
| 16:20 – 16:40 | Development of coloration pattern in several <i>Salamandra</i> species and subspecies <u>S. Bogaerts</u> | 16:20 – 16:40 | The diversity of male space use in <i>Lacerta saxicola</i> in the deciduous forests of the Navagir mountain ridge <u>E. A. Galoyan</u> |
| 16:40 – 17:00 | Individual differentiation and sexual dimorphism in Majorcan Midwife Toad, <i>Alytes muletensis</i> , adults <u>S. Pinya & V. Pérez-Mellado</u> | 16:40 – 17:00 | Reproductive isolation in Iberian <i>Podarcis</i> species complex: An overview <u>D. Barbosa, E. Font, R. Ribeiro, E. Desfilis & M. A. Carretero</u> |
| 17:00 – 19:00 | Roundtable: Identification of individual amphibians and reptiles - problems and possible solutions Chairperson: J. Penner | 17:00 – 17:20 | Prey capture efficiency in the dice snake, <i>Natrix tessellata</i> <u>I. V. Chira & D. Butanescu</u> |
| | | 17:20 – 17:40 | On gaits and locomotor diversity within the yellow anaconda (<i>Eunectes notaeus</i>) <u>B. A. Young</u> |
| | | 17:40 – 18:00 | Testing the aposematic coloration in Madagascan poison frogs, genus <i>Mantella</i> <u>O. Jovanovic & M. Vences</u> |
| | | 18:00 – 18:20 | <i>Allobates femoralis</i> (Dendrobatidae): a very handy fellow for anuran field bioacoustics <u>W. Hödl, A. Amézquita, P. Narins & A. C. Lima</u> |
| | | 18:20 – 18:40 | Who is calling? Intraspecific call variation in the dendrobatid frog <i>Allobates femoralis</i> <u>H. Gasser, A. Amézquita & W. Hödl</u> |
| | | 18:40 – 19:00 | Moving houses - Territoriality, site fidelity and pair bonding in <i>Allobates femoralis</i> (Dendrobatidae) <u>M. Ringler</u> |
| 19:00 | Cruise in river Douro | | |

Thursday, 20 September (morning)

| | ROOM 1 | | ROOM 2 |
|---------------|---|---------------|--|
| 9:00 – 10:00 | Plenary Lecture: The recent evolutionary history of Iberian herpetofauna <u>N. Ferrand</u> | | |
| 10:00 – 10:20 | <i>Coffee break</i> | | |
| 10:20 – 12:20 | Session 3a: Ecology & Physiology Chairpersons: J. Črnobrnja-Išaitović, M. A. L. Zuffi | 10:20 – 12:20 | Workshop: Phylogeography Chairpersons: U. Joger, D. J. Harris |
| 10:20 – 10:40 | Why are there so many species? – Understanding hyperdiverse tropical tadpole communities <u>A. Strauss</u> , R. D. Randrianaina, J. Glos & M. Vences | 10:20 – 10:40 | Phylogeography of European snakes <u>U. Joger</u> , D. Guicking, S. Kalyabina-Hauf, Z. Nagy & M. Wink |
| 10:40 – 11:00 | Amphibians and ponds in a Mediterranean transitional landscape <u>M. Ferreira</u> , P. Antunes, L. Vicente, P. D. Rodrigues & E. G. Crespo | 10:40 – 11:00 | Nuclear introns give evidence for reticulate speciation in the <i>Triturus cristatus</i> superspecies G. E. Themudo & J. W. Arntzen |
| 11:00 – 11:20 | Limited relevance of fluctuating features of temporary ponds in explaining amphibian beta diversity <u>C. Gómez-Rodríguez</u> , C. Díaz-Paniagua, L. Serrano, M. Florencio, A. Porthault & J. Bustamante | 11:00 – 11:20 | Phylogeography and diversification patterns in the agamid lizards of the central Asian deserts <u>J. Melville</u> , J. Hale, G. Mantziou, N. Clemann & N. Ananjeva |
| 11:20 – 11:40 | The population of lizards and snakes on border of Europe and Asia <u>V. V. Malimonov</u> | 11:20 – 11:40 | Nuclear molecular markers in investigation of genetic relationships, phylogeography and systematics of lizards from <i>Darevskia</i> and <i>Lacerta</i> s. str. genera V. V. Greehko & I. S. Darevsky |
| 11:40 – 12:00 | Using diet overlaps for testing competition between <i>Podarcis bocagei</i> and <i>P. carbonelli</i> in NW Portugal: the influence of seasons <u>A. Marques</u> & M. A. Carretero | 11:40 – 12:00 | Genealogy of the nuclear β -fibrinogen intron 7 across old, divergent mtDNA lineages of Bosca's newt (<i>Lissotriton boscai</i>): concordance between mt and nuclear DNA based on explicit spatial models <u>J. Teixeira</u> , I. Martínez-Solano, D. Buckley, P. Tarroso, M. García-Paris & N. Ferrand |
| 12:00 – 12:20 | Diet of the Southern Crested Newt, <i>Triturus karelinii</i> (Strauch, 1870), from Giresun, Turkey <u>Z. Çolak-Yılmaz</u> , B. Kutrup, H. Onay-Karaoglu, U. Bulbul & E. Çakır | 12:00 – 12:20 | Comparative phylogeography of widespread reptile species in Madagascar <u>M. Vences</u> , L. Boumans, F. Glaw & D. R. Vieites |
| 12:20 – 14:00 | <i>Lunch break</i> | | |





Thursday, 20 September (afternoon)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|---|
| 14:00 – 16:00 | Session 3b: Ecology & Physiology Chairpersons: C. Corti, J. C. Brito | 14:00 – 16:00 | Workshop: Phylogeography Chairpersons: U. Joger, D. J. Harris |
| 14:00 – 14:20 | Food intake and energetics in the European Whip snake, <i>Hierophis viridiflavus</i> <u>M. A. L. Zuffi</u> , R. Picchioti, P. Poli, M. Mele & S. Fornasiero | 14:00 – 14:20 | Biogeography and evolution of European cave salamanders, <i>Hydromantes</i> (Urodela: Plethodontidae) inferred from mtDNA sequences <u>S. Carranza</u> , A. Romano, E. N. Arnold & G. Sotgiu |
| 14:20 – 14:40 | Ultraviolet visual sensitivity in lacertid lizards <u>E. Font</u> , G. Pérez i de Lanuza, P. Cid & A. Latorre | 14:20 – 14:40 | Phylogeny and biogeography of a Malagasy radiation: <i>Phelsuma</i> day-geckos <u>S. Rocha</u> , M. Vences, F. Glaw, D. Posada & D. J. Harris |
| 14:40 – 15:00 | Towards thermal land evaluation for species distribution mapping: thermoregulation and use of microhabitat by <i>Timon lepidus</i> <u>V. Venus</u> , <u>F. Ferri-Yáñez</u> & B. Toxopeus | 14:40 – 15:00 | Molecular phylogeny of cophylines: regional endemism and parallel miniaturization in Madagascan microhylid frogs <u>K. C. Wollenberg</u> , D. Vieites, A. van der Meijden, F. Glaw, M. Vences & D. C. Cannatella |
| 15:00 – 15:20 | Population structure of the Selvagens Gecko, <i>Tarentola boettgeri bischoffi</i> , at the Selvagem Grande island after the eradication of rabbits and house mice <u>R. Rebelo</u> , D. Menezes, P. Catry, J. P. Granadeiro, M. A. Dias, M. Lecoq, R. Matias, H. Alonso, L. Vicente & P. Oliveira | 15:00 – 15:20 | Genetic variation in parthenogenetic Caucasian rock lizards of genus <i>Darevskia</i> <u>D. N. Malysheva</u> , A. A. Vergun, I. A. Martirosyan, V. I. Korchagin, O. N. Tokarskaya & A. P. Ryskov |
| 15:20 – 15:40 | Population regulation of the Leaf-toed Gecko <i>Euleptes europaea</i> in a NW Italian Natura 2000 site <u>S. Salvidio</u> & F. Oneto | 15:20 – 15:40 | DNA sequence variation in the mitochondrial DNA of <i>Bufo viridis</i> in Israel <u>T. Goldberg</u> , <u>G. Degani</u> , A. Gasith, E. Elron & E. Nevo |
| 15:40 – 16:00 | Habitat selection of <i>Phrynocephalus persicus</i> (Agamidae) in the Goravan Sands Sanctuary (Armenia) <u>T. L. Tadevosyan</u> | 15:40 – 16:00 | Rapid diversification and dispersal during global warming periods by plethodontid salamanders <u>D. R. Vieites</u> , M.-S. Min, S. Nieto-Roman & D. B Wake |
| 16:00 – 16:20 | Coffee break | | |

Thursday, 20 September (afternoon) (continued)

| | ROOM 1 | | ROOM 2 |
|---------------|---|---------------|---|
| 16:20 – 19:00 | Workshop: Ecotoxicology Chairperson: A. Marco | 16:20 – 19:00 | Workshop: Phylogeography Chairpersons: U. Joger, D. J. Harris |
| 16:20 – 17:00 | Complexity of toxic response of amphibians and reptiles to environmental pollution <u>A. Marco</u> | 16:20 – 16:40 | Phylogeny of the Geckos of the World <u>A. M. Bauer</u> , T. Jackman, E. Greenbaum & T. Gamble |
| | | 16:40 – 17:00 | Genetic evidence for wild-living <i>Aspideretes nigricans</i> and a molecular phylogeny of south Asian softshell turtles (Reptilia: Trionychidae: <i>Aspideretes</i> , <i>Nilssonina</i>) P. Präsachag, A. K. Hundsdoerfer, A. H. M. A. Reza & U. Fritz |
| 17:00 – 17:20 | Bioaccumulation of heavy metals in <i>Psammotromus algerius</i> from tailing-dam collapse in the Aznalcollar mine (SW Iberian Peninsula) <u>R. Márquez-Ferrandó</u> , X. Santos & J. M. Pleguezuelos | 17:00 – 17:20 | Get an eyeful of this: phylogeny and biogeography of cobras and the origin of venom spitting in elapid snakes <u>W. Wüster</u> , S. Crookes, I. Ineich, C. E. Pook & D. G. Broadley |
| 17:20 – 17:40 | Genotoxic stress on frog populations along exposure gradients: a test of the co-tolerance hypothesis O. Marquis, C. Miaud, F. Fictola, A. Devaux, A. Bocher & S. Guittoneau | 17:20 – 17:40 | Phylogeography of the endemic <i>Hemidactylus bouvieri</i> (Bocourt, 1870) geckos of Cape Verde islands based on mitochondrial and nuclear genes <u>R. Vasconcelos</u> , E. N. Arnold, J. A. Mateo, D. J. Harris & S. Carranza |
| 17:40 – 18:00 | Ecotoxicological studies on sea turtles stranded in the Canary Islands <u>J. Orós</u> , P. Monagas, A. Torrent & O. M. González-Díaz | 17:40 – 18:00 | Molecular phylogeny of the Western Palearctic tree frogs (<i>Hyla</i> spp.) with implication to advertisement call evolution <u>V. Gvozdík</u> , D. Canestrelli, P. Kotlík, J. Moravec, G. Nascetti, E. Recuero & J. Teixeira |
| 18:00 – 18:20 | Arsenic accumulation and biotransformation during <i>Rana perezi</i> aquatic development <u>M. E. Ortiz-Santaliestra</u> , E. Sanz-Rodríguez, M. Bryzewska, R. Muñoz-Olivas, C. Cámara | 18:00 – 18:20 | Genetic differentiation among Levant populations of <i>Hemidactylus turcicus</i> <u>J. Moravec</u> , D. Modry, Z. S. Amr, L. Kratochvil & V. Gvozdík |
| 18:20 – 18:40 | Amphibians and biomarkers: potentials tools for wetland assessment <u>G. Parra</u> , E. García-Muñoz, R. Jiménez, F. Jiménez-Gómez, M.I. Torres-Lopez & F. Guerrero | 18:20 – 18:40 | Taxonomic chaos in west African <i>Arthroleptis</i> species – can it be solved? <u>A. Hillers</u> , M.-O. Rödel & M. Veith |
| 18:40 – 19:00 | Effect of UV-B radiation on the survival of amphibian larvae from coastal wetlands in SW Spain <u>W. de Vries</u> , G. Macías & A. Marco | 18:40 – 19:00 | Molecular and morphological patterns in evolution of Asian salamanders (family Hynobiidae) <u>N. A. Poyarkov</u> , M.-S. Min & S. L. Kuzmin |





Friday, 21 September (morning)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|---|
| 9:00 – 10:00 | Plenary Lecture: Amphibians of Vietnam: taxonomic and ecological diversity <u>R.W. Murphy</u> & <u>N. L. Orlov</u> | | |
| 10:00 – 10:20 | <i>Coffee break</i> | | |
| 10:20 – 12:20 | Session 4a: Life History Chairpersons: <u>M. Denoël</u> , <u>A. Perera</u> | 10:20 – 12:20 | Workshop: Monitoring Chairperson: <u>D. Schmeller</u> |
| 10:20 – 10:40 | Understanding geographical variation in morphology and life-history traits in the Moor Frog <i>Rana arvalis</i> : phenotypic plasticity and genetic effects <u>P.-A. Crochet</u> , <u>T. Knopp</u> , <u>J. M. Cano</u> & <u>J. Merilä</u> | 10:20 – 11:00 | Monitoring amphibians and reptiles in Europe <u>D. S. Schmeller</u> , <u>B. Bauch</u> , <u>P. Y. Henry</u> & <u>K. Henle</u> |
| 10:40 – 11:00 | Longevity in <i>Bombina variegata</i> (Anura, Amphibia) <u>B. Seidel</u> | | |
| 11:00 – 11:40 | Long-term observations on a breeding population of <i>Salamandra atra</i> <u>M. Warburg</u> | 11:00 – 11:20 | Monitoring the conservation status of UK herpetofauna: different approaches for different species <u>C. Gleed-Owen</u> , <u>J. Baker</u> , <u>J. Buckley</u> , <u>T. Gent</u> , <u>N. Moulton</u> & <u>D. Wright</u> |
| | | 11:20 – 11:40 | Using digital images of <i>Lacerta agilis</i> dorsal patterning and capture mark recapture methods to estimate population sizes of <i>L. agilis</i> on areas of heathland <u>H. Fearnley</u> , <u>M. Hudson</u> , <u>J. Allen</u> & <u>C. Gleed-Owen</u> |
| 11:40 – 12:00 | <i>Triturus v. vittatus</i> (Urodela) breeding site conditions at various altitudes <u>O. Pearlson</u> & <u>G. Degani</u> | 11:40 – 12:00 | A seven-years' monitoring of an isolated population of the lizard <i>Acanthodactylus erythrurus</i> in NE Iberia <u>M. A. Carretero</u> , <u>P. X. Alborná</u> & <u>G. A. Llorente</u> |
| 12:00 – 12:20 | A preliminary study of the embryonic development of kidneys in <i>Typhlonectes compressicauda</i> (Amphibia, Gymnophiona) <u>M. Bastit</u> & <u>J.-M. Exbrayat</u> | 12:00 – 12:20 | Efficiency of different methods in detecting amphibian and reptile species in Hungary: a national overview <u>M. Puky</u> & <u>P. Schád</u> |
| 12:20 – 14:00 | <i>Lunch break</i> | | |

Friday, 21 September (afternoon)

| | ROOM 1 | | ROOM 2 |
|---------------|--|----------------|---|
| 14:00 – 16:00 | Session 4b: Life History Chairpersons: P. Lymberakis, P.- A. Crochet | 14: 00 – 16:00 | Workshop: Monitoring Chairperson: D. Schmeller |
| 14:00 – 14:20 | Evolution of risk-sensitive hatching in neotropical leaf-breeding treefrogs (<i>Agalychnis</i> : Hylidae) <u>I. Gomez-Mestre</u> , J. J. Wiens & K. M. Warkentin | 14:00 – 14:20 | Implications of sampling methods and protocol for the estimation of site occupancy and extinction <u>R. M. Dorazio</u> |
| 14:20 – 14:40 | Amphibian community ecology and life history parameters in <i>Pelophylax perezi</i> in the Peneda-Gerês mountain system, Portugal <u>A. Ceia-Hasse</u> , R. Brito, M. Ferreira & L. Vicente | 14:20 – 14:40 | Surveying the distribution of a fossorial lizard that is not always available for detection <u>B. Schmidt</u> |
| 14:40 – 15:00 | Male reproductive cycle of <i>Acanthodactylus schreiberi syriacus</i> Böttger, 1879 (Reptilia, Lacertidae) in Lebanon <u>S. Hraoui-Bloquet</u> , R. Sadek, M. Lahoud-Hokayem & J. Hakim-Saade | 14:40 – 15:00 | Detection probability of reptiles derived from the national reptile monitoring program in the Netherlands <u>I. Janssen</u> & A. Zuidervijk |
| 15:00 – 15:20 | Geographic variation in clutch size and female size - clutch size relationship in the sand lizard, <i>Lacerta agilis</i> <u>E. S. Roitberg</u> , F. Amat , N. A. Bulakhova, M. A. Carretero, V. N. Kuranova, O. I. Zinenko & V. A. Yakovlev | 15:00 – 15:20 | Using model-based monitoring in a national amphibian monitoring program <u>L. C. Ball</u> |
| 15:20 – 15:40 | Reproduction in the lizard <i>Scelarcis perspicillata</i> : effect of climate and body shape <u>A. Perera</u> & V. Pérez-Mellado | 15:20 – 16:00 | General discussion – methodological problems and new developments in monitoring – monitoring efforts in Europe. Where forces could be joined? |
| 15:40 – 16:00 | Reproductive strategies of high mountain snakes in the Caucasus <u>B. Tuniyev</u> & S. Tuniyev | | |
| 16:00 – 16:20 | Structure of mixed <i>Rana ridibunda</i> – <i>Rana esculenta</i> population in the Barycz river valley, Poland. M. Socha & <u>M. Ogińska</u> | 16:00 – 16:20 | Coffee break |



Friday, 21 September (afternoon) (continued)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|---|
| 16:20 – 17:00 | The formation of a pool of the definite number of ova is a once-for-a-lifespan event in anuran amphibians <u>M. Ogińska</u> , R. Augustynska, Agnieszka Kotusz & J. Ihnatowicz | 16:20 – 19:00 | Workshop: Conservation Chairpersons: A. Stumpel, Y. Chiari |
| 17:00 – 19:00 | Workshop: Sea Turtles Chairperson: C. Carreras | 16:20 – 17:00 | Strategies for habitat conservation <u>A. Stumpel</u> & T. Gent |
| 17:00 – 17:20 | Using genetic tools to infer distribution of loggerhead sea turtles (<i>Caretta caretta</i>) in the western Mediterranean C. Carreras, M. Pascual, L. Cardona, A. Aguilar, A. Marco, C. Rico, J. L. Mons, J. J. Martín, J. Tomas, J. A. Raga, G. Fernández & M. San Félix | 17:00 – 17:20 | Herpetofaunal community changes during forest succession <u>A. Herrera-Montes</u> & N. Brokaw |
| 17:20 – 17:40 | The impact of longline fishery in juvenile loggerhead sea turtles: insights from 14 years of stranding data in the Valencian Community (eastern Spain) <u>J. Tomás</u> , P. Gozalbes, J. A. Raga & B. J. Godley | 17:20 – 17:40 | Active help in saving a Hungarian meadow viper (<i>Vipera ursinii rakosiensis</i>) habitat B. Halpern, A. Máté, C. Pálmkás, R. Vidéki, G. Szövényi, K. Katona & T. Péchy |
| 17:40 – 18:00 | Importance of SW Europe for conservation of Atlantic and Mediterranean sea turtles <u>A. Marco</u> | 17:40 – 18:00 | Examining the IUCN categories of species with modelling techniques: the case study of the Iberian Herpetofauna <u>X. Santos</u> , J. C. Brito, N. Sillero & J. M. Pleguezuelos |
| 18:00 – 18:20 | Blood biochemistry and haematological values for wild juvenile pelagic loggerheads <i>Caretta caretta</i> offshore Madeira Island, north-eastern Atlantic and its relation to biometrical parameters <u>C. Delgado</u> , I. Quaresma, M. Costa & T. Dellinger | 18:00 – 18:20 | Amphibians and their conservation in western Africa J. Penner, M. Wegmann, T. Konrad, A. Hillers, M. Schmidt & M.-O. Rödel |
| 18:20 – 19:00 | Climate change and evolution of loggerhead sex-ratio in Cabo Verde <u>E. Abella</u> , A. Marco & L. F. López-Jurado | 18:20 – 19:00 | The common spadefoot in the Netherlands: Its distribution and conservation <u>W. Bosman</u> & P. van den Munckhof |

Saturday, 22 September (morning)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|--|
| 9:00 – 10:00 | Plenary Lecture: Studying herpetology in the Aegean: The Archipelago confirms its reputation <u>P. Lymberakis</u> | | |
| 10:00 – 10:20 | <i>Coffee break</i> | | |
| 10:20 – 12:20 | Session 5a: Distribution Chairpersons: R. Sindaco, J. Teixeira | 10:20 – 12:20 | Workshop: Conservation Chairpersons: A. Stumpel, Y. Chiari |
| 10:20 – 10:40 | Are land use and biodiversity associated at a regional scale? The case of Catalonia's reptiles (NE Iberian Peninsula) <u>R. Ribeiro</u> , <u>X. Santos</u> , <u>N. Sillero</u> , <u>M. A. Carretero</u> & <u>G. A. Llorente</u> | 10:20 – 10:40 | EU money down the drain: non-functioning amphibian mitigation measures under roads increase fragmentation at the Parassapusza Natura 2000 site, Hungary <u>M. Puky</u> |
| 10:40 – 11:00 | Amphibians in Triglav National Park and Landscape Park Goričko in Slovenia – 3 years of survey <u>M. Cipoč</u> , <u>A. Lešnik</u> , <u>K. Poboljšaj</u> & <u>M. Govedič</u> | 10:40 – 11:00 | Pond requirements of coexisting newts: Why is <i>Triturus cristatus</i> more vulnerable than <i>T. vulgaris</i> ? <u>R. Rannap</u> , <u>L. Briggs</u> & <u>A. Lõhmus</u> |
| 11:00 – 11:20 | Contribution to the knowledge of the reptile fauna of the Former Yugoslav Republic of Macedonia <u>B. Sterijovski</u> & <u>L. Tomović</u> | 11:00 – 11:20 | A new wave of declining of European amphibians following the distribution of introduced fish roan <i>Perccottus glenii</i> <u>A.N. Reshetnikov</u> |
| 11:20 – 11:40 | Herpetofauna of Croatia: biodiversity and distribution <u>M. Kuljerić</u> , <u>T. Šilić</u> & <u>D. Šalamon</u> | 11:20 – 11:40 | The application of genetics in conservation: the case of the Malagasy frogs of the genus <i>Mantella</i> <u>Y. Chiari</u> , <u>M. Vences</u> & <u>A. Meyer</u> |
| 11:40 – 12:00 | Towards a Dutch atlas of amphibians and reptiles <u>J. van Delft</u> & <u>R. Creemers</u> | 11:40 – 12:00 | Comparative mitochondrial variability in two microendemic and critically endangered Madagascan frogs, <i>Mantella expectata</i> and <i>Scaphiophryne gottliebei</i> inside and outside the Isalo National Park <u>A. Crottini</u> , <u>Y. Chiari</u> , <u>V. Mercurio</u> , <u>A. Meyer</u> , <u>M. Vences</u> & <u>F. Andreone</u> |
| 12:00 – 12:20 | The new European Atlas Project <u>N. Sillero</u> , <u>S. Bogaerts</u> , <u>P.-A. Crochet</u> , <u>R. Sindaco</u> , <u>B. Toxopeus</u> & <u>D. Vieites</u> | 12:00 – 12:20 | Patterns of nuclear and mitochondrial DNA variation in Iberian populations of <i>Enys orbicularis</i> (Emydidae): conservation implications <u>G. Velo-Antón</u> , <u>M. García-Paris</u> & <u>A. Cordero</u> |
| 12:20 – 14:00 | <i>Lunch break</i> | | |





Saturday, 22 September (afternoon)

| | ROOM 1 | | ROOM 2 |
|---------------|--|---------------|--|
| 14:00 – 16:00 | Session 5b: Distribution Chairpersons: D. Vieites, N. Sillero | 14:00 – 16:00 | Workshop: Conservation Chairpersons: A. Stumpel, Y. Chiari |
| 14:00 – 14:20 | The role of the Azov – Black Sea littoral-steppe ecological corridor for the conservation of reptiles T. Kotenko | 14:00 – 14:20 | Attempting to define natterjack toad (<i>Bufo calamita</i>) populations by the use of molecular markers T. Beebe |
| 14:20 – 14:40 | Distribution of <i>Vipera berus nikolskii</i> Vedmederja, Grubant et Rudaeva, 1986 in western and central Ukraine, Moldova and eastern Romania O. I. Zinenko & V. F. Tsurkanu | 14:20 – 14:40 | Conservation genetics in a crested newt (<i>Triturus cristatus</i> , <i>Triturus carnifex</i>) hybrid zone A. Maletzky, P. Mikulicek & R. Kaiser |
| 14:40 – 15:00 | The ‘arid corridor’ distribution in Africa: a search for instances among reptiles P. Wagner | 14:40 – 15:00 | The American bullfrog <i>Rana catesbeiana</i> in Europe F. Ficetola & C. Miaud |
| 15:00 – 15:20 | Distribution of <i>Testudo</i> in Sardinia (Italy). Is one species more “important” than another one? C. Corti, L. Bassu, C. Fresi, V. Nulchis, M. G. Satta & G. Spano | 15:00 – 15:20 | The amphibian pathogen <i>Batrachochytrium dendrobatidis</i> in Europe: distribution, risk assessment and conservation actions T.W.J. Garner, J. Bielby, S. Walker, J. Bosch, A. A. Cunningham, S. Bovero, R. Gibson & M. C. Fisher |
| 15:20 – 15:40 | Systematics and distribution of the Iranian Plateau species of <i>Tropicolotes</i> Peters (Sauria: Gekkonidae) N. Rastegar-Pouyani, G. Nilson & H. Urei | 15:20 – 16:00 | Discussion |
| 15:40 – 16:00 | How to live at Tibetan altitudes as a snake - <i>Thermophilis baileyi</i> : new records, distribution and biogeographic conclusions S. Hofmann, T. Dorge & G. Miede | | |
| 16:00 – 16:20 | <i>Coffee break</i> | | |
| 16:20 – 19:00 | SEH session | 16:20 – 19:00 | Poster session |
| 16:20 – 16:40 | Special talk: Foundation and early history of the “Societas Europaea Herpetologica”: A personal view after 30 years W. Böhme | | |
| 16:40 – 19:00 | 14th Ordinary General Meeting of the Societas Europaea Herpetologica | | |
| 18:00 | <i>Reception in Porto Wine cave</i> | | |
| 20:00 | <i>Farewell party</i> | | |

POSTER COMMUNICATIONS

Session 1: Morphology & Systematics

Geographical Herpnames

L. Bauer

Comparative head osteology and myology of *Elaphe* Fitzinger (Serpentes: Colubridae)

B. Borczyk

Cuban *Tropidophis* (Serpentes, Tropidophiidae): Descriptions, Distributions and Natural History

M. Domínguez

New giant species of the blind snakes (Scolecopidia, Typhlopidae, Typhlops) from Cuba

M. Domínguez & L. V. Moreno

Morphological variability of the Siberian newt *Salamandrella keyserlingii*

V. N. Kuranova & E. V. Fokina

Asymmetry in *Podarcis bocagei* and *P. carbonelli*: a preliminary study

A. Lima, A. Kaliontzopoulou & M. A. Carretero

Body form and habitat use of neotropical pitvipers of the *Bothrops atrox* species complex

M. E. Oliveira & M. Martins

Mucous specialised glands in the nuptial pads of the Eastern fire-bellied toad, *Bombina orientalis*

S. Quagliata, G. Delfino & R. Brizzi

Geographic variability and taxonomy of the *Montivipera raddei* species group (Reptilia, Viperidae) in Iran – a morphological approach

M. Rajabizadeh, N. Stümpel & B. H. Kiabi

Morphological variability of *Podarcis muralis* (Sauria: Lacertidae) in Bulgaria

N. D. Tzankov

Morphological variation of 6 populations of *Podarcis cretensis* in western Crete

C. Veríssimo, V. Spaneli, S. Koutsoupakis, A. Kaliontzopoulou & P. Lymberakis

Melanism, abundism and pseudomelanism in populations of the European Whip snake, *Hierophis viridiflavus*: a preliminary analysis of proximal causes.

M. A. L. Zuffi

Session 2: Behaviour

An experimental test of sexual selection on colour and morphology in green lizards (*Lacerta viridis*)

K. Bajer & O. R. Molnár





Reproductive strategy of satellite males of European tree frog (*Hyla arborea*)

A. Bajgar & M. Berec

A test of the risk allocation hypothesis in tadpoles: responses to temporal change in predation risk and group size

M. Berec, T. Bodnár & P. Kutílková

Antipredator behaviour in *Alytes cisternasii* tadpoles: a comparison between responses to natural predators (*Leuciscus pyrenaicus* and *Natrix maura*) and to an exotic predator (*Procambarus clarkii*)

V. Gonçalves, S. Amaral & R. Rebelo

Mating call structure of *Rana* in north eastern Libya, as compared with *Rana ridibunda* in Thrace region of Turkey

T. B. Jdeidi

Terrestrial migration of Alpine newt (*Mesotriton alpestris*) during breeding phase

O. Kopecký & J. Vojar

Female Preferences for male call parameters in the strawberry poison frog, *Dendrobates pumilio*

I. Meuche, K. E. Linsenmair & H. Pröhl

Individual quality, parasites, home-range: harem size in green lizards (*Lacerta viridis*)

O. R. Molnár & K. Bajer

A carnivorous tadpole from Madagascar: *Gephyromantis corvus*

E. Reeve, H. T. Rasolonjatovo, S. Ndriantsoa, A. Strauss, J. Glos & M. Vences

Factors affecting territorial response in Common wall lizards

R. Sacchi, F. Pupin, A. Gentilli, D. Rubolini, S. Scali, P. Galeotti & M. Fasola

Phonotactic approach in *Allobates femoralis* (Dendrobatidae) – spatial and temporal analysis of movement

E. Ursprung

Responses to conspecific calls in *Dendropsophus cruzi* (Anura:Hylidae) from Central Brazil

T. R. A. Vilaça, J. R. S. Silva & R. P. Bastos [questions to M. Solé]

Size-assortative mating in explosive breeder anurans

J. Vojar, V. Puš, O. Kopecký & M. Šálek

Session 3: Ecology & Physiology

Emys orbicularis movement along a temporal stream in a Zamora population (Spain)

G. Alarcos, J. Madrigal, M. E. Ortiz-Santaliestra, M. J. Fernández-Beneitez & M. Lizana

Presence of Iberian Terrapins depending on land characters in two regions of Spain (Zamora & Salamanca)

G. Alarcos, J. Madrigal, M. J. Fernández-Beneitez, M. E. Ortiz-Santaliestra, M. Lizana, P. García & M. F. Flechoso

Body temperatures and terrestrial movements of natterjack toad during spring and winter in a semiarid zone

J. Alas, N. Oromí, M. Pavillard, D. Sanuy & U. Sinsch

Variation in the body mass condition of the populations of *Testudo graeca* in southeast Spain

J.D. Anadón, V. Abad, A. Tenza, R. Ballestar & A. Giménez

The ratio of blood parasites between hybrids and their parental species of rock lizards of genus *Darevskia*

M. Arakelyan

New approach of herpetological investigations with biophysical methods

N. M. Ayyvazian & N.A Zakharyan

Occurrence of *Hepatozoon* sp (Apicomplexa, Hepatozoidae) in different species of Brazilian snakes recently caught and donated to the Butantan Institute, São Paulo, Brazil.

G. Bauer, L.C. Rameh-De-Albuquerque, W. Fernandes, J. L. Catão-Dias, K. F. Grego

Diet of the painted frog (*Discoglossus pictus*) in the oases of Kettana (Gabes, Tunisia)

J. Benhassine & S. Nourira

Species composition and similarities among anuran assemblages of four forest sites in south-eastern Brazil

J. Bertoluci, R. A. Brassaloti, J. W. R. Júnior, V. M. F. N. Vilela & H. O. Sawakuchi

Do environmental variables related to hydroperiod of ponds influence in the tadpole community structure?

C. Both, M. Solé, T. Gomes dos Santos, S. Z. Cechin

The conservation aspects of seasonal and daily activity of Hungarian Meadow Viper (*Vipera ursinii rakosiensis*) in Hungary

D. Brankovits & I. Sándor

Retreat site selection and thermoregulation through one year in sharp-snouted rock lizard (*Dalmatolacerta oxycephala*)

D. Lisičić & S. Kapelj

Calpains-like expression during *Xenopus laevis* development

E. N. Moudilou, N. Mouterfi, Y. Benyamin, J.-M. Exbrayat & C. Brun

Glutamate induced calpains-like expression in *Xenopus laevis* development

N. Mouterfi, E. N. Moudilou, J.-M. Exbrayat & C. Brun





Hematological profile for selected species of *Bothrops* and *Crotalus* (Ophidia, Viperidae), kept in captivity at the Butantan Institute, São Paulo, Brazil

L. C. Rameh-De-Albuquerque, C. K. M. Kolesnikovas, A. P. Zanotti, K. F. Grego, S. S. Sant'anna & J. L. Catão-Dias

Serum biochemical profile for selected species of *Bothrops* and *Crotalus* (Ophidia: Viperidae), kept in captivity at the Butantan Institute, São Paulo, Brazil

L.C.Rameh-De-Albuquerque, C. K. M. Kolesnikovas, A. P. Zanotti, K. F. Grego, S. S. Sant'anna & J. L. Catão-Dias

The role of historical and ecological factors in the structure of a tadpole community (Amphibia, Anura)

D. de C. Rossa-Feres, V. H.M. do Prado, F. Nomura & F. Langeani

Colonisation and abundance of amphibians in recently created temporary ponds in a Mediterranean region

O. San Sebastián, M. Portella, X. Bravo, Á. Richter-Boix, M. Franch, G. A. Llorente & A. Montori

Variation of ecological parameters of 6 populations of *Podarcis cretensis* in western Crete

V. Spaneli, C. V. Veríssimo, S. Koutsoupakis, P. Pafilis, C. Simou, E. Valakos & P. Lymberakis

Parasitism, island size and populations density, as interfering factors in tail regeneration in Aegean wall lizard (*Podarcis erhardii*)

G. Tsasi, C. Simou, P. Pafilis, J. Foufopoulos, D. Bitchava & E. Valakos

Intraspecific variation of preferred body temperatures in the lizard *Podarcis vaucheri* from Morocco

C. Veríssimo & M. A. Carretero

Newts as transporters of freshwater mussels

L. R. Wood, R. A. Griffiths, K. Groh, L. Schley & E. Engel

Session 4: Life History

Growth rate of juvenile males and females of the grass frog *Rana temporaria*

R. Augustyńska & M. Ogielska

New finding in the natural history of *Rhinoderma darwinii*

J. E. Bourke., P. Ulmer., M. Solé, H. Werning, K. Busse & W. Böhme

Age structure and some growth parameters of the green toad *Bufo viridis* (Laurenti, 1768), from an island and a mainland population in Giresun, Turkey

E. Çakır, B. Kutrup, U. Bulbul, H. O. Karaoglu & Z. Çolak-Yilmaz

Bergmann and converse Bergmann clines in amphibians: what can we learn from the common toad *Bufo bufo*?

D. Cvetković, N. Tomašević, J. Crnobrnja-Isailović, F. Ficetola & C. Miaud

What are cold winters good for – the effect of climatic conditions on post-hibernation body condition and reproductive traits of female common toads

D. Cvetković¹, N. Tomašević, I. Aleksić & J. Crnobrnja-Isailović

Metamorphosis rate of paedomorphs in a natural newt population

M. Denoël, J.P. Lena & P. Joly

Comparative analysis of survival in early ontogenesis of two populations of common toad (*Bufo bufo*) in Moscow region

E.V Dmitrieva & A.Y. Dmitriev

Seasonal reproduction in males of the Cuban lizard *Anolis lucius* (Polychrotidae)

M. Domínguez, A. Sanz, N. Almaguer & J. Chávez

Distribution of amphibian larvae within various breeding types in northern Israel

T. Goldberg, E. Nevo & G. Degani

Reproductive cycles in *Bufo mauritanicus* (Schlegel, 1841) of wet area of Beni-Belaïd (Jijel, Algeria)

O. Kisserli & J.-M. Exbrayat

Geographical and local variation in age distribution and growth rate in brown frogs: the results of long-term skeletochronological study

S. M. Lyapkov

The biology and life history of *Triturus v. vittatus* (Urodela) at various habitats and breeding sites

O. Pearlson & G. Degani

Gonadal cycle in males and females of *Triturus vittatus vittatus* (Urodela) from the southern limit of its distribution

O. Pearlson, K. Jackson & G. Degani

Reproductive cycle of female in *Boulengerula taitanus* (Loveridge, 1935), an oviparous Gymnophionan amphibian

M. Raquet, J. Measey & J.-M. Exbrayat

Age of males and females in amplexing pairs, and number and size of eggs in the grass frog *Rana temporaria*

K. Skierska, K. Pierzchot, M. Socha & M. Ogielska

Study of the European pond turtle (*Emys orbicularis*) at “Draga pri Igu” ponds and implications to the wider Ljubljansko barje wetlands

M. Vamberger





Session 5: Distribution

Geographic patterns in the distribution of amphibian and reptile species richness in the Iberian Peninsula and Morocco

S. Carvalho, J. C. Brito & E. G. Crespo

Environmental factors, distribution and abundances of terrestrial reptiles in Latvia

A. Čeirāns

Historical distribution of fringed-toed lizards *Acanthodactylus boskianus* in northern Africa since the last Glacial Maximum

G. Ferrão da Costa & J. C. Brito

Updating data on distribution of herpetofauna with the use of volunteers

J. Herder

Ecological affinities and potential distribution of *Podarcis* lizards in North Africa: effects of modelling techniques and data precision.

A. Kaliontzopoulou, J. C. Brito, S. Larbes & M. A. Carretero

Amphibians in the city of Wrocław, Poland

P. Kierzkowski & M. Ogielska

Distribution and status of *Rana latastei* populations in Croatia

M. Kuljerić

Amphibians and reptiles of Buçaco National Forest, Centre of Portugal

M. Matos, C. Fonseca & A. M. V. M. Soares

Distribution of the fire salamander *Salamandra s. salamandra* (Linnaeus 1758) in lower Silesia (Poland) in the past and present time

A. Ogrodowczyk, M. Ogielska, P. Kierzkowski & R. Maślak

On the occurrence of the Zagros lacertid, *Lacerta zagrosica* Rastegar-Pouyani & Nilson, 1998 (Sauria: Lacertidae) in Central Zagros Mountains, Iran

N. Rastegar-Pouyani

Amphibians of a Venezuelan Table Mountain

A. Schlüter

Amphibians of southern Bahia, Brazil: A hotspot for Anuran diversity

M. Solé, I. R. Dias, E. A. S. Rodrigues, E. M. S. S. Junior, S. M. J. Branco & K. P. Cavalcante

Predicting potential geographic distribution of Hermann's tortoise in the Natural Park of the Alpera (Eastern Pyrenees, Catalonia) via ecological niche models

A. Vilardell, N. Roura-Pascual, X. Capalleras, J. Budó & P. Pons

Workshop: Phylogeography

Microsatellite instability in parthenogenetic rock lizard *Darevskia unisexualis*

T. N. Badaeva, V. I. Korchagin, O. N. Tokarskaya & A. P. Ryskov

Molecular and morphological differentiation of rapid racerunner *Eremias velox* (Lacertidae) with comments on taxonomy and biogeography of Middle-Asian racerunners

S. I. Dolotovskaya, M. Chirikova, E. N. Solovyeva, N. A. Poyarkov, L. Wan & V. F. Orlova

Molecular perspective on the evolution and barcoding of toad-headed agamas (genus *Phrynocephalus*, Agamidae) in Middle Asia

E. A. Dunayev, N. Ivanova, N. A. Poyarkov, A. Borisenko, T. Duiseibayeva & P. D. N. Hebert

Evolutionary history of a threatened species: the meadow viper (*Vipera ursinii ursinii*) in France

A.-L. Ferchaud, S. Ursenbacher, M. Cheylan, C. Montgelard & A. Lyet

Systematic and phylogeographical assessment of the *Acanthodactylus erythrurus* group (Reptilia: Lacertidae) based on mitochondrial and nuclear DNA

M. M. Fonseca, J. C. Brito, O. Paulo, M. A. Carretero & D. J. Harris

Diversity of frogs in the eastern Guianas

A. Fouquet, A. Gilles & N. Gemmell

Cytonuclear associations in *Bombina* hybrid zones from the Danube Basin

G. Gollmann, S. Hofmann, M. Pabijan & J. M. Szymura

Genetic structure of the isolated populations of *Bufo calamita* in northeast of Iberian Peninsula

A. Iraola, X. Rubio, B. J. Gómez & M. García-París

Exploring phylogenetic relationships within the family Lacertidae

P. Kapli, N. Poulakakis, P. Lymberakis & M. Mylonas

Molecular phylogeny of the Ocellated skink, *Chalcides ocellatus* (Sauria: Scincidae) in the Mediterranean

P. Komilios, P. Lymberakis, N. Poulakakis & M. Mylonas

The Inter-SINE-PCR (IS-PCR) method for the study of molecular systematics of Caucasian lacertid lizard (Sauria: Lacertidae)

S. A. Kosushkin, A. A. Bannikova, V. V. Grechko, I. S. Darevsky & D. A. Kramerov

A molecular phylogenetic approach of Cretan snakes

P. Kyriazi, P. Lymberakis, N. Poulakakis & M. Mylonas

Phylogeography of an isolated population of the Aesculapian snake (*Zamenis longissimus*)

R. Musilová, V. Zavadil & P. Kotlík





Preliminary molecular phylogeography of wide-spread steppe-runner lizard – *Eremias arguta* (Lacertidae) and considerations on its subspecific structure

V. F. Orlova, N. A. Poyarkov, M. Chirikova & S. I. Dolotovskaya

Incipient speciation in Iberian and north African wall lizards (*Podarcis*): a multilocus approach

C. Pinho, D. J. Harris & N. Ferrand

Testing phylogeographic hypotheses in Iberian and north African *Podarcis*: the influence of latitude in shaping historical demography and substructure

C. Pinho, D. J. Harris & N. Ferrand

Sauria SINEs as phylogenetic markers in lizards and snakes and an interesting horizontal transfer event of a SINE to a poxvirus genome

O. Piskurek & N. Okada

Amphibian COI-barcoding and its application to taxonomy of European newts (genera *Mesotriton*, *Ommatotriton*, *Lissotriton*, *Triturus*) (Salamandridae)

N. A. Poyarkov, A. M. Smith & P. D. N. Hebert

Bioacoustic and genetic variation in the strawberry poison frog, *Dendrobates pumilio*

H. Pröhl & S. Hagemann

Phylogeography and genetic diversity within *Psammophis schokari* (Serpentes) in north Africa based on mitochondrial DNA sequences

C. Rato, J. C. Brito, M. A. Carretero, S. Larbes, B. Shacham & D. J. Harris

Phylogeography of Bedriaga's rock lizard, *Archaeolacerta bedriagae* (Lacertidae) based on mitochondrial DNA sequences data

D. Salvi, D. J. Harris, P. Bombi, M. A. Carretero & M. A. Bologna

Tetraploid hybrid of rock lizards of genus *Darevskia*

I. Stepanyan, M. Arakelyan & F. Danielyan

Molecular diversity and population genetic structure of the Danube crested newt (*Triturus dobrogicus* Kiritzescu, 1903) in the Pannonian lowland

J. Vörös, J. W. Arntzen & Á. Major

The phylogeography of the crested newt *Triturus karelinii* from the eastern Mediterranean Basin

B. Wielstra, J. W. Arntzen & G. E. Themudo

Workshop: Ecotoxicology

Combined effects of ammonium chloride, sodium nitrite and sodium nitrate on larvae of the frog *Pelophylax perezi* (Seoane, 1885)

A. Egea-Serrano, M. Tejedo & M. Torralva

Impact of three nitrogenous compounds on larvae of the European waterfrog *Pelophylax perezi* (Seoane, 1885)

A. Egea-Serrano, M. Tejedo & M. Torralva

Influence of ammonium nitrate on anuran larval responses to predation pressures

M. E. Ortiz-Santaliestra, M. J. Fernández-Benítez, A. Marco & M. Lizana

Do agriculture practices affect negatively waterfrog populations?

A. Rosso, E. Marzona, L. Tontini & C. Giacoma

Workshop: Monitoring

Test of a new method for Hermann's tortoise population monitoring

A. Besnard, M. Cheylan, T. Couturier, A. Bertolero & A. Astruc

A valid individual marking technique for amphibians

G. Cadeddu, V. Marconi, V. Zanollo, S. Castellano, A. Rosso & C. Giacoma

Variation in reproductive phenology of amphibians: A 30 years perspective

C. Díaz-Paniagua, C. Gómez-Rodríguez & A. Portheault

How detection probabilities of *Lacerta agilis* change with the weather

H. Fearnley, M. Hudson, T. Woodfine & C. Gleed-Owen

10 years amphibian monitoring in the Netherlands: preliminary results

E. Goverse, G. Smit & T. van der Meij

Long-term study of demography of population of moor frog, *Rana arvalis* Nilss.

V.G. Ishchenko

17 years of monitoring the Majorcan midwife toad, *Alytes muletensis*. A growing tendency of the global population

S. Pinya., J. A. Oliver. & X. Manzano

National responsibilities and conservation priorities in species conservation

D. S. Schmeller, B. Bauch & K. Henle

Herpetofauna field notebook database for study and share phenological and chorological data

D. Villero, A. Montori & G. A. Llorente

Workshop: Sea Turtles

Computed tomography and magnetic resonance imaging anatomy of the salt gland of the loggerhead sea turtle (*Caretta caretta*)

A. Arencibia, M. R. Hidalgo, S. Contreras, A. De Miguel, J. M. Vázquez, J. A. Ramírez, A. Marrero & J. Orós

First olive ridley sea turtle (*Lepidochelys olivacea*, Eschscholtz, 1829) in the Canary Islands

P. Calabuig, M. Camacho, D. Estévez, A.L. Loza & J. Orós





Morphometric characterization of blood cells of loggerhead sea turtles (*Caretta caretta*)

A. B. Casal, J. Orós, G. Bautista, M. R. Hidalgo & A. Arencibia

Genetic characterization of a nesting population of *Caretta caretta* in southern Italy: identification of a new relevant management unit

L. Garofalo, A. Mico, A. Novelletto & T. Mingozi

Care and rehabilitation of the loggerhead sea turtle (*C. caretta*) in Italy

D. Gelli, A. Zaccaroni, G. Nardini, A. Zanella, V. Partata, P. Arena, M. Bielli & D. Scaravelli

Genetic structuring of loggerhead sea turtle (*Caretta caretta*) in Turkey

O. Guclu, C. Ulger, F. Kiremit & O. Turkozan

Extending the reproductive habitat of the loggerhead turtle into the Macaronesian waters: viability study

A. Liria & L. F. López-Jurado

The eastern Atlantic juveniles of loggerhead sea turtle: Where do they come from and how do they distribute?

C. Monzon-Arguello, C. Rico, C. Carreras, P. Calabuig, A. Marco & L. F. Lopez-Jurado

GIS - based modelling for site suitability identification of sea turtle nesting areas in south-western Atlantic

D. Moraes & P. C. Scott

Commercial fishing impact on *Caretta caretta* in south Sardinia (Italy), 1997-2006

G. Ollano, D. Fadda, G. Lenti, S. Piovano & C. Giacoma

Immunohistochemistry as a tool for the accurate diagnosis of systemic mycotic infections in sea turtles

J. Orós, E. Ríos, M. R. Hidalgo & H. E. Jensen

Sea turtle nesting populations of the Dominican Republic

J. Tomás, Y. M. León, P. Feliz, F. X. Gerales, A. C. Broderick, M. Fernández, B. J. Godley, J. A. Raga

Is vitellogenin conserved in sea turtles? Preliminary western blot analysis

A. Zaccaroni, M. Gamberoni, D. Scaravelli, J. Y. Georges, D. Gelli & S. C. Gardner

Workshop: Conservation

Cross species amplification and characterization of DNA microsatellite markers developed for *Podocnemis unifilis* in *Peltocephalus dumerilianus*

N. C. O. S. Almeida, C. Fantin, I. Farias, L. A. S. Monjeló

Habitat preference of *Podarcis sicula* in agricultural landscapes (Central Italy)

M. Biaggini, R. Berti & C. Corti

Conservation of *Bombina bombina* in the Baltic Sea Region

L. Briggs & H. Drews

Using a point density Kernel equation and GIS to identify the principal hotspots of amphibian mortality in a road of West Spain

V. J. Colino, S. Martin & M. Lizana

New Red Data List for herpetofauna in the Netherlands

R. Creemers & J. van Delft

Ecological thresholds and estimates of breaking points in newt populations: a useful tool to categorise habitat use and apply conservation measures

M. Denoël & G. F. Ficetola

Ranaviruses: potential agents of extinction in amphibian communities

A.L.J. Duffus, R. A. Nichols, A. A. Cunningham & T.W.J. Garner

Presence and population data of the pond-terrapins of the Bay of Txingudi (Northern Spain)

A. Egaña-Callejo & M. Franch

Microsatellite DNA markers for *Podocnemis unifilis*, the endangered yellow-spotted Amazon River turtle

C. Fantin, C. F. Carvalho, T. Hrbek, J. W. Sites jr., L. A. S. Monjeló, S. Astolfi-Filho, I. P. Farias

Mortality of *Bufo calamita* embryos as a consequence of a *Saprolegnia diclina* infection

M. J. Fernández-Benítez, M. E. Ortiz-Santaliestra, M. Lizana, J. Diéguez-Urbeondo

Repercussion of the land use on amphibians and reptiles distribution

E. García-Muñoz, F. Ceacero, A. Hidalgo-Fontiveros, G. Parra, F. Guerrero & L. Pedrajas

Artificial ponds for irrigation: the alternative habitats for amphibians in the south of Spain

E. García-Muñoz, G. Parra, F. Ortega & F. Guerrero

Road mortality of Milos viper (*Macrovipera schweizeri*) and the efficiency of underpasses

Y. Ioannidis, M. Dimaki, G. Nilson, C. Andrèn & K. Kostoulia

Genetic structure and microsatellite variation in a fragmented tree frog (*Hyla arborea*) population

A. Krug, U. Manzke & H. Pröhl

The Common Spadefoot – Frog of the Year 2007

A. Kwet

Quantification of road-mortality for amphibians and reptiles in a future protected area of northern Spain

F. Martínez-Freiría & J. C. Brito

The importance of non-matrix fragments for the reptile community of cork-oak landscapes

R. Martins, A. Leal, M. Santos-Reis & R. Rebelo





Necropsy findings in La Gomera giant lizards (*Gallotia bravoana*)

J. Orós, M. Andrada, A. Martínez-Silvestre, G. Cruz & J. A. Mateo

Preliminary study of the distribution of *Batrachochytrium dendrobatidis* in interest areas in the Basque Country (Spain)

L. Paz & J. Bosch

Analysis of factors affecting the success rate of habitat management actions and repatriation in an endangered frog of Northern Italy

D. Pellitteri-Rosa, A. Gentili, R. Sacchi, F. Pupin, E. Razzetti, S. Scali, F. Bernini & M. Fasola

Conservation of Italian Agile frog (*Rana latastei* Boulenger, 1879) in Slovenia in the frame of the 92/43EEC Habitats Directive

K. Poboljšaj, M. Cipot & A. Lešnik

Frog concerts: a new initiative for more effective amphibian conservation

M. Puky & I. V. Lukács

The data on status and official plan of conservation of *Bombina bombina* L. in Latvia

A. Pupina & M. Pupins

The data on status and prospective official plan of conservation of *Emys orbicularis* in Latvia

M. Pupins & A. Pupina

Xenopus laevis, a new exotic amphibian in Portugal

R. Rebelo, F. Gil, C. Santos, C. Faria, V. Almada, P. Amaral, M. Bernardes & D. Leitão

Species and ontogenetic differences in vulnerability of amphibians to predation by introduced fish rotan *Perccottus glenii*

A. N. Reshetnikov

Influence of fire in the reptile community of a Mediterranean protected area near Barcelona

X. Santos & A. Miño

Microsatellites from *Rana dalmatina*

V. Sarasola & T. J. C. Beebee

Spatial analysis of amphibian mortality on local roads

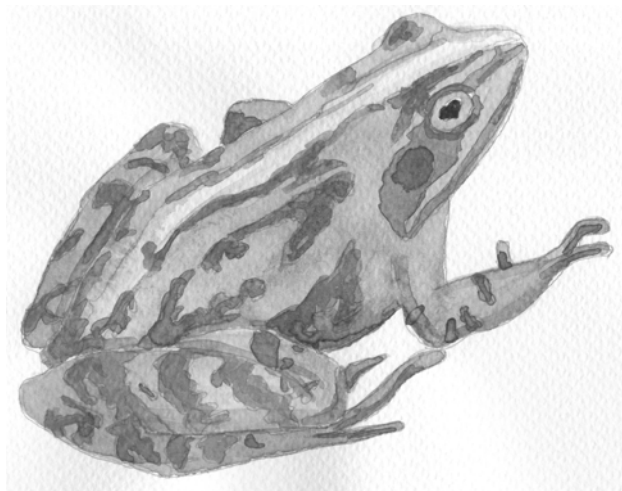
N. Sillero

Threatened species of Calabrian Herpetofauna: distribution and conservation

E. Sperone, A. Bonacci & S. Tripepi

Great divergence among haplotypes from the Cuba Island as a challenge for conservation strategies of rock iguanas of the genus *Cyclura*

Z. Starostová, I. Reháč & D. Frynta



3. Plenary Lectures & Special Talk



Transmarine colonisation by reptiles and its consequences

E.N. ARNOLD

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There is increasing evidence from DNA phylogenies and molecular clocks that reptiles have made many long journeys across the sea. Lizards and tortoises especially have reached distant oceanic islands, and sometimes crossed oceans and invaded continents. Much movement has occurred with prevailing warm currents but storm tracks have also been important, and islands have sometimes been colonised from more than one direction, resulting in unique combinations of inhabitants. Thus, the Mascarene islands in the Indian Ocean received invaders that travelled 700 km from Madagascar and others that came from Australasia nearly 5000 km away. Although continental islands are sometimes assumed to have had their communities since they separated from other land masses, later transmarine migration has also often contributed taxa.

Once on islands, invading species sometimes expand their niches, and their presence appears to prevent ecologically similar forms from colonising. In many cases, invaders persist for millions of years, suggesting they are not prone to taxon cycles. In spite of such long residence, speciation often does not take place. When it does so, allopatric separation seems more important than ecological processes in producing it. Speciation often appears necessary for the production of marked increases in morphological diversity on islands, such as dramatic change in body size and other niche-related features. In the frequent absence of predators, island reptiles often dismantle their defence mechanisms, a process sometimes driven by increased intraspecific competition, and one of the reasons why island species are so prone to extinction by people and the animals they introduce.

The recent evolutionary history of Iberian herpetofauna

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The Iberian Peninsula has been described as a major refugium during Pleistocene glaciations, but also as a place of speciation and endemism. For many years, little was known about the evolutionary history of amphibians and reptiles in this southern European peninsula. In the last few years, however, multiple genetic studies focusing on the Iberian herpetofauna came to light, revealing a previously unsuspected natural history for many species. In this presentation, I will show that different amphibian and reptile species exhibit the genetic imprint of strong subdivision phenomena that may have lasted a few millions of years and, in consequence, promoted incipient speciation. In addition, these studies are also documenting the occurrence of a remarkable number of hybrid zones which investigation is now in place for many cases. In the future, the continued use of different types of molecular markers together with the explicit consideration of various historical scenarios will certainly reveal the complex evolutionary processes that sculpted the genetic architecture of Iberian amphibians and reptiles.





Studying herpetology in the Aegean: The Archipelago confirms its reputation

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The area of the Aegean can be described as one of nature's most intensively active laboratories.

The forming of the contemporary geomorphology is a result of diverse, still ongoing, geological events, which coupled with global climate changes, have created, flooded, joined, separated, rejoined and re-separated landmasses, creating high mountains and thousands of islands.

In this area where three continents meet, there has been intense human activity for at least 10.000 years, whereas in adjacent areas, humans were present much earlier.

The contemporary Aegean biodiversity is the complex result of the direct and indirect effects of the aforementioned processes on the species evolution.

The herpetofauna offered the possibility of describing patterns in the Aegean, especially as the distributional limit for several species and faunal elements. The patterns initially described at a rather coarse scale was the frame on which, the application of new techniques opened new views and permitted for finer analyses.

The effort of this work will be to present cases of herpetofaunal research in the Aegean which have revealed, among others, cases of hidden diversity, paraphyly, new species and new endemics. The findings have altered or confirmed biogeographic scenarios and taxonomic views. Many questions have been answered and certainly new ones have emerged, contributing not only to our knowledge on the Aegean, but to wider issues of Ecology and Evolution.

Amphibians of Vietnam: taxonomic and ecological diversity

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On the base of revised list of species the taxonomic and ecological diversity of amphibians of Vietnam are analyzed. During the last decades more than 100 species were described and recorded in the fauna of Vietnam. The modern data on the distribution and ecological patterns of more than 200 species of amphibians of Vietnam are provided. The cryptic diversity makes a serious contribution into amphibian's biodiversity.

The classification of ecological types of amphibians of Vietnam was elaborated for the main spatial and temporal parameters; the data on 15 species of amphibians with direct development are analyzed.

On the base of data received after 20 years of field work in Vietnam the distribution ranges are more accurately determined; the ideas about the northern and southern borders of distribution are strongly modified. Results of comparison of the species number and composition in Vietnam and other regions of Southeast Asia are discussed. The interpretation of the borders of Chinese-Burmanese zoogeographic unit is give on the base of data received.

This study was supported by grant RFFI-VAST 07-04-90004.





SPECIAL TALK

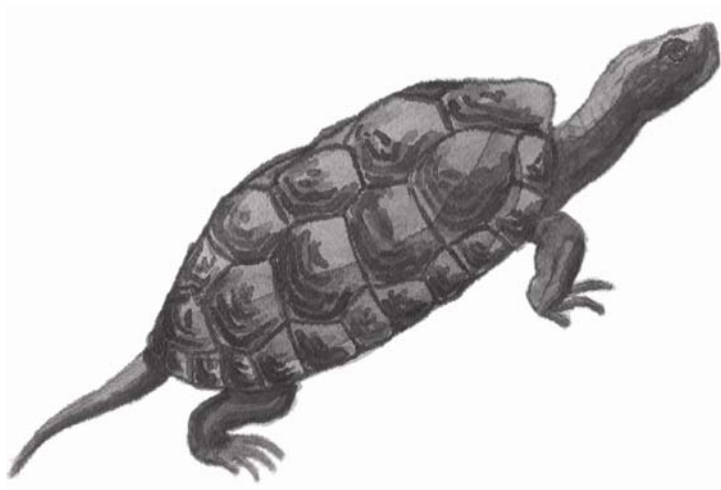
Foundation and early history of the “Societas Europaea Herpetologica”: a personal view after 30 years

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The "Societas Europaea Herpetologica" (SEH), founded in September 1979 in Bonn, owes its origin to a first French-German initiative which was started in 1978 by two herpetologists with similar ideas how to organise a future herpetological community in Europe. The main common objective intended with the foundation of a European society was the creation of a truly international, scientific herpetological journal which was lacking in Europe at that time whereas the United States had three such journals. This bilateral, first meeting, held at the National Museum of Natural History in Paris, was followed by a second discussion meeting in Montpellier in spring 1979 which included, next to the delegates from France and Germany, also attendants from Austria, Italy, the Netherlands and Spain. It ended without clear decisions but was nonetheless followed by an invitation to a foundation meeting at the Museum Alexander Koenig in Bonn in autumn 1979.

This meeting was attended by herpetologists from Austria, France, Germany, The Netherlands, and Turkey. The society was formally founded, received its Latin (since supranational) name and the late Wirkl. Hofrat Dr. Josef Eiselt of the Vienna Natural History Museum was elected as the first president. The main objective of the new society, viz. the creation of a new European scientific herpetological journal, was decided and a compromise was found to name it "Amphibia-Reptilia". This journal started in 1980 and developed from being first quadrilingual into a purely anglophone and meanwhile internationally recognized and reputed journal. Ordinary general meetings were held biannually in varying countries: Austria, Czech Republic (twice; once integrated into the 3rd WCH), Germany (twice), Greece (twice), Hungary, Russia, Spain (twice), The Netherlands, and now Portugal. Most of these congresses resulted in the publication of proceedings volumes which were published as single books but not yet as a recognizable series.



4. Oral Presentations

Climate change and evolution of loggerhead sex-ratio in Cabo Verde

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Global warming can affect nesting success of sea turtles due to the rise of the sea level and the subsequent increased inundation or erosion of nesting beaches. Moreover, it can reduce male production to levels that can alter reproduction due to their temperature dependant sex determination (TSD). Now, mean nest temperatures all around the world predict a predominance of female hatchlings, and this trend may increase with global warming in the next decades. Many actual nesting beaches would not be adequate for seaturtle incubation in a warming future. During 2005 and 2006, we recorded the sand and incubation temperatures in 48 nests loggerhead (*Caretta caretta*) nests in the only important loggerhead rookery in the eastern Atlantic in Boavista Island (Republic of Cabo Verde). A prediction of how the primary sex ratios could change in the further 50 and 100 years is presented. The mean temperature of the middle third of incubation (TSD period) ranged from 28.4°C to 30.9°C. No correlation was found between nest temperature on the first third of incubation temperature (when metabolic heating is absent) and nest mortality ($p=0.87$). Sex ratio was female dominated (Mean: 71.9%, range: 45.8 - 89.2 %) and varied seasonally ($p<0.05$). We found warmer temperatures late on the nesting season (October-November, $p<0.01$). The most moderate climate change models (ICPP 2001) predict increases of temperature around 1°C and 2°C degrees respectively for 2050 and 2100. Hatchling sex ratio in Boavista could severely skew toward females both in 2050 (Mean: 79.8 %) and 2100 (Mean: 87.7 %). Natural nesting dispersal to colder beaches is highly improbable in the Archipelago.



Morphological differentiation of mainland populations of the Kotschy's gecko (*Cyrtopodion kotschy*) from the Balkans and Asia Minor

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Kotschy's gecko (*Cyrtopodion kotschy*) is distributed in southern Italy, southern Crimea, at the Balkan Peninsula and Asia Minor. Until now, more than 25 subspecies have been described. We analysed about 300 specimens of mainland populations of nine subspecies (*Cyrtopodion kotschy kotschy*, *C. k. bibroni*, *C. k. rumelicus*, *C. k. skopjensis*, *C. k. danilewskii*, *C. k. lycaonicus*, *C. k. steindachneri*, *C. k. orientalis* and *C. k. syriacus*). Morphological analyses included 23 morphometric, 7 meristic and 5 qualitative characters. Various multivariate statistical techniques (Discriminant analyses and Correspondence analyses) were used in order to define and/or discriminate populations at multivariate level. Results of discriminant analyses of morphometric traits showed very complex differentiation of the described subspecies and lack of clear geographical pattern. On the contrary, results of correspondence analyses of meristic and qualitative traits showed that different combination of characters and states defined sample from the Balkan Peninsula and those from Asia Minor. We compare our results based on morphological analyses, with the published phylogeographic results. Also, validity of some described subspecies is discussed.



MORPHOLOGY & SYSTEMATICS

Comparative analysis of taxonomic and morphological diversity of Agamids (Agamidae, Acrodonta, Sauria, Reptilia) of China, southeast Asia and north Eurasia

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Taxonomic and morphological diversity of agamid lizards (Agamidae, Acrodonta, Sauria, Reptilia) inhabiting China, Southeast Asia and North Eurasia is analysed. The total number of subfamilies, genera and species and the number of endemic species are compared. In particular, in China there are 4 subfamilies, 12 genera and 55 species (Ermi et al., 1999); in North Eurasia – 1 subfamily, 3 genera, 21 species (Ananjeva et al., 2004, 2006) and Vietnam – 3 subfamilies, 9 genera, 22 species (Ananjeva et al., 2006). In comparison with Indochina and North Eurasia, the fauna of agamid lizards of China is the most rich and diverse. Its origin is complicated, presenting four different evolutionary lines - Amphibolurinae, Leiolepidinae, Draconinae and Agaminae. The composition of Palaearctic and Oriental elements in the agamid fauna of China and the role of cryptic taxonomic diversity are discussed.

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A cost to adaptive plasticity: Prey size and head shape in young Tigersnakes, *Notechis scutatus*

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Many organisms can flexibly adjust their phenotypes to match local environmental conditions via shifts in developmental trajectories, rather than relying on changes in gene frequencies wrought by natural selection. Adaptive developmental plasticity confers obvious benefits in terms of rapid response and higher mean fitness, so why isn't it more common? Plausibly, adaptive plasticity also confers a cost: reshaping the phenotype takes time and energy, so that canalised (genetic) control of trait values enhances fitness if the optimal phenotype remains the same from one generation to the next. Although this idea is central to interpreting the fitness consequences of adaptive plasticity, empirical data on costs of plasticity are scarce. In Australian tigersnakes, larger relative head size enhances maximal ingestible prey size, and hence snake fitness, on islands containing large prey. The trait arises via adaptive plasticity in snake populations on newly-colonised islands, but becomes genetically canalised on islands where snakes have been present for much longer periods. We experimentally manipulated relative head size in captive neonatal snakes to quantify the costs of adaptive plasticity. Although small-headed snakes were able to increase their head sizes when offered large prey, the delay in doing so, and their inability to consume large prey at the outset, significantly reduced their growth rates relative to conspecifics with larger heads at the beginning of the experiment.



MONITORING

Using model-based monitoring in a national amphibian monitoring program

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Many monitoring programs could be more informative with small adjustments. The purpose of many monitoring programs is to track species for several years until the population decreases or increases to a certain level. At that point, management may occur. The problem is that when it is time for managers to act, there is little information. This is because the goal of monitoring was not to learn about the species' ecology, only to know its status.

An alternative approach is to monitor so that learning about the ecology of the species occurs. This is called model-based monitoring. With this approach, multiple models are proposed about factors that may affect the species' status. As data are collected about species status, learning also occurs when it is determined if the data support or do not support certain models.

A second limitation of many monitoring programs is that not all individuals are detected perfectly during surveys. Because of this, it is not known if species density actually varied across habitats, treatments, or time, or only appeared to be to do so because the detection of individuals varied. There are ways to estimate detection probability and produce unbiased estimates of density or distribution.

In the United States, the Amphibian Research and Monitoring Initiative (ARMI) has used model-based monitoring to study amphibians across public lands for 6 years. We have tested models to learn about ecology, management, and disease on the distribution, colonization and extinction of amphibians while estimating status.



Reproductive isolation in Iberian *Podarcis* species complex: An overview

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Prezygotic reproductive isolation in closely related sympatric species remains a central issue in evolutionary biology. An ability to distinguish conspecifics from heterospecifics is important for reducing energy costs of finding potential mates or facing sexual rivals. In some species complexes, features other than morphology may be critical for specific recognition. Here, we describe the results of a series of studies performed with Iberian lizards of the phylogenetically complex genus *Podarcis*, both in the laboratory and in the field. The aim of these experiments was to gather evidence on the possible role of behaviour in preventing interspecific mating in a group with limited morphological variation and high genetic variability. Two case studies are presented: a) specific discrimination based on chemical cues between two syntopic species with a narrow contact zone (*P. bocagei* and *P. carbonelli*), and b) specific discrimination between two syntopic sister species with a wide contact zone (*P. bocagei* and *P. hispanica* “type 1”). The latter are the only Iberian members of this genus whose geographical distributions mutually overlap in 50% of their range, suggesting a long period of co-evolution, and making them ideal models for studies of specific recognition.



LIFE HISTORY

A preliminary study of the embryonic development of kidneys in *Typhlonectes compressicauda* (Amphibia, Gymnophiona)

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Embryonic development of organs is still poorly known in Gymnophiona. More especially, the development of kidneys has not been the subject of deep studies. In *Typhlonectes compressicauda*, normal development can be divided into 34 stages, and it is characterized by metamorphosis occurring between stages 30 and 33.

At stages 18-19, Wolffian ducts begin to be observed in the anterior part of the embryo. At stage 23, each pronephros is elaborated with several nephrostoma that empty in the coelomic cavity. At stage 29, just before the metamorphosis, a pair of mesonephros begins to develop with tubules and glomerula. At stage 30, the pronephros that was observed at the level of 2nd and 5th vertebrae is now observed at the level of 24th and 28th vertebrae. At this stage, several mesonephritic tubules are observed between 29th and 32nd vertebrae, and a mesonephritic tissue is observed on the posterior part of body. At stage 31, each pronephros begins to disappear, scratched by other tissues. The mesonephros situated behind the pronephros are now equipped with proximal and distal tubules. At stages 32-33, two mesonephros are observed as a pair of lengthened layers, representing the definitive kidneys.



Phylogeny of the Geckos of the World

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We used a combination of nuclear and mitochondrial genes analyzed under a variety of optimality criteria to reconstruct relationships among representatives of more than 450 species representing 100 genera in all recognized higher order groups of geckos and pygopods. The clade Carphodactylidae + Pygopodidae + Diplodactylidae is the sister group to Eublepharidae + Gekkonidae. Within the Gekkonidae, two well-supported basal clades include the sphaerodactyl geckos, the endemic South American genera, and a diverse group of Palearctic genera. Remaining geckos include several robust clades, including a *Hemidactylus* + bent-toed gecko clade, an Afro-Malagasy clade and a Gekko group. Other lineages appear to have long independent histories and few close relatives. Several widespread groups currently assigned to single genera, including *Cnemaspis*, are polyphyletic and a number of small or monotypic genera can be shown to have evolved from within larger genera, thus rendering them paraphyletic. This is especially true within the large genus *Hemidactylus*. Most of the basal divergences within gekkotans are probably Cretaceous or older in age and a major radiation within the most generically-diverse group of geckos dates to approximately the K/T boundary. Morphological convergence is common among geckos. It is evident from our phylogeny that adhesive toe pads have been derived independently on several occasions and lost many times. Likewise, secondary diurnality has evolved at least eight times within geckos.



CONSERVATION

Attempting to define natterjack toad (*Bufo calamita*) populations by the use of molecular markers

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Defining the extent and limits of amphibian populations can be problematic, especially in areas of continuous habitat. I used data from eight polymorphic microsatellite loci, collected from every area in Britain where natterjacks occur (38 localities), and analysed them to try and define toad populations on genetic grounds. Three Bayesian approaches were employed, all available in free software packages: STRUCTURE, BAPS and GENELAND. The results from the three sets of analyses were then compared. Although there was a large degree of consensus, there were also some differences in the definitions of population boundaries among the three methods, especially in the most biogeographically complex region of south Cumbria. The value of this approach to population definition for future conservation management will be discussed.



Development of coloration pattern in several *Salamandra* species and subspecies

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The development of coloration pattern in several *Salamandra* species and subspecies was studied. Captive bred larvae of specimens from known localities were photographed every few months after metamorphosis in order to follow the possible changes in arrangement, size and amount of spots. Besides that also changes in the coloration were noted. Focus lied on the dorsal coloration, but also changes in ventral pattern were noted. The following species and subspecies were studied: *S. corsica*, *S. salamandra crespoides*, *S. s. morenica*, *S. s. longirostris*, *S. s. gallaica*, *S. s. gigliollii*, *S. algira algira*, *S. algira tingitana*, *S. inframaculata* ssp. They were followed for three to four years directly after metamorphosis. The results of this research will be presented. The relevance for field work (individual recognition) and the taxonomical values will be discussed.



CONSERVATION

The common spadefoot in the Netherlands: Its distribution and conservation

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In the Netherlands the common spadefoot reaches the eastern border of its distribution in Europe. The last 15 years the number of populations in the Netherlands has decreased. What might have been the reason for this decline? The common spadefoot inhabits different habitat types in the Netherlands, varying from floodplains of small rivers up to agricultural and urban areas. The presentation gives an overview of these habitat types and how to protect and improve these.



Comparison of mitochondrial DNA, morphological and skeletal muscle protein data between island and mainland populations of the green toad, *Bufo viridis*, in Giresun, Turkey

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We compared 47 (females and 11 males) adult specimens from the island population and 34 (6 females and 28 males) adult specimens from the mainland population by twenty one different morphological measurement characters. It was revealed that LHEAD, WHEAD, NOSTIP, DTYM, LPAR, RADUL and WEB in females and SVL, LHEAD, WHEAD, EYETYM, DEYE, DTYM, LPAR, WGRASP, RADUL, LTIB, LTARS and WEIGHT in males were significantly different when compared both populations with Mann -Whitney U test. The mean SVL of the island population was 77,2 mm for females and 77,5 mm for males while it was 67,1 mm for males and 72,2 mm for females in the mainland population Both populations were also compared regarding skeletal muscle protein bands by SDS-PAGE. Totally 23 bands were detected in specimens of both populations. Finally mitochondrial 16S rRNA and 12S rRNA sequences were compared between both populations. Totally 34 specimens for 16S rRNA and 30 specimens for 12S rRNA were examined for sequence variation in the part of 871 bp of 16S rRNA and 408 bp of 12S rRNA partial sequences by using maximum likelihood and maximum parsimony analyses in PAUP program. Totally 8 haplotypes for 16S rRNA and 7 haplotypes for the 12S rRNA were revealed. Pairwise comparisons of DNA sequences among haplotypes showed substitutions of 5 bases in the 16S rRNA and 2 bases in 12S rRNA. Although significant differences were found between island and mainland populations in morphological comparison there was no significant difference in SDS-PAGE and mitochondrial comparisons. It is suggested in the present study that the morphological difference in both populations could be indicator of an ecological variation instead of phylogenetic distinction between the populations.



Biogeography and evolution of European cave salamanders, *Hydromantes* (Urodela: Plethodontidae) inferred from mtDNA sequences

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The phylogenetic relationships of the plethodontid genus *Hydromantes* including representatives of all European taxa was inferred using 1306 bp of mitochondrial DNA (398 of cytb; 367 of 12S rRNA and 541 of 16S rRNA). The results indicate that the separation between the American and European clades occurred approximately 13.5 Ma, most probably before or after westward dispersal across the Bering Land Bridge. In Europe, divergence started in the later Miocene, when *Hydromantes (A.) genei* Temminck & Schlegel, 1838 separated from other members of the genus 9 Ma and colonized southwest Sardinia. Movement between the European mainland and Sardinia, by a member of the subgenus *Speleomantes*, occurred in the Messinian Salinity Crisis, after the Mediterranean basin desiccated almost completely 5.96 Ma. Subsequent widespread aridification fragmented the geographical ranges of *Hydromantes*, which live in cool and humid situations, resulting in the origin of the six species in the subgenus *Speleomantes*. In contrast, a second period of diversification, in continental Europe 2 – 1.3 Ma was probably caused by very cold interludes during the climatic oscillations that characterized the Pleistocene. The molecular clock used here indicates separation of Californian and European *Hydromantes* occurred more recently than previously believed, and the same is true of some subsequent phylogenetic divergences within Europe. Estimated dates for these fit known geophysical and climatic events that could have caused or facilitated them.



Using genetic tools to infer distribution of loggerhead sea turtles (*Caretta caretta*) in the western Mediterranean

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The analysis of mitochondrial DNA and 7 microsatellites in loggerhead sea turtles (*Caretta caretta*) from several foraging grounds in the Mediterranean and the adjoining Atlantic revealed deep genetic structuring within the western Mediterranean. As a consequence, the foraging grounds off the southern Mediterranean coasts and the Gimnesies Islands are shown to be inhabited mainly by turtles of the Atlantic stocks, whereas the foraging grounds off Italy and the northern shore of the western Mediterranean are shown to be inhabited mainly by turtles from the eastern Mediterranean rookeries. Finally, the contribution of the eastern Mediterranean rookeries to the foraging grounds off Lampedusa, Valencia and Pitiüses islands is higher than expected in agreement with their geographic locations. This structuring is explained by the pattern of sea surface currents and water masses and suggests that immature loggerhead sea turtles entering the western Mediterranean from the Atlantic and the eastern Mediterranean remain linked to particular water masses, with a limited exchange of turtles between water masses. As the north of the western Mediterranean comprises almost entirely individuals from the highly endangered eastern Mediterranean rookeries, conservation plans should make it a priority to reduce the mortality caused by incidental by-catch in these areas.



MONITORING

A seven-years' monitoring of an isolated population of the lizard *Acanthodactylus erythrurus* in NE Iberia

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“Els Muntanyans” is a coastal protected area near Torredembarra (NE Iberia) which includes a narrow stripe of natural dunes and marshes. This minute space (35 ha) harbours an isolate of the thermophilous lacertid *Acanthodactylus erythrurus*, outlying the north-westernmost border of its range. The extreme vulnerability of both the area and the species advised for the development of a monitoring plan for: 1) determining the natural fluctuations of the population, 2) detecting and/or anticipating tendencies recording the variables associated with them and 3) orienting and evaluating corrective measures.

Since 2000, teams of volunteers have been trained to perform normalised transects scanning the whole area. Species (*Psammodromus algirus* and *Podarcis (hispanica) liolepis* are also found), size class (adult/immature), habitat type and sampling sector were recorded. Transects were carried out before (April-June) and after (September-October) summer draught controlling for meteorological conditions.

The results of seven years of monitoring (2000-2006) indicate stability of the (adult) population and annual variation in recruitment. The distribution is, nevertheless, heterogeneous by habitats and sector. *A. erythrurus* mainly uses the fixed dunes and dune backs and is rarely observed on the artificial substrates where *P. hispanica** is the most frequent. Some buildings in the middle of the area, as well as the wooden walking passes lying on the sand, caused habitat disturbance and microfragmentation. Based on the monitoring results, the removal of some wooden passes proved to be a successful measure for increasing local connectivity. Future perspectives, including other management measures and general applications of this methodology, are discussed.



Amphibian community ecology and life history parameters in *Pelophylax perezi* in the Peneda-Gerês mountain system, Portugal

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Amphibians are threatened globally. Population declines and extinctions have already been documented for several species and regions around the world. Numerous declines have occurred in high altitude locations. Some authors suggest that high altitude amphibian populations can be more threatened of decline or extinction due to increasing ultra-violet radiation. Furthermore, it has also been suggested that amphibian populations in high altitude locations can be less resilient and more prone to decline or extinction due to their life history parameters. Although environmental temperature is considered the driver of the altitudinal variations in amphibian life histories, other factors such as habitat quality, food availability and biotic interactions can also be important. Because these factors have not been so far consistently analysed, it is important to evaluate them, by means of comparing populations at different altitudes. In this work we analyse the temporal dynamics and spatial structure of several features of amphibian community ecology and amphibian life history parameters in a mountain system, using *Pelophylax perezi* as referential model. The study area is the Peneda-Gerês mountain system, which is internationally recognized as a priority area for the conservation of Iberian amphibians.



CONSERVATION

The application of genetics in conservation: the case of the Malagasy frogs of the genus *Mantella*

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The use of genetics, in combination with ecological, morphological and behavioral data can contribute to better assess important factors for long-term conservation. Conservation genetics is a subfield of the wider field of conservation biology and aims to minimize the risk of decline or extinction due to genetic factors. Genetic analyses allow to recognize the genetic variability of species or populations detect hybridization, evaluate inbreeding effects, study the evolution of the organism through time and in correlation with environmental changes, study the effects of captivity on genetic variability and on reintroduction and increase the knowledge of the biology of the organism to better focus conservation actions. Moreover, genetics help also in resolving taxonomic uncertainties and identifying units for conservations (species, populations). Conservation genetics has as a goal not only to minimize the loss of genetic diversity, but also recognize adaptation to the new habitat conditions. In other words, conservation genetics should be the tool to recognize units for conservation and to evaluate threat status of species and populations to better direct management activities. We will use our genetic studies on the Malagasy frogs of the genus *Mantella* to discuss most of the above-mentioned points. The genus *Mantella* includes species, which are included in the IUCN Red List and in different CITES Appendices. We used genetic markers to resolve phylogenetics uncertainties within the genus, study the genetic variability of the different species, detect hybridization and to identify units for conservation. We will highlight the advantage and limits of those kind of studies in terms of species/population conservation.



Using digital images to reconstruct the 3D carapace shape of tortoises: a new tool for morphometric studies

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We examined two inexpensive and efficient image-based methodologies for reconstructing 3D shape. One method, based on photogrammetry, reconstructs a sparse set of points from a series of images taken with a single camera. The second method, from the field of computer vision, reconstructs a dense set of points from pairs of images taken with two physically linked cameras. Image-based methods require only inexpensive instruments and softwares. We tested these two methodologies on a museum specimen of an Aldabra tortoise. The accuracy of these methods was evaluated by comparing geodesic and Euclidean measurements made on the digital models with linear measurements obtained with caliper and tape ruler. We also compared the performance of different digital cameras. We found no substantial difference between the two methods in measuring the Euclidean distance between landmarks, but spatially denser model obtained using the two physically linked cameras was more accurate for geodesic distances. For both methods, the use of digital cameras from different manufacturers did not influence the results. We also successfully applied a combination of those techniques on a living specimen of Galápagos tortoise sampled in the field. The major limitation of image-based methods is the time consumed to process the images.



DISTRIBUTION

Amphibians in Triglav National Park and Landscape Park Goričko in Slovenia – 3 years of survey

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Inventory of amphibians in Triglav National Park (tnp) and Landscape Park Goričko (kpg) is part of the three-year project INTERREG IIIA Slovenia-Austria “Amphibian and Bat Conservation in Alps-Adriatic Region”. Information on existence of potential amphibian breeding sites was gathered from different sources (CKFF database, land use maps, KPG and TNP databases, habitat types mapping of KPG). A survey of more than 1500 localities - potential amphibian breeding sites at two areas was performed. Both areas are Natura 2000 sites for and of similar size (450 km² KPG and 480 km² N part of TNP) but differ in geographic feats (soil, altitude (200-300 m KPG and 650-1600 m TNP)) and climate. Breeding sites were survived frequently in different seasons and information of presence, relative abundance and phenology were gathered. The correlation between species composition and abiotic factors like proximity to communities, land use, proximity of particular habitat types and the type of pond was determined. Since amphibian-breeding sites are disappearing due to abandonment of traditional land use, the state/condition of the breeding sites is determined. A distribution of amphibian species is presented in 5 x 5 km squares.

In tree years of intensive survey (270 field work days) of INTERREG IIIA Slovenia-Austria project “Amphibian and Bat Conservation in Alps-Adriatic Region” a basic knowledge on distribution of species and breeding sites was established and a successful monitoring of amphibians in these two areas is possible in the future.



Diet of the Southern Crested Newt, *Triturus karelinii* (Strauch, 1870), from Giresun, Turkey

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The Southern Crested Newt, *Triturus karelinii*, is listed in a number of national and sub national Red Data Books and Lists. Current management plans for this species must include maintenance of appropriate habitat. Our objective was to evaluate the diet of *T. karelinii* (n=47) collected from Tamzara, Giresun, Turkey. The diet of *T. karelinii* was composed on 5 major prey taxa: Ephemeroptera (nymph), Pulmonata, Diptera (larvae), Heteroptera and Amphibia (larvae). Diptera (adult), Acarina, Homoptera (nymph), Coleoptera (larvae) and Isopoda were rarely seen in the stomachs. An amphibian egg mass was also found from one newt. Seven specimens had plant materials in their stomachs. Ephemeroptera had the largest proportions in frequency and number followed by Pulmonata which had also the largest fraction in volume. Larval dipterans were the third most important taxon in frequency but in number and volume. Like larger amphibians, cannibalism was also detected for *T. karelinii* though its small size. Even though this newt was found to feed on almost all aquatic invertebrates, terrestrial adult dipterans were also found in its diet. A significant correlation between Snout-Vent Length (SVL) and prey size was evaluated. According to diet analyses, there were no differences between female and male newts. Our results showed that *T. karelinii* feeds on very small invertebrates with the exception of larval amphibians.



DISTRIBUTION

Distribution of *Testudo* in Sardinia (Italy). Is one species more “important” than another one?

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Three *Testudo* species are present in Sardinia and some of its satellite islands: *T. graeca*, *T. hermanni* and *T. marginata*. All three inhabit mainly coastal areas covered by low maquis but also mountain zones characterised by Mediterranean vegetation, uncultivated or with very low agricultural pressure. Three different sectors of the island are steadily occupied each by one of the three species, even if observations of solitary individuals of the other ones are reported. Stable and noteworthy populations of *Testudo graeca* inhabit coastal and mountain central-western Sardinia, *T. hermanni* inhabits the north-western part of the island, while *T. marginata* lives in its north-eastern sector. On the rest of the island, individuals of all three species have been observed scattered and, up to now, no other consistent and stable wild populations have been recorded. The contemporaneous presence of all the different species is easily brought back to translocation by humans. Sporadic individuals have been also recorded in towns and villages (in a captivity or in semi-captivity status), and in a protected local site with a relatively high frequency of visitors. According to some authors *T. hermanni* has been considered the only autochthonous tortoise present on this island whereas *T. marginata* and *T. graeca* are considered introduced. The latter has been sometimes also considered of reduced worth if compared to the other species but without any scientific basis. Recent palaeontological studies indicate the presence of a Pliocene tortoise not having reference to *T. hermanni*, but showing more similarity to *T. graeca sensu stricto*. DNA analysis carried out using mitochondrial DNA sequencing has shown that the Sardinian population is similar to the other western Mediterranean populations. Does it perhaps mean that, as observed for *T. hermanni*, differences in evolution rates could be suggestive of a slower molecular clock in the western Mediterranean populations? We therefore think that all the Sardinian *Testudo* species deserve proper conservation measures considering the abundance of individuals and the evident spatial separation of the different species. Available scientific data are not sufficient to allow discrimination against one or another species seemingly being Sardinia, so far land use change will allow the presence of all the three species, a natural “reserve” of these endangered taxa.



Understanding geographical variation in morphology and life-history traits in the Moor Frog *Rana arvalis*: phenotypic plasticity and genetic effects

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Geographical variation in morphological or life-history traits is a common feature in natural populations of plants and animals. Understanding geographical variation requires first separating environmental effects (phenotypic plasticity) from genetic effects (genetic differentiation). If genetic differentiation is indeed present, the second step is determining whether random variation (genetic drift) alone could have explained this differentiation or whether the action of selection has to be postulated. We applied this approach to the geographical variation between Moor Frogs *Rana arvalis* from the island of Gotland and the Swedish mainland. We performed translocation experiments in natural conditions and breeding experiments in the lab to separate phenotypic plasticity and genetic differentiation effects, and we compared the amount of differentiation at quantitative traits and neutral markers to identify the action of selection. We found that most of the difference in morphology between metamorphs from both populations is due to phenotypic plasticity, but that genetic effects were involved in both size and shape differences. For size differences, amount of genetic differentiation was higher than for neutral markers, suggesting selection favoured different optimums on Gotland and mainland. For shape difference (relative tibia length), genetic differentiation was lower than for neutral markers, suggesting stabilising selection. We could not measure differences in life-history traits (size at metamorphosis and development duration) in natural conditions. In the lab, both traits differed between Gotland and mainland, and crossing experiments showed an effect of paternal alleles on phenotypes, hence strictly genetic effects. Interestingly, for development duration, “fast” (mainland) alleles were dominant.



CONSERVATION

Comparative mitochondrial variability in two microendemic and critically endangered Madagascan frogs, *Mantella expectata* and *Scaphiophryne gottlebei* inside and outside the Isalo National Park

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Scaphiophryne gottlebei and *Mantella expectata* are two endemic, critically endangered and co-distributed frogs of Isalo (SE Madagascar), a xeric sandstone massif crossed by deep canyons. Analyzing a fragment of ca. 600 bp of the mitochondrial cytochrome b gene of samples originating from the whole known distribution of the two species we assessed the population genetic structure of these two threatened frogs. Our focus was to compare populations living within the Parc National de l'Isalo boundaries and populations occurring outside of this reserve, and potentially subject to a higher disturbance. Then, we reconstructed the haplotype networks and by means of several analyses (e.g., such as nucleotide diversity, mismatch distribution, test for gene flow and isolation by distance) we characterized their genetic structure. For both species we assessed a comparatively low genetic variability, determined by the presence of a few widespread haplotypes and few others that were locally restricted. However, *S. gottlebei* populations showed lower genetic variability than *M. expectata*. Our data show that populations outside Isalo National Park harbour a significant part of the genetic variability of the two species, and therefore highlight the importance of these endangered yet unprotected habitats for the conservation of the endemic fauna of the Isalo region.



Towards a Dutch atlas of amphibians and reptiles

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RAVON (Reptile Amphibian Fish Research and Protection the Netherlands) is the Dutch foundation for study and protection of reptiles, amphibians and freshwater fish. RAVON is working on a new atlas of reptiles and amphibians of the Netherlands. This book will be published in 2008. In this new atlas 390.000 records on distribution are used, which is ten times more compared to the former atlas (Bergmans & Zuiderwijk, 1986).

We will explain how we managed the collection and quality of incoming data on a national scale. To illustrate this, we will give an overview of how RAVON (28 employees and approximately 1000 volunteers) is organised. Organising, motivating and training our volunteers, stimulates people to provide RAVON with huge amounts of field data.

In the new atlas the first herpetogeographical map of the Netherlands will be presented. In the presentation we will use this map as an example of functional data analysis. Although the Netherlands is a small country and inhabits only 7 reptile and 16 amphibian species, ten different herpetogeographical regions can be identified. There is a strong correlation between soil and landscape and the distribution patterns of herpetofauna. Large rivers (e.g. Rhine!), polders, peat and deposits of clay explain many of the observed patterns.



Blood biochemistry and haematological values for wild juvenile pelagic loggerheads *Caretta caretta* offshore Madeira Island, North-Eastern Atlantic and it's relation to biometrical parameters

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The number of injured or debilitated loggerhead turtles *Caretta caretta* stranded offshore Madeira Island, Portugal, has been increasing during the last decade. Although the primary cause of sickness is anthropogenic, subsequent infection and emaciation contribute to decreased fitness and eventual death of the animal. Several animals have been rehabilitated at University of Madeira, but there is still a lack of data on the blood parameters for this population. In fact, reference values have not been established for most wild sea turtle populations, although the assessment of physiologic values provide a sensitive and less-invasive tool for obtaining valuable information on the populations' health. Therefore, our objective is to develop a baseline profile for blood parameters in pelagic loggerheads. In 2005-2006 summers we started a health assessment of these free-ranging animals. 50 sea turtles were sampled on July-September 2005 and May-July 2006. Animals were captured out in the sea and brought into the laboratory. They were visually checked for an external health assessment and biometry data collected. Blood samples were collected from the dorsal cervical sinus and the serum was frozen for later analysis; sex was determined through laparoscopy. The plasma biochemicals analyzed are: Uric acid, Total Bilirrubin, Total cholesterol, Creatinine kinase, Total Protein, Urea nitrogen, LDH, SGOT, SGTP, GGT, Albumin, Alkaline phosphatase, CPK, Sodium, Potassium, Chloride, Calcium and Phosphorus. Correlations between physiological parameters and morphometry will be presented, as well as with sex. The data will also be compared with databases already existing for adult and sub-adult populations of the same species.



Implications of sampling methods and protocol for the estimation of site occupancy and extinction

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In surveys of reptile or amphibian populations the effective number of animals that are present and available to be detected at a sample location is often low, resulting in few or no detections. Low detection frequencies are especially common in surveys of imperilled species; however, the choice of sampling method and protocol also may influence the size of the population that is vulnerable to detection. In these circumstances, probabilities of animal occurrence and extinction will generally be estimated more accurately if the models used in data analysis account for differences in abundance among sample locations and for the dependence between site-specific abundance and detection. Simulation experiments are used to illustrate conditions wherein these types of models can be expected to outperform alternative estimators of population site occupancy and extinction.



MONITORING

Using digital images of *Lacerta agilis* dorsal patterning and capture mark recapture methods to estimate population sizes of *L. agilis* on areas of heathland

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The population size of the sand lizard *L. agilis* on the Dorset heathlands in the UK is unknown. Research was undertaken over three field seasons (2005-2007) to determine whether the size of the *L. agilis* populations could be established using CMR methods with digital dorsal images as the 'marking tool'. Much literature has commented on the use of natural markings for individual identification using capture mark recapture methods to estimate the number of individuals using specific areas. More recently Arzoumanian et al. (2005) describes a successful technique of pattern-matching spot patterns on whale sharks using a computer programme developed for astronomers. The patterning present on the whale sharks is very similar to that found on *L. agilis*. Nine areas of heathland were surveyed intensively through the *L. agilis* field season with equal sampling effort. Location, temperature, humidity and habitat data were collected at each lizard sighting and an image of each *L. agilis* seen was taken. Population estimates were calculated by identifying individual lizards from their dorsal patterning and creating a capture history for each lizard. The capture history data was then used to generate the population estimates.

The population estimates will be presented with their confidence limits and the success of the technique evaluated annually and per location. Difficulties encountered when using this technique will be discussed and remedial measures adopted will be shared.

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Amphibians and ponds in a Mediterranean transitional landscape

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Ponds have high biodiversity, are important for nature conservation and have aesthetic and recreational value. These small water bodies are also important for amphibian conservation. We studied the spatial and temporal variation of amphibian community structure in a set of small ponds and factors affecting it in a Mediterranean transitional landscape. This study took place in the region of the Serra de S. Mamede, in the centre of Portugal. Results for the amphibian communities in general are presented and discussed. We also show that different species' larvae select different microhabitat types. This study also analysed the spatial and temporal variation of the acoustic environment. Most important threats identified were abandonment, changes and destruction due to different reasons and introduction of exotic predators. The maintenance of a biologically functional network of natural and semi-natural ponds with different characteristics (e.g. hydroperiods), preventing invasion by exotic predators is important for the conservation of amphibians and biodiversity.



CONSERVATION

The American bullfrog *Rana catesbeiana* in Europe

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The American Bullfrog *Rana catesbeiana* has been introduced in several European countries since the XXth century. However, in some localities the bullfrog introduction was not successful: the reasons of this partial success are not well understood. We studied the bullfrog invasion in Europe, by using a combination of large scale habitat modelling and population genetics. Genetic data showed that bullfrogs has been introduced several times from the native range, that these introductions come from different population sources, and were followed by multiple secondary translocations. In most of cases, invasive populations originated from very few founders. These results suggest that the number of founders, or the locality of origin, are not the main drivers of the success for non native populations. Habitat models showed that not all areas of Europe have climatic conditions suitable for the establishment of bullfrog populations. Climatic suitability well explained the success of bullfrog invasion in different areas of Europe. Moreover, the integration of climatic data with data collected at local scale on hunting pressure and native communities greatly improved the performance of models, and explained >57% of variance in introduction success. Our study stresses the importance of the combination of data on genetics and ecology for conservation; it provides target figures for eradication plans and individuates the areas where monitoring and management efforts need to be focused.



Ultraviolet visual sensitivity in lacertid lizards

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In the last decade, ultraviolet (UV) vision and colouration have become increasingly appreciated as an integral part of vertebrate and invertebrate behaviour. Previous studies have suggested that UV-reflecting skin patches of several lacertids may function as signals for intra- and interspecific communication. An important step towards an understanding of the signalling role of UV reflectance patterns is knowledge of the lizards' visual sensitivity. Here we characterize the visual system of four lacertid species, with special reference to retinal oil droplet types and distribution, spectral transmission of the ocular media, and DNA sequencing of opsins to detect expression of a putative UV-sensitive opsin gene. In all species examined four classes of retinal oil droplets, named according to size and apparent colour, were found: yellow, light yellow, large colourless, and small colourless droplets. Spectral transmission measurements of the ocular media show that wavelengths down to approximately 300 nm are transmitted ($T_{50} = 310\text{--}365$). Results of genomic DNA sequencing using degenerate primers show that all species examined have a functional shortwavelength-sensitive type 1 (SWS1) opsin. The lacertid SWS1 opsin is identical at 13 critical sites to that in the presumed ancestral vertebrate (which had UV vision), and other lizards in which UV visual sensitivity has been confirmed using microspectrophotometry, indicating that the lacertid SWS1 opsin may be maximally sensitive to UV light. Taken together, these results suggest that lacertids are sensitive to light in the UV waveband, very likely by means of an independent photopigment similar to the UV-sensitive photopigment found in other lizards.



BEHAVIOUR

The diversity of male space use in *Lacerta saxicola* in the deciduous forests of the Navagir mountain ridge

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Studies on behavioral ecology of *Lacerta saxicola* not far from Novorossiysk showed that, in optimal biotopes (beech forest) with resource abundance and low temperature, males displayed two main life strategies: cryptic males with large home ranges ($449.8 \pm 73.3 \text{ m}^2$) and males with little home ranges ($205.8 \pm 122.8 \text{ m}^2$). Males occupying small home ranges spend much time basking with females in the basking sites (sunlight is limitative in this biotope because of the shade below the thick forest canopy). Such kind of intersexual communication plays a relevant role for these males. During two years, the individual space use of the same species was also studied in another kind of biotope: oak-forest on the south mountainside. This biotope is characterized by patched distribution of resources, fine illumination and high temperature conditions. In this case, females bask much less, males cannot spend the same amount of time with them as in the beech forest. So, in this kind of biotope some males have large home ranges ($383 \pm 37.2 \text{ m}^2$) with several areas of intense use, where their activity is concentrated, often moving between these areas. These males have stable home ranges which do not change from year to year, but they can move their areas of intense use. Other males display small home ranges ($118.3 \pm 38.8 \text{ m}^2$) with one area of intense use, where they spend most of the time. The second category could be divided into three, differing in their behaviour and relation with females. Cryptic males as those from the beech-forest are also found. Male space use is determined by the female distribution which depends on resource distribution. So, in unpredictable conditions, when males do not know exactly where to find females (oak forest) they use numerous strategies, and when females are potentially available for males, they have only two main strategies.

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The amphibian pathogen *Batrachochytrium dendrobatidis* In Europe: distribution, risk assessment and conservation actions

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The chytridiomycete fungus *Batrachochytrium dendrobatidis* is a globally emerged pathogen of amphibians implicated in numerous amphibian species extinctions. In Europe, only one situation of Bd-related amphibian declines has been reported, that of *Alytes obstetricans* and *Salamandra salamandra* in the Sierra de Guadarrama region of Spain. We have screened new and archived amphibian tissue samples and DNA extractions for the molecular signal of the presence of *Bd* and previously reported infected animals in Portugal, Spain, Switzerland, the U.K. and Italy, but this is likely an underestimate of the risk posed to Mediterranean amphibians by *Bd*. We now have evidence of several new locations of infections along the northern part of the Mediterranean Basin and evidence of either disease symptoms or mortality in two endangered amphibian species. Our model suggests that species inhabiting small ranges, higher elevations and with strong water dependency are especially at risk of *Bd*-related declines. We propose a suite of conservation actions for European amphibians with such species characteristics.



Who is Calling? Intraspecific call variation in the dendrobatid frog *Allobates femoralis*

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Many territorial species respond less aggressively to familiar neighbours than to unfamiliar floating strangers based on individual differences in acoustic signals. This form of social recognition, termed neighbour-stranger discrimination (NSD) or dear enemy phenomenon has been reported so far from three anuran species. As a first step to investigate possible neighbour-stranger discrimination in another territorial frog species, we determined patterns of within-male and between-male variability in the advertisement call of the dendrobatid frog *Allobates femoralis*. High territorial stability among males, a main prerequisite for NSD, is known from a Peruvian population and has been recently confirmed in another study on reproductive success in Brazil.

We examined 285 calls from 19 males to assess those call properties showing sufficient and reliable inter-individual differences to function as possible recognition cues. Beside calls per call bout and call rate, all other examined call properties were more variable among males than within males. Generally, temporal call features showed a higher between-male than within-male variability than spectral properties and contributed mostly to separate individual males in the discriminant function analysis. Mean classification success of 64.9% correctly assigned calls to individual males is mainly attributable to three temporal call properties. Altogether, our results suggest that there is sufficient variation in the advertisement call to discriminate statistically among individual males. However, assessed call differences between *A. femoralis* males were quite small, suggesting that potential neighbour-stranger discrimination might be based rather on a combination of call features or even on the whole pattern of individual call variation instead on single call properties.



Prey capture efficiency in the dice snake *Natrix tessellata*

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Natrix tessellata is an aquatic species feeding mainly on small fish captured by active foraging. Laboratory feeding experiments were conducted on six *N. tessellata* adults (three males and three females). A total of 153 feeding sequences were filmed and analyzed, 83 finishing with fish capture and swallowing. In characterizing the prey capture efficiency, the following parameters were considered: forage time, forage speed, attack speed, grasping zone, handling time, swallowing direction, swallowing time and fish dimensions. In the dice snake, prey capture efficiency depends on body condition index, forage speed and attack speed. The feeding algorithm shows that in more than 85% of the studied cases in which the snake grasp the fish from mid-body, the swallowing occurs head-first, proving the existence of an adaptation for feeding efficiency improvement.



MONITORING

Monitoring the conservation status of UK herpetofauna: different approaches for different species

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The UK herpetofauna comprises 13 native species with different ranges, distributions and ecological preferences, and therefore requiring different monitoring approaches. The need to monitor the Conservation Status of European Protected Species (most of which are rare) is most acute, but there are increasing demands for data on widespread species. The Herpetological Conservation Trust (the HCT) coordinates existing long-term rare species monitoring programmes, but its new 'NARRS' project has expanded to cover all species across the UK. The large majority of herpetofauna monitoring in the UK is carried out by trained volunteers, currently numbering around 1000.

The four rarest species are subject to long-term monitoring programmes. Natterjack toad monitoring has run since 1970 and now covers all 55 sites; spawn string counts have enabled analysis of population trends. Sand lizard and smooth snake population status is much harder to quantify without intensive effort, and cannot easily be standardised. Whilst monitoring collects count data at over 500 sites, complex detectability variables mean that presence-absence is the best common denominator for assessing status between populations and across range. Attempts to standardise methods are the subject of ongoing research. The youngest rare species scheme involves intensive pool frog since its reintroduction in 2005.

Other projects collect data on: adder population size counts, adder population losses, garden amphibian and reptile surveys, and alien species. The most ambitious project to-date is a national survey of all herpetofauna species at randomly-selected 1km squares across the UK, with the aim of monitoring long-term trends in conservation status.



DNA Sequence Variation in the Mitochondrial DNA of *Bufo viridis* in Israel

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Molecular DNA variations in 28 populations of *Bufo viridis*, collected from various areas in Israel (24 populations), Egypt (1), Turkey (1), Iran (1) and Germany (1), were studied by means of mitochondrial sequence analysis. The nucleotide sequences of the DNA fragments were determined from a 413-bp clone of cytochrome b and a 569-bp clone of the control region. The genetic differences of cytochrome b nucleotide sequences (CBNS) among *B. viridis* populations from Israel and Germany (3-5%) were higher than among those from Israel and Turkey (0-2.3 %), Iran (0.4-1.7%) and between the different populations in Israel (0-2 %). The genetic variations between the toad populations of the Northern Israel and Turkey were low when compared to those of the other populations in Israel and Turkey.

The control region nucleotide sequences (CRNS) varied more than did CBNS among the various populations. Among *B. viridis* populations from Germany and Israel, the genetic differences observed, with respect to CRNS, were higher (7-7.6%) than among those from Turkey (1-2.4%) and Iran (0.9-1.5%).

Based on the results of the present study, we suggest that genetic variation is not only affected by geographic distance, but also by environmental factors of the habitats.



LIFE HISTORY

Evolution of risk-sensitive hatching in neotropical leaf-breeding treefrogs (*Agalychnis*: Hylidae)

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We studied the evolution of risk-sensitive hatching in arboreal frog embryos in response to two common egg-stage risks: snake predation and flooding. Risk-sensitive hatching is a key mechanism of embryo defense against predators, pathogens, and abiotic stresses. Red-eyed treefrogs (*Agalychnis callidryas*) hatch early to escape from several egg-stage risks but otherwise hatch later, improving larval survival with predators. We reconstructed a phylogeny for *Agalychnis* and related genera based on three mitochondrial and four nuclear genes. We used field experiments to assess onset of hatching competence, spontaneous hatching timing, responses to egg-stage risks, and costs of premature hatching in *Agalychnis* and *Pachymedusa*. We also assessed hatching plasticity in a basal phyllomedusine, *Cruziohyla calcarifer*. The capacity to hatch ~30% before modal spontaneous hatching age appears to be ancestral for phyllomedusines, with little change over ~34-50 million years among the species examined. A strong hatching response to flooding, with no mortality of hatching-competent eggs, is similarly ancient and conserved. Premature hatchlings of *Agalychnis* and *Pachymedusa* are more vulnerable to fish predation than are full-term hatchlings, indicating a conserved risk trade-off across hatching that would make plasticity advantageous. In contrast, the hatching response to snake attack has changed twice in the *Agalychnis*–*Pachymedusa* clade, with two species showing substantially lower escape success than the others. Responses to different threats have thus evolved independently.



Limited relevance of fluctuating features of temporary ponds in explaining amphibian beta diversity

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The temporal dynamics of amphibian habitats are usually not considered in multi-spatial scale studies, despite such papers usually include habitat characteristics that change with time. In addition, observed population turnover in amphibian communities is expected to be driven by temporal changes in habitat attributes. Therefore, it is necessary to assess the relative influence of fluctuating (hydric variables: hydroperiod and physico-chemical characteristics) versus non-fluctuating (local and landscape) attributes in structuring amphibian communities in order to understand the relevance of temporal scale in amphibian habitat monitoring.

We have monitored 21 temporary ponds during a 4-year study (2003-2006), in Doñana National Park, quantifying larvae of amphibian species and characterizing amphibian habitats. Interannual variation of amphibian species composition in the ponds was evaluated. We also quantified the relative effects of fluctuating and non-fluctuating variables as well as their joint effect in explaining amphibian beta diversity.

ANOSIM analyses showed a high interannual turnover in assemblage composition. Partial Constrained Analyses of Principal Coordinates revealed that the contribution of non-fluctuating variables alone was significant in all the analyses (annual and cumulative periods), but the contribution of fluctuating variables was only significant in 2003. The joint contribution of both sets of variables was always high.

Therefore, the relevance of fluctuating attributes in structuring amphibian communities was low. However, other features that showed temporal fluctuations, such as stochastic processes or biotic interactions, might be critical in explaining the composition of amphibian communities.



PHYLOGEOGRAPHY

Nuclear molecular markers in investigation of genetic relationships, phylogeography and systematics of lizards from *Darevskia* and *Lacerta* s. str. genera

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Some nuclear DNA molecular markers (satellite DNA, Inter-SINE-PCR sequences [Buntjer, 1997], taxonoprint [Grechko et al., 1997] and RAPD methods) were used to investigate molecular genetic relations in Caucasian *Darevskia* and *Lacerta* s. str. complexes in an attempt to clarify some uncertainties in their systematics and phylogeography. In general, all of these markers correlate well enough to morphological systematics but indicated some alternative positions. Taxonoprints support genera discriminations between *Darevskia*, *Lacerta* s. str., *Podarcis*, *Eremias*, *Zootoka*, *Gallotia* offering a number of unique molecular marker for each genera studied along with a small number of synapomorphic characters. At the same time intra-genera pattern similarities were high. Satellite DNA found in *Darevskia* and *Lacerta* were found to be specific for each of them and did not indicate hybridization with lizards of the genera mentioned above. SatDNAs permitted genetic relationships to be established intra-*Darevskia* and intra-*Lacerta* s. str. and have shown closer similarities within “*Darevskia saxicola* complex” (including *D. alpina*, *D. raddei*, *D. chlorogaster*), “*D. mixta* complex” (including *D. clarcorum*, *D. dryada*, *D. caucasica*, *D. daghestanica*), and “*D. rudis* complex” (including *D. valentini*, *D. portschinskii*). Meanwhile satDNA sequences of *D. parvula*, *D. praticola* and *D. derujgini* were genetically more distant from the above mentioned species. IS-PCR markers show the intra-species similarities between populations and subspecies and inter-species discrimination by the values of Nei-Li genetic distance coefficients. These coefficients can be used for verification of the subspecies status of the studied specimen and here we support some of the subspecies studied while questioning the validity of others. RAPD markers of *Darevskia* and *Lacerta* s. str. species were useful only for intra-population level or for discrimination of very closely similar species – at least in the lizard groups studied by us. Several aspects of speciation and phylogeography of Caucasian lacertids will be discussed.



Molecular phylogeny of the western Palearctic tree frogs (*Hyla* spp.) with implication to advertisement call evolution

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Phylogenetic relationships among populations of all nominal taxa of the Western Palearctic tree frogs (*Hyla*) were inferred from mitochondrial and nuclear gene sequences. All currently recognized species have been found to form monophyletic lineages according to the mitochondrial gene trees. Nuclear phylogenies showed concordant pattern, with the exception of several specimens from a contact zone between different mitochondrial lineages, suggesting limited amount of gene flow. According to the mitochondrial phylogeny, *H. meridionalis* occupied a basal position, and *H. savignyi* formed a sister clade to the clade formed by *H. arborea*, *H. intermedia* and *H. sarda*. This pattern is congruent with previous findings based on acoustic parameters of advertisement calls, with *H. meridionalis* having the longest call segments with the highest number of pulses, while *H. arborea*, *H. intermedia*, *H. sarda* all have short call segments with low number of pulses, and *H. savignyi* is in between with its call properties. The evolution of the Western Palearctic tree frogs thus may have led to shortening of the call segment length. In some species (*H. meridionalis*, *H. savignyi*, *H. intermedia*) we have detected deep genealogical divergences among geographically separated populations, which could have implications for their taxonomic status. Intraspecific taxonomy of *H. arborea*, traditionally based on morphometrical differences, was incongruent with the molecular phylogeographic pattern. Thus, morphometric traits cannot be reliably used to infer phylogenetic relationships within this species.

MORPHOLOGY & SYSTEMATICS

First results on the taxonomy of the *Lamprophis fuliginosus* complex in Africa

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The Brown House snake (*Lamprophis fuliginosus*) and the Striped House snake (*L. lineatus*) are well known snakes known to occur widespread in Africa. Usually they are differentiated by the presence or absence of head stripes: *fuliginosus* without, *lineatus* with two light stripes from snout to nape and below eye. Recently a third name (*L. capensis*) has been used for *lineatus*-like specimens from southern Africa and the eastern African coast. Pattern of lines and colouration in this species complex is very variable, and an allocation to specific species using these characters is impossible.

About 400 specimens from different localities throughout Africa were measured and parameters of head and body scalation were recorded to differentiate taxa. Muscle tissue from freshly dead specimens and mucosal mouth tissues from life specimens were used to extract mitochondrial 16S rRNA and analyze relationships.

First results of molecular data indicate at least three clades of proposed species in South-, eastern and Northeast Africa are presented. Morphological data illustrate different species in the *L. fuliginosus* complex. In West Africa two species occur: *L. lineatus* and *L. fuliginosus*, whereas in South Africa a different species, *L. capensis* is present. Eastern Africa *fuliginosus* and *capensis* live partly sympatric. In Ethiopia a fourth probably new species is detected which occurs sympatric with *fuliginosus*.



Active help in saving a Hungarian meadow viper (*Vipera ursinii rakosiensis*) habitat

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Thanks to the significant donation of SEH in 1995, Hungarian Nature Conservation Authority and Kiskunság National Park became able to purchase a 129 ha grassland, a very important part of the critically endangered Hungarian meadow viper's (*Vipera ursinii rakosiensis*) habitat. This grassland is a mosaic of lower wet meadows and higher dry pastures. It is now part of Kiskunság National Park, and also included in Natura2000 Network. Some higher hills were previously forested with false acacia in the mid 20th century, but these tree plantations are being removed as part of the ongoing Hungarian meadow viper LIFE-project's grassland reconstruction action. Although monitoring of vipers was started in 1996, the detailed monitoring of the area was started in 2004 in the frame of the LIFE-project. Beside the occurrence of this unique viper, other rare species can be found on this site. Nineteen amphibian and reptile species out of whole Hungarian herpetofauna's 33 species have at least one record from this site, but many species are very abundant.

Parallel with describing its recent state we started an investigation in order to learn more about the history of the area, by collecting all available maps and aerial photos, and interviewing locals. Following this work we gained GIS-processed information about previous management of the area dating back as far as 1783. The recent management of the area is directed according to strict guidelines and the feedbacks of biomonitoring.

INSULAR SNAKES

Does a gigantic insular snake grow faster or live longer to be gigantic?: Evidence from a long-term field study

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Insular snake populations show bimodal size distributions with giants evolving on islands with large prey size and dwarfs on islands with small prey size. However, there is no published study that examined growth trajectories of individual snakes to test whether giant and dwarf populations of a species differ in their growth rates and life spans. In order to address this issue, we compared the growth history of individually marked snakes in two insular populations of *Elaphe quadrivirgata* on the Izu Islands, Japan: one is Tadanae-jima Island that exhibits gigantism, and the other is Kozu-shima Island that exhibits non-gigantism. Our long-term field study, which started in 1981, suggested that gigantic snakes on Tadanae-jima live twice longer (almost 30 years) to attain maximum snout-vent length of ca 1700 mm than non-gigantic snakes on Kozu-shima. Our study also clearly showed that gigantism is realized by continuous growth throughout ontogeny rather than rapid growth early in their life. Benefit of attaining larger body size should outweigh the cost of taking longer growth period, and continuous growth throughout life might be related to delay in sexual maturity on Tadanae-jima. Environmental regime such as the absence of potential predators and the availability of abundant but large prey items (eggs and chicks of seabirds) are suggested to be a major reason that has caused gigantism on Tananae-jima.



Herpetofaunal community changes during forest succession

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In some areas of the tropics, forests are recovering on abandoned cattle pastures. We studied herpetofaunal community changes during forest succession after pasture abandonment in Puerto Rico. Twelve sites were selected in a submontane area (100 to 200 masl) to represent four forest recovery stages; pasture stage and young (1-5 yr after abandonment), middle (10-20 yr), and advanced (>40 yr) forest stages. During one year 7,991 individual reptiles and anurans were observed. Almost 60% of all observations were of reptiles. Thirteen species of reptiles and six of anurans were identified. Anuran species richness appeared to remain unchanged during forest succession (mean = 3 species per stage), while reptile richness increased from means of 5 to 7 per stage after 20 years of abandonment. In pastures, species associated with herbs dominated (*Anolis pulchellus* and *Eleutherodactylus antillensis*). With forest recovery, species associated with shrubs and arboreal species became more important (*A. cristatellus* and *E. coqui*). Reptile and anuran density increased from pasture to advanced forest stages (reptiles: 7,000 to 19,500; anurans: 4,200 to 12,400 individual/ha). Density generally decreased during the drier months and increased in humid months (ANOVA P value<0.01). For reptiles, seasonal changes were more dramatic in younger forest patches (<5 year after abandonment), while anurans seemed to show high reproduction after dry months in forest >20 years after abandonment. Herpetofaunal community structure changed during succession after pasture abandonment and can be associated with changes in habitat structure.



Taxonomic chaos in west African *Arthroleptis* species – can it be solved?

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So far eight *Arthroleptis* species have been described from the West African Upper Guinea forest block. The majority of these species descriptions have been based on single type specimens from partly not well defined type localities. The examination of many *Arthroleptis* specimens revealed that in general the available names can only be referred to the respective museum specimens but not to frogs in the field. It seems that it is not even possible to identify different species based on morphology only.

We therefore studied the phylogeny of the West African *Arthroleptis* species based on two genes (16S and rag1). *Arthroleptis* species from other African regions are included in the analysis. Preliminary results indicate that more than the described species exist within the area of the Upper Guinea forest block. As different taxa have different mating calls, we assume that they most likely represent distinct species although their genetic distances are generally low. So far affiliation of available names to the genetic/acoustic entities can only be done via the respective locations.



How to live at Tibetan altitudes as a snake - *Thermophis baileyi*: new records, distribution and biogeographic conclusions

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Thermophis baileyi (Wall, 1907) is a small montane colubrid snake, endemic to the Tibetan Plateau with unknown distribution. The snake was previously recorded from only three sites. We aimed to provide new records and to gather the initial basic information about its ecology and biogeography necessary to understand its origin and history. Data were collected on several expeditions between 1999 and 2006 in Tibet (A.R., China). We surveyed selected locations that offered convenient living conditions for *T. baileyi* and determined every position using GPS. A map of hot-spring distribution on the plateau was then superimposed on these records. We report 13 new localities for *T. baileyi*. The snake is only known from hot-spring areas and has the highest altitudinal distribution among all reptiles, ranging from 3600 to 4900 m asl. The new localities extend the known range of the species considerably, from c. 28.70° to 30.90°S and 87.12° to 92.54°E. Although *T. baileyi* is rare in Tibet as a whole, it is probably widely distributed on selective sites; the populations may be relatively small and isolated. We infer that *T. baileyi* found glacial refugia in hot-spring locations during the uplift of the Tibetan Plateau and the cooling during the ice ages. Owing to the availability of suitable habitats and high density of hot springs, a further distribution of the snake in Sichuan and even in the northern parts of Yunnan seems to be likely. Because of its restricted distribution and specific habitat preferences, we emphasize the need for populational and phylogenetic studies, particularly with respect to the ongoing habitat destruction.



LIFE HISTORY

Male reproductive cycle of *Acanthodactylus schreiberi syriacus* Böttger, 1879 (Reptilia, Lacertidae) in Lebanon

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The male reproductive cycle of the Lacertidae *Acanthodactylus schreiberi syriacus* was studied in South Lebanon on the sandy beach of Sour (Tyr). It belongs to the vernal or prenuptial type. Spermatocytogenesis begins at autumn before males enter hibernation which lasts 4 to 5 months, from the second half of November until the second half of March. Spermiogenesis and mating are observed during spring and summer. Epididymis, vas deferens and sexual segment of kidney also develop and become secretory from May until the end of August. A short period of sexual inactivity is observed in September. Males reach sexual maturity after the first hibernation and measure 54 mm (at the age of 8 to 10 months).



Conservation of Milos Viper, *Macrovipera schweizeri* (Werner, 1935) on Milos Island: A review of the last 15 years

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Milos Viper (*Macrovipera schweizeri*) is an endemic species of Greece. It has a limited distribution on the islands of Milos, Sifnos, Kimolos and Polyaigos. Almost 60% of the total population exists on Milos island where it is threatened by habitat destruction, mainly due to opencast mining. Although the largest part of Western Milos is a Natura 2000 area, the fact that most of this area is private and the absence of imagination in the use of land, rise fears for extensive building development. The main strategy towards this threat is to give alternatives to the landowners for more sustainable use of their lands and to propose them funding opportunities for those activities. Complementary actions in the direction of habitat protection included the restoration of inactive mines, and the planting of scrubs in a burned area with poor regeneration. The recent legislation for the protection of western Milos is a significant step for the conservation of Milos viper although it has some weak points and faces the reaction of some landowners.

Increased mortality levels are also a serious threat for this population. Illegal collection has declined during the last decade but road mortality is a serious threat for the species. There are some positive results from restrictions to the night traffic during summer for the mining companies lorries and the implementation of a pilot project of barriers and underground passages. The monitoring of Milos viper populations and its habitats, which started in 1993, aims at the collection of long-term data on the population trends and the evaluation of conservation actions. Monitoring is an important tool for future decisions regarding conservation and development actions in the area.



MONITORING

Detection probability of reptiles derived from the national reptile monitoring program in The Netherlands

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Since the start of a nationwide monitoring program in the Netherlands hundreds of volunteers count reptiles on their transects each year. Over the years they sighted over 137000 reptiles during monitoring visits. Based on these data we can calculate detection probability for *Anguis fragilis*, *Lacerta agilis*, *Zootoca vivipara*, *Coronella austriaca*, *Natrix natrix* and *Vipera berus* in several habitat types and for different survey methods.



Phylogeography of European Snakes

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A phylogeographic analysis of 5 species complexes of European snakes, belonging to 4 genera (*Natrix*, *Hierophis*, *Zamenis* and *Vipera*) was executed using mitochondrial sequences and ISSR genomic fingerprints. Highest genetic diversity was found among the southern populations of each species complex, where hypothetical Pleistocene refuges should have been located. In central Europe, only the last (Holocene) invasions from those refuges left imprints in the genomes. The predominant direction of invasion was from the Southeast (Balkans, Turkey, Caucasus). Populations in the Iberian and Apennine peninsulas were less efficient invaders to other regions. This limitation is attributed to the barrier function of the Pyrenees and of the Alps. Within the peninsulas a barrier function was also attributable to mountain chains like the Apennines and the major Iberian Sierras, as they separate haplotype groups from each other.



Testing the aposematic coloration in Madagascan poison frogs, genus *Mantella*

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Predator avoidance of warningly coloured prey (aposematism) is based upon learning and reinforcement. Theoretical models involving learning psychology and game theory have suggested how warning colouration in unprofitable prey could evolve and become stable.

We made preliminary tests of the efficiency of aposematic colouration in Madagascan poison frogs, genus *Mantella*. A first experiment was done by feeding snakes (genera *Liopholidophis* and *Geodipsas*; their natural predators) with *Mantella* and edible non-conspicuous frogs at the same time, giving the snakes the opportunity to choose. The preliminary results showed preference in snakes for non-conspicuous frogs over specimens of *Mantella*. Out of total 137 frog/days offered to snakes (68 *Mantella* and 69 edible frogs), 43 frogs were eaten, from which 9 *Mantella* and 34 edible frogs.

A second experiment was carried out using clay frog models in different colours: brown (resembling edible frogs), orange (resembling *Mantella aurantiaca*) and black-yellow (resembling *Mantella baroni* / *madagascariensis*). The experiment was set in areas populated by *Mantella aurantiaca* (Andasibe region) as well as in areas populated by *Mantella baroni* and *M. madagascariensis* (Ranomafana National Park), and at control sites (without *Mantella* populations) in both areas. Predators had different preferences for different colours of models at all sites, but no significant difference for colour preference between *Mantella* sites (with experienced predators) and control sites (with presumably naive predators) was found.



Geographic patterns of morphological and genetic variability of *Podarcis vaucheri* in Morocco

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The wall lizards of the genus *Podarcis* are characterised by a very high intraspecific morphological variability. *Podarcis vaucheri* is a member of the Iberian/Maghrebian clade of the genus; it was recently re-elevated to the species level and is distributed in Morocco and Southern Spain. Moroccan populations present very high levels of intra- and interpopulation genetic variability and it has been suggested that genetic patterns in this species result from isolation during the Pleistocene Ice Ages. In this study, we analyse potential sources of morphological diversification of the group, trying to evaluate the relative contribution of genetic and environmental factors. In order to do this, we examined 9 populations throughout the range of the species in Morocco and quantified 13 linear biometric and 9 pholidotic variables. We explored patterns of variation in morphological characters both in a geographic context and in relation to genetic variability of populations and environmental characteristics of the sampling sites. Both morphological and genetic traits presented local patterns of variation, associated to geographic units. On the other hand, the variability of some characters showed patterns of geographic variation along a latitudinal gradient. Results are discussed in the light of the evolutionary history of this phylogenetically complex group.



Reproductive consequences of a changing prey Base in island watersnakes

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Island populations are often sensitive to changes in the environment. One such change has been establishment of invasive round gobies (*Neogobius melanostomus*) in the North American Great Lakes. Round gobies reach extraordinary densities in the island region of Lake Erie and now constitute more than 90% of prey consumed by the Lake Erie watersnake (*Nerodia sipedon insularum*). This change, together with high round goby abundance, has resulted in increased watersnake growth rate and body size. Here, we analyze the impact of diet change on watersnake reproduction. We compare litter characteristics of 38 females captured prior to the round goby invasion (1979-1990) with those of 70 females captured after the round goby invasion (2003-2005). Following the round goby invasion, the slope of the relationship between female size and offspring number was steeper (test for equality of slopes; $F_{1,102} = 5.085$, $P = 0.027$) and female size explained more variation in offspring number ($r^2 = 0.54$ vs. 0.16 in post- vs. pre-invasion litters). In contrast, offspring size remained unchanged (mean offspring mass = 4.6 vs. 4.7 g in post- vs. pre-invasion litters). Greater mean adult female body size (827 vs. 875 mm snout-vent length) coupled with a steeper slope to the relationship between female size and offspring number means that offspring production increased about 20% following the round goby invasion. This outcome is consistent with the maximization hypothesis of life history evolution and suggests that prior to the round goby invasion, watersnake reproduction was more severely limited by prey availability.



The role of the Azov – Black Sea littoral-steppe ecological corridor for the conservation of reptiles

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The Azov – Black Sea littoral-steppe ecological corridor (ABSLSEC) stretches out from Russian Azov region to Romanian Dobrogea, its main part being situated within Ukraine. It is one of the most important ecocorridors in Europe. It is distinguished by remarkable landscape and biological diversities, which are protected in many nature and biosphere reserves, national parks, Ramsar sites etc. ABSLSEC is crossed by 5 meridional ecocorridors passing along big rivers. These intersections, especially the Danube and Dnepr deltas, as well as the Sivash region and Kerch Peninsular are core areas for biodiversity (and reptile) conservation. Totally 20 reptile species inhabit ABSLSEC: *Emys orbicularis*, *Testudo graeca*, *Pseudopus apodus*, *Eremias arguta*, *Lacerta agilis*, *L. trilineata*, *L. viridis*, *Podarcis taurica*, *Ablepharus kitaibelii*, *Eryx jaculus*, *Coronella austriaca*, *Dolichophis caspius*, *Elaphe dione*, *E. sauromates*, *Natrix natrix*, *N. tessellata*, *Zamenis longissimus*, *Vipera ammodytes*, *V. renardi*, *V. ursinii* (underlined are species with high abundance and relatively large or very large populations). Different sections of ABSLSEC differ in reptile species composition and abundance. The Ukrainian section supports 12 species (57% of the country's native herpetofauna), 6 of them being included to the Red Data Book of Ukraine (RDBU). Data on distribution, habitats, abundance of all reptile species inhabiting ABSLSEC will be presented, the Azov – Black Sea coast as a functional ecocorridor for reptiles will be considered. In Ukraine ABSLSEC is the main reservation for *Eremias arguta* and two species of RDBU — *Elaphe sauromates* and *Vipera renardi*. In Romania (and Europe) it is the most important reservation for *Vipera ursinii moldavica*.



DISTRIBUTION

Herpetofauna of Croatia: biodiversity and distribution

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On a surface area of only 56 542 km², making for 0,5% of European territory, Croatia harbours a rich herpetofauna of 21 amphibian and 36 reptile species, which is 26,9% and 34,8% of European species richness, respectively. This relatively high biodiversity can be attributed to a high diversity of habitat types and the position of Croatia in the area of four major european biogeographical regions. Since most of the country was left outside ice-cover in the glacials, it served as one of the refuges for European herpetofauna.

The specificity of Croatian herpetofauna is characterized by:

- high degree of endemism: 11 regionally endemic species and 6 local endems, 9 species with restricted areals in Europe
- isolation on islands has produced a number of spatially restricted forms of *Podarcis sicula* and *P. melisellensis* whose taxonomic status is still under review, but at least several of them can be considered as endemic subspecies
- edges of species' distribution areals for 16 species
- hybridisation zones for *Pelophylax ridibundus* and *P. lessonae*, *Bombina bombina* and *B. variegata*, *Triturus carnifex* and *T. dobrogicus* and contact zone for *Lacerta bilineata* and *L. viridis*
- eight species listed in IUCN red list, categories NT to EN

The existing literature on herpetofauna in Croatia is scarce and unsystematic. Published data is summarized and previously unpublished data from field workers is gathered to give an account of a current knowledge of herpetofauna distribution. Species distributions and diversity according to biogeographical regions, type of habitat and altitude are given.



Trophic ecology of insular Cottonmouth Snakes

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Cottonmouth Snakes (*Agkistrodon piscivorus*) inhabit insular as well as mainland habitat, and they occur in particularly large numbers on the island of Seahorse Key located on the Gulf coast of Florida. The success of this species on islands is attributable, in part, to a breadth of prey that provide a potential energy base for populations. The snakes on Seahorse Key largely consume dead fish that are dropped from colonial nesting bird rookeries, and they also prey on rats (*Rattus rattus*) that are invasive fauna on the island. While alternative prey (e.g. lizards) are available to newborn snakes, smaller individuals also scavenge successfully for fish carrion at early ages. Field observations indicate there is sometimes social structure during foraging events that involve multiple snakes. Occasionally, insular cottonmouths scavenge for intertidal carrion deposited on the beach at high tides. Numerous and diverse objects of appropriate size, shape, and odor are ingested by foraging snakes, including masses of marine algae that bear fish odors. The intensive scavenging behaviors of cottonmouth snakes appear to reflect behavioral and physiological specializations that have evolved in response to insular resource limitations. There is no permanent fresh water on the island, and the resident snakes are dependent on rainfall. During periods of drought, dehydrated snakes cease to forage at about 16% body mass deficit and refuse to eat at about 20% body mass deficit in the laboratory. Water resources thus interact with prey availability in limiting the growth and persistence of these insular pit vipers.



CONSERVATION

Conservation genetics in a crested newt (*Triturus cristatus*, *Triturus carnifex*) hybrid zone

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Our study was carried out in an area of approximately 25 x 35 kilometres in the surroundings of Salzburg (Austria). This area represents a contact zone between Northern crested newts (*Triturus cristatus*) and Italian Crested newts (*Triturus carnifex*) where most populations are genetically admixed. Like in many parts of their range, the conservation status of these species is unfavourable due to a considerable decline in population numbers and distribution area, as well as ongoing fragmentation of habitats and isolation of populations. Crested newts are therefore listed as "critically endangered" in the current Red Data Book of amphibians and reptiles of the province of Salzburg.

The aims of our study are (1) to analyse the genetic structure of populations, (2) to evaluate which processes determine the genetic architecture of studied populations - past hybridisation (hybrid zone) or contemporary genetic drift (gene flow) influenced by habitat fragmentation - and (3) to predict future scenarios with implications for regional conservation measures.

We studied 145 individuals from 14 crested newt populations and analysed one mitochondrial (cyt b) and seven highly polymorphic microsatellite markers and calculated the genetic diversity, population differentiation, isolation by distance patterns and the spatial genetic structure applying a Bayesian approach, using the programs STRUCTURE and BAPS. Furthermore we carried out spatial statistics using R-statistical software framework to extract perceptually meaningful structure of populations point pattern and to find potential dispersal corridors.



Genetic variation in parthenogenetic Caucasian rock lizards of genus *Darevskia*

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Studying the genetic variation in unisexual species is very important for understanding the molecular basis of their diversity. Different methods of genome analyses were used to study the genetic variation in parthenogenetic lizard species of genus *Darevskia*. Multilocus DNA-fingerprinting shows that *Darevskia* lizards possess species-specific patterns and display some level of intrapopulation variation with different microsatellite probes. Mutant fingerprint phenotypes were revealed in families and tissues of *D.unisexualis* and *D.armeniaca*.

DNA-fingerprinting RAPD and mitochondrial DNA analysis were used to study intraspecies structure of *D.rostombekovi* lizards. This data suggests that *D.rostombekovi* have a more complex intraspecies structure, than was previously supposed.

To understand the molecular basis of microsatellite variability it is important to know the detailed structure of microsatellite containing loci. Earlier we cloned and sequenced a number of polymorphic microsatellite containing loci of *D.unisexualis*. PCR amplification and the sequence analysis of population samples of related species of genus *Darevskia* showed that allelic differences of these loci were caused by variation in a number of tandem repeats in microsatellites clusters and point mutations in the flanking regions. This information is significant for understanding the basis of genetic variability of parthenogenetic lizards, which arises partly from mutations in microsatellite loci, and for studying relationships between species of genus *Darevskia*.



The population of lizards and snakes on border of Europe and Asia

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The territory of Middle Ural was investigated in 2000-2005. Four populations of common lizard (*Zootoca vivipara*) and four populations of adders (*Vipera berus*) from vicinities of the Ekaterinburg city agglomeration were analysed. About 1500 animals were found and 650 individuals were studied in order to determine their morphological variation and distribution in the territory of Middle Ural. The study also intended to establish dependence between the population features of both reptiles and the anthropogenous transformation of environment.

Besides usual descriptive procedures when processing the received materials (definition of age on layers in bones, studying of external morphological attributes and others), we also applied the method of the morphophysiological indicators, described in the scientific literature (Shwarts et al., 1968). The basic morphological and morphophysiological parameters of adults were investigated; data on density and number of individuals in population were specified.

The results obtained allow specifying distribution of *Z. vivipara* and *V. berus* on the Middle Ural. New data on phenological features of these species are established. Recommendations for conservation of abundance and biodiversity of the reptiles are proposed. The most vulnerable periods of life cycle of various kinds of reptiles are characterized and optimum strategy of protection is provided.

Results indicate that on these reptile populations do not depend only on natural factors, but also anthropogenous activities are of strong influence. Interestingly, the index of heart of the viviparous lizard correlates with a degree of their anxiety and similar results were recorded for adders.



Complexity of toxic response of amphibians and reptiles to environmental pollution

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Many studies document the exposure of amphibians and reptiles to environmental pollutants and their bioaccumulation. Moreover, in many occasions we have found a negative relationship between environmental alterations and diversity or abundance. But, there are few clear evidences that demonstrate a cause-effect relationship. Standard experimental protocols are simple approaches that hardly consider the complexity of life history traits or of ecological interactions that can mask the real impacts of pollution on amphibians and reptiles. For example, the possible impact of soil pollution on incubation of flexible-shelled reptile eggs is an unexplored but promising topic. Preliminary studies suggest that pollutants present in the incubation substrate can affect gas and water egg exchange processes and can even pass throughout the eggshell affecting embryos.

Increasing evidence is showing the importance of addressing the impact of sub-clinical levels of environmental pollution in behavioural abilities, growth, reproduction or metamorphosis, factors that can decisively influence the fitness and survival of amphibians.

Inter-specific, inter-population or ontogenetic variability on sensitivity to stressors make difficult the extrapolation from results obtained in ecotoxicological studies using target species. For example, UV-B radiation causes a significant mortality on amphibian larvae but there is a strong variability in sensitivity among species. Some species do not show any negative effect during the complete embryonic or larval period while others cannot survive to 6 hours of sun exposure in shallow water. Vulnerability to chemical fertilizers is strongly affected by the developmental stage of amphibian tadpoles. Finally, the exposure of amphibians and reptiles to combinations of low levels of environmental stressors may also produce complex interactions that can negatively affect individuals and populations.



SEA TURTLES

Importance of SW Europe for conservation of Atlantic and Mediterranean sea turtles

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South-western European waters are visited for at least 5 sea turtle species, all of them endangered, and 3 of their populations are included in the list of the 10 most endangered on the world (IUCN – MTSG, 2006). For example, observations of *Lepidochelys kempii*, the rarest species in the World, are increasing in European waters. Transatlantic juvenile migration from the Mexican rookeries could be relevant. We can also find juveniles of the endangered nesting population of *Chelonia mydas* in the Eastern Mediterranean. The loggerhead (*Caretta caretta*) nesting population of Florida, that have surprisingly declined by the 50 % in the past 5 years, represent more than the 75 % of juveniles present in the Macaronesia and the western Mediterranean. Loggerheads from Cabo Verde, Mexico or the Eastern Mediterranean are also found together with those from southern USA in SW Europe. *Eretmochelys imbricata* juveniles and *Dermochelys coriacea* juveniles and adults from American and African rookeries can also be found in SW Europe.

But the mortality of sea turtles, mainly due to the incidental capture in fishing gears, is now very intense in SW Europe. Such mortality is likely contributing to the mentioned sudden decline of loggerhead nesting in Florida. The number of females that mature and come back to their natal beaches is significantly decreasing in the last years. Nesting of loggerheads in south-western Europe is also critically endangered. Sea turtle conservation in south-western Europe feeding grounds and nesting beaches is a priority and requires especial monitoring and conservation measures.



Using diet overlaps for testing competition between *Podarcis bocagei* and *P. carbonelli* in NW Portugal: the influence of seasons

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Podarcis bocagei and *P. carbonelli* are two ground-dwelling lizard species that meet in a narrow area in NW Portugal. As they occupy a similar microhabitat, diet overlaps may provide information on possible niche segregation in their contact area.

For this study we collected data on diet and trophic availability in three different sites: one where both species live together (Espinho) and two sites of allopatry for each of the species (Mindelo and Torreira). The overlaps in diet were calculated using OTU (Operational Taxonomic Units) and prey size as variables.

To be able to compare the effects of sympatry, we created a “pseudo-sympatry” area joining the diet data of the two allopatric sites and compared the obtained overlaps with the observed overlaps in sympatry. If competition for trophic resources was important we should expect lower interspecific overlaps in the real, sympatric community than in the “pseudo-community”. If competition was negligible, the overlaps between the same pairs should be higher in the real community. The effect of seasons also had to be considered since there is significant variation of prey throughout the year in the three sites. This effect could mask the real overlaps.

Results discard the hypothesis of competition between both species throughout the year. On the contrary, both inter- and intraspecific overlaps were higher in the real community in spring (but not during the rest of the year). These results are discussed in the light of the climate constraints and ecological trends in lacertids.

Bioaccumulation of heavy metals in *Psammodromus algirus* from tailing-dam collapse in the Aznalcollar mine (SW Iberian Peninsula)

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In 1998, a tailing pond of the pyrite mine of Aznalcóllar (southwest Spain) collapsed, and 6 millions m³ of mud with high concentrations of heavy metals were spilled into the Guadiamar basin. After the spill, a restoration program began and the area was declared Protected Landscape: The Green Corridor of the Guadiamar River. From 1998 several studies are monitoring the contamination levels of the area, using as bioindicators several aquatic organisms as well as terrestrial organisms that feed on aquatic fauna. However, terrestrial organisms that have colonized recently the restored area also could be good bioindicators to demonstrate persistence of heavy metals in the ecosystem and their transmission across the food chains. In 2005 and 2006 we collected tail samples of 65 adult lizards *Psammodromus algirus* from three different localities: one site that was completely covered by the toxic mud, plus two control sites not affected by the spill, one located next to the pond and the other 20 km far to the pond. We analyzed contents of 14 heavy metals. Results showed higher concentrations in 12 out of the 14 elements analyzed in the samples of the contaminated locality. In this site, there were no sexual or annual differences, although heavy metal concentration increased with lizard size. As the area was restored after the accident, we discuss how heavy metals moved across the web chain up to the lizards. We claim for the use of this non-destructive technique in terrestrial reptiles to monitoring bioaccumulation of heavy metals in Mediterranean ecosystems.



Genotoxic stress on frog populations along exposure gradients: a test of the co-tolerance hypothesis

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Spatial heterogeneity of environment implies that selection forces can vary among populations of widespread species. Pollutants can also exert evolutionary changes in exposed populations such as population size decrease by direct genotoxic effects, lost of genetic diversity before and after pollutant exposure and local adaptations such as resistance and industrial melanism and can occur in years or after few generations. Here we reported on the variation among Common frog populations exposed to two potentially selective pressures. The first gradient was the natural increase of UV-B with altitude and the second gradient was the decrease of sediment contamination by Polycyclic Aromatic Hydrocarbons (PAHs) as the distance to emitting sources increases. In laboratory experiments, we estimated the impact of separate and simultaneous exposure to UV-B and one PAH (BaP) on 8 populations that vary in altitude and pollution exposure. We measured survival, malformation rate, size at hatching and genotoxic effects with the micronucleus test. Results indicated that tadpoles were able to resist to both UV-B and BaP, but synergistic UV x BaP effect strongly reduced survival. In the absence of mortality, the micronucleus test revealed that UV or BaP exposure less affected high-altitude than lowland populations. Conversely, populations exposed to higher levels of PAHs in sediments did not exhibit higher tolerance to experimental exposure to BaP. This resistance to BaP genotoxic effects in high altitude populations – which were not exposed to the pollutant – could be due to a previously acquired resistance to genotoxic stress via UV-B exposure (the so-called co-tolerance hypothesis).



INSULAR SNAKES

Seasonal and sexual patterns of microhabitat use by the golden lancehead, *Bothrops insularis*

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The golden lancehead is semiarboreal and endemic to the Queimada Grande island (43 ha) in southeastern Brazil. Adults, especially females, feed heavily on migratory passerine birds, which stay in the island for short periods every year, especially in late summer-early autumn (late March-early April) and mid-spring (early November). We hypothesize that microhabitat use by *B. insularis* varies seasonally and intersexually in response to variations in prey availability in different forest strata. To explore this hypothesis, we used field data gathered in 1995-1998 in March-April (late summer-early autumn), July (early-winter), September-October (late winter-early spring) and December (late spring). Only adults (males, SVL \geq 500 mm; females, SVL \geq 600 mm) were considered. We found 240 snakes on the ground and 68 on the vegetation. There was no significant difference neither in the frequency of use of vegetation between sexes nor in the height above ground at which sexes were found. We found a significantly larger number of snakes on the vegetation in late summer-early autumn than expected when both sexes are considered together. When sexes are treated separately, there was no significant difference between observed and expected frequencies of use of vegetation for males, whereas females used the vegetation with a significantly higher frequency in late summer-early autumn than expected. Our results indicate that females track the availability of migratory passerine birds on trees, whereas males seem not to be affected like females by the presence/absence of migratory birds. Funded by FAPESP.



Phylogeography and diversification patterns in the Agamid lizards of the Central Asian Deserts

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The deserts of Central Asia are of significant conservation concern, with many ecoregions listed as endangered or threatened. The deserts of northern Central Asia have some of the highest biodiversity of all Eurasian deserts, yet very little is known of the ecology, evolutionary history or phylogeography of constituent species. Consequently, we conducted two extensive field trips in Uzbekistan and Kazakhstan, collecting ecological data and samples for molecular work on the Agamid lizards of this region. The largest genus is *Phrynocephalus*, which includes spectacular lizards such as *P. mystaceus*. In addition to collecting data on six species of *Phrynocephalus*, we also collected data on *Trapelus sanguinolentus* and *Laudakia lehmanni*. We sequenced a mtDNA region (~1400bps) and a nuclear gene (~1400bp) across >70 samples incorporating the eight study species. Our results, combined with some previously published data, show that there are significant levels of phylogeographic structuring in all *Phrynocephalus* species studied and that *P. versicolor* and *P. guttatus* are not monophyletic. Molecular clock estimates, using BEAST, place the diversification of *Phrynocephalus* during the Miocene. Aridity has a long history in Central Asia. The relief changes associated with the Indian – Eurasian plate collision have played a fundamental role in the development of aridity in Central Asia. Foremost among the continental-scale changes has been the uplift of the Tibetan Plateau. We discuss the age and patterns of evolutionary diversification in these agamid species in relation to aridification in Central Asia.



Genetic differentiation among Levant populations of *Hemidactylus turcicus*

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The wide range of the Mediterranean gecko *Hemidactylus turcicus* extends from the Western Mediterranean to the Near and Middle East (except for recent New World colonisations). Whereas the Circum-Mediterranean populations represent only one genetically more or less uniform unit, the populations from northern Jordan form a divergent clade considered a sister taxon to the Mediterranean form (Carranza and Arnold 2006). Regarding the fact, that a morphologically different population named *Hemidactylus turcicus lavadeserticus* is known from the area of the black lava desert in southern Syria, we estimated phylogenetic relationships among Levant populations of *H. turcicus* using cytochrome b mitochondrial DNA sequences. The obtained results show, that several well differentiated evolutionary lineages of unclear taxonomic status exist within *H. turcicus* in the area of Levant countries. Further, deep genealogical divergences among these clades indicate a more recent origin of the Circum-Mediterranean populations of *H. turcicus*. Therefore, a possible effect of human activity on spreading of *H. turcicus* within the Mediterranean region and taxonomic status of the individual Levant lineages of this gecko will be discussed.

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Recent advances to the molecular systematics of Malagasy snakes

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Madagascar and the nearby islands in the Western Indian Ocean harbour a number of fascinating vertebrate radiations. Among these are various lineages of advanced snakes, but relatively little is known about their evolutionary relationships. Based on several field trips between 2000-2007, a large number of snake samples have been collected and analysed. Nuclear and mitochondrial genetic markers were used to infer phylogenetic relationships. The most important observation is the multiple origins of the Malagasy (and also some other insular) advanced snake faunas. Molecular clock estimates place the divergence of the Malagasy snakes from their non-insular relatives in the time frame between the Eocene and Miocene. Moreover, we found a remarkable high genetic diversity even at intrageneric and intraspecific levels representing geographic clades. Recent molecular genetic results led to the recognition of some new taxa, and to the revision of the genera *Liopholidophis*, *Compsophis*, and *Geodipsas*.



LIFE HISTORY

The formation of a pool of the definite number of ova is a once-for-a-lifespan event in anuran amphibians

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Amphibians produce rather big numbers of eggs in several breeding seasons during lifespan. There is a widely accepted belief that residual oogonia arranged in an ovary in “germ patches” renew the pool of oocytes after each spawning by a wave of mitoses. However, our stereological studies on *Rana temporaria* indicate that the definitive pool of eggs-to-be-laid is established during juvenile period and is sufficient for the whole life of a female without renewal. The ovaries of three-years-old females contain 23,440 in average. The average number of eggs oviposited by a female from the population under study was about 2 000, which gives a pool of oocytes for 11–12 breeding seasons. The oldest female from this population was 9 years old, and the oldest known *R. temporaria* was 12 years old. *Rana temporaria* females achieve sexual maturation usually when 3-years old (sometimes when 2- years old), which gives the reproductive age ranging from 6 to 9 years.

The definite number of eggs is not formed steadily. One-year-old females contained in average 28,500 diplotene oocytes, and then their number increased to 54,480. In two-years-old frogs this number dramatically decreased to 34,666, and eventually reached the number of 23,440. The sharp decrease was accompanied by massive intrafollicular atresia. Assuming that a female lays eggs once a year, we concluded that the number of oocytes is established during second year of a female life, and is sufficient for about a dozen of spawnings, i.e. for the whole life span.



Ecotoxicological studies on sea turtles stranded in the Canary Islands

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Since 1993 the Veterinary Faculty (ULPGC) has been conducting a survey on the pathology and causes of mortality among sea turtles stranded in the Canary Islands.

Tissue samples of bone, liver, skeletal muscle and kidney from 80 loggerhead turtles were collected during necropsy for heavy metal determinations. Concentrations of Al, As, Cd, Cu, Fe, Hg, Ni, Pb and Zn were determined using an inductively coupled plasma atomic emission spectrophotometer. Sea turtles necropsied in this study showed higher concentrations of Al, Ni and Pb than others from different geographic areas. However, our turtles showed lower Hg concentrations. The highest concentrations of As, Cu, Fe, Hg and Pb were found in liver. Ni and Cd had their highest concentrations in kidney, while Al and Zn were higher in bone.

Liver and adipose tissue samples from 32 sea turtles (30 loggerheads, 1 green turtle, and 1 leatherback turtle) were analysed for organochlorine levels and compounds (PCBs and DDTs). Results showed higher organochlorine levels than those found in marine turtles from other geographical areas and lower than those detected in marine mammals. OCs levels were higher in liver than in adipose tissue of turtles with septicaemia or cachexia, confirming the association general status-distribution and concentration of OCs. The main OCs group was that of the PCBs, specially the congeners 180, 153, 138, and 209. The detection of the congener 209 in high levels in the liver is the first noticeable reference of the presence of this OC in sea turtles. The DDTs were not detected in an important number of samples, being the 2,4'-DDD the most important. The 2,4'-DDE was not detected in any sea turtle.



Arsenic accumulation and biotransformation during *Rana perezi* aquatic development

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Information on stage-specific patterns of contaminant accumulation is generally lacking for amphibians, yet such information could provide valuable knowledge on how amphibians interact with contaminants. We assessed accumulation and biotransformation of As during development of Iberian green frogs (*Rana perezi*) from embryonic to metamorphosis stages. Individuals were collected from a non-polluted location at Sierra de Gredos (Central Spain) and exposed to three different As levels (0, 50 and 100 µg As/L) as iAsV. Mortality was below 10% in all treatments and no statistical differences were detected among As levels. Biological samples were taken at six moments during experiment (days 5, 19, 47, 57, 63 and 69) corresponding to Gosner stages 21-22 (hatchling), 25 (free-swimming), 26-29 (hind limbs emerged) , 31-39 (hind limbs completed), 40-45 (forelimbs emerged) and 46 (metamorph). Anionic exchange with a Dionex AS-7 column was selected among three options as the best method to determine the As species present in the frogs. This method allowed the investigation of 8 standard arsenic compounds. As accumulation was detected until hind limb emergence, followed by a decrease in As concentration, which could indicate a detoxification ability. The occurrence iAsIII and dimethylarsenic acid throughout the experiment indicated reduction and methylation processes that decreased the concentration of the more toxic inorganic forms. This study demonstrates that tadpoles may accumulate As during their initial developmental stages, and that they have the ability to transform As into organic forms that might be easily excreted. Thus, earlier larval predators would be more susceptible than later larval or juvenile predators to accumulate As.

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Fossil Chelonians of the Oulad Abdoun phosphates basin (Maastrichtian-Ypresian, Khouribga, Morocco)

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The phosphate deposits in Morocco are very rich in fossil remains. These fossils document one of the most important periods in the evolution of vertebrates, the Maastrichtian-Ypresian, which includes two major biological crises: first, the Cretaceous-Tertiary boundary when dinosaurs became extinct and the subsequent mammal radiation begun; and second, the Paleocene-Eocene crisis in which the replacement of archaic mammal fauna by the mammal “modern” fauna took place. This great scientific heritage is noteworthy for the Paleobiodiversity.

A bibliographic synthesis makes it possible to draw up a faunal list of the phosphate deposits, including tetrapod vertebrates, particularly Chelonians. Due to the lack of studies, this group remains poorly-known in comparison to other groups. However, an important collection of tortoises is under elaboration. A full Chelonians collection list is made, providing a better understanding of phosphate Chelonians (their anatomy, phylogeny and ecology). A great amount of fossil turtles have been found in the Oulad Abdoun basin. A cranial anatomy description of a new Moroccan turtle skull is given. It probably represents a new genus and a new species belonging to the Bothremydidae family, closely related to *Phosphatochelys tedfordi* Gaffney et Tong 2003 from the Paleocene of Morocco.



Amphibians and biomarkers: potentials tools for wetland assessment

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In Spain many wetlands already have been degraded or lost due to agricultural, urban, and industrial activities. Knowing that the pollution pressures from agriculture are ever-increasing, it is necessary to develop assessment techniques that can provide information about wetland stress or degradation. Our objective was to evaluate the potential use of the amphibians as early warning indicators of wetland degradation. In conjunction with other ecotoxicological techniques, biochemical, histological, morphological, and behavioural biomarkers were tested to provide rapid and realistic results in wetland assessment. Three toxic substances used regularly in olive tree agriculture were tested on tadpoles of different anuran species. Lethal responses and sublethal effects were studied and used to classify the biomarkers. All biomarkers selected gave a positive result for detecting the toxicity. Behavioural test was considered timely and cost effective for obtaining realistic information about wetland degradation. Due to these characteristics the behavioural test is proposed as a useful tool for wetland management.



***Triturus v. vittatus* (Urodela) breeding site conditions at various altitudes**O. PEARLSON^{1,2,3} & G. DEGANI^{1,2*}¹ MIGAL–Galilee Technology Center, P.O. Box 831, Kiryat Shmona 11016, Israel; oren@migal.org.il² School of Science and Technology, Tel-Hai Academic College, Galilee, Israel³ Institute of Evolution, Faculty of Sciences and Science Education, University of Haifa, Israel; [*gad@migal.org.il](mailto:gad@migal.org.il)

Ecological and biological conditions of different breeding sites, inhabited by *Triturus v. vittatus* in northern Israel, were examined over four years. Altitudes of the localities ranged from 212 to 740 m ASL. The larval growth period was found to be longest, between April and July, in Dovev Pond, which is located at the highest elevation studied (740m ASL). The period of larval growth varied among the different sites and differed from year to year during the study. All breeding sites encompassed newt larvae simultaneously with various anuran larvae; *Hyla savignyi*, *Bufo viridis*, *Rana bedriagae* and *Pelobates syriacus*. Although *Salamandra infraimmaculata* larvae and adult newts inhabited two rain pools concurrently, there was hardly any overlap of the larval growth periods. The temperatures of the ponds increased significantly from winter to spring, ranging between 5-30 °C. The pH varied from 6.5-10, and dissolved oxygen ranged between 2-27 mg/L (generally 5-10 mg/L). Electrical conductivity (EC) varied between 150–800 μ S and increased slightly throughout the season, with significant differences among the ponds during some periods ($P < 0.05$). Ammonia (NH₄) and nitrite (NO₂) concentrations were low, and tended to be less than 1 and 0.25 mg/L, respectively. Turbidity remained relatively constant, varying between 0-150 nephelometric turbidity units (NTU). In conclusion, among the different ponds, large variations were found in the length of the newt larval growth period and the time required for the completion of metamorphosis, but no differences in the ecological parameters and water quality of the ponds were observed during the larval growth period.

CONSERVATION

Amphibians and their conservation in western Africa

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West Africa has a unique amphibian fauna which differs distinctively from other regions in Africa. About 200 amphibian species have been recorded for this area, ranging from Senegal to eastern Nigeria. Thirty-six species are listed by IUCN as threatened mainly due to their small distributions and / or their specialisation on habitats which are under high anthropogenic pressure.

We examined amphibian distribution patterns of all species using own data (> 30 surveys) as well as literature records. Based on the distribution, remote sensing and GIS data, we conducted different descriptive analyses, various multivariate statistics and modelling techniques, to identify centres of high conservation importance.

So far our analyses revealed three centres of high conservation importance, mainly identified by the occurrence of locally endemic species. All three areas are also regional hotspots for other taxa (e.g. vascular plants, bats) but are heavily threatened mainly by logging, mining and agriculture and therefore there is an urgent need for a better protection. In addition our data clearly revealed that true forest frog communities are under higher pressure compared to savannah communities.



Reproduction in the lizard *Scelarcis perspicillata*: effect of climate and body shape

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Scelarcis perspicillata is a small lizard endemic to North Africa (Morocco and Algeria) with an insular introduced population in Menorca (Balearic Islands). This species has recently been separated from the genus *Lacerta*, being *S. perspicillata* the only species included in its genus. Species systematics is not clear, but recent DNA studies confirm that this group comprises several species. *S. perspicillata* is a climbing species, highly adapted to vertical rocky surfaces and stony damp habitats. Its biology is poorly known, and few studies are available. Regarding to their reproductive characteristics, data are reduced to field observations in continental North African populations on clutch size and hatchings, and on the existence of mating plugs.

We analysed the reproductive characteristics of a population living in an open-air quarry in the island of Menorca. *S. perspicillata* moves mostly on the vertical walls of the quarry, searching for food and escaping from predators. We use both field observations and breeding in captivity to study its reproductive phenology and clutch and egg characteristics. Results show that *S. perspicillata* has a reproductive pattern similar to that observed in other lacetids living in mild temperate climates. However, the flattered shape and small size of this species, adapted to vertical surfaces and crevices, constrains its reproductive strategy. We discuss the influence of the foraging mode and predator escape tactics on its reproductive characteristics.



MORPHOLOGY & SYSTEMATICS

Individual differentiation and sexual dimorphism in Majorcan midwife toad, *Alytes muletensis*, adults

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In order to provide more information about demographic parameters of the Majorcan midwife toad (*Alytes muletensis*), a study of the adult population was carried out between 2005 and 2007. The study was based on weekly visits during the reproductive period, when all the adults found were collected. A digital image database of the back of each individual has been created to enable to identify each of the individuals according to the black spot distribution pattern. Once all the individuals were identified by images, fourteen morphological variables were measured on sexed adults. The sex was determined by observing the males carrying their egg masses and the gravid females by observing the developed eggs through the transparent skin of the lower abdomen. Thus, the data analysis obtained has allowed creating a discriminant function that will help to differentiate a male from a female. In this way, this method provides an improvement of the knowledge of the biology of this emblematic Mediterranean midwife toad.



Molecular and morphological patterns in evolution of Asian salamanders (family Hynobiidae)

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The family of *Hynobiidae* or Asian Salamanders is one of the most ‘primitive’ groups of terrestrial vertebrates, of probably Triassic age. Until 2006 its taxonomy was exclusively based on morphological characters. This is unfortunate, because recent molecular data (Zhang et al., 2006) indicate that many taxa - homogenous from a morphological perspective – may be para- or polyphyletic. We consider the availability of a robust phylogenetic hypothesis essential to any evolutionary study. We are therefore in the process of sequencing 40 species and subspecies (out of ca. 60 *Hynobiidae*) and generated approximately 2.6 kilobase pairs of mitochondrial DNA (Cytochrome Oxidase I, 16S-, 12S-rRNA and Cytochrome b). The molecular phylogeny – be it preliminary – is employed to trace morphological character evolution, to detect cryptic species and to reconstruct patterns of historical biogeography and phylogeography. Revealed evolutionary parallels in morphological characters (craniology, morphology of hyoid apparatus and limbs) are especially remarkable in stream-dwelling forms (*Paradactylodon* – *Batrachuperus*, *Ranodon* – *Liua*, ‘*Pseudohynobius*’ *tsinpaensis* – *Pseudohynobius flavomaculatus*) and can be explained by paedomorphic modifications of certain morphological features. High local mtDNA polymorphism and cryptic forms are discovered in groups with wide and in groups with small distributions. Examples include the Siberian salamander *Salamandrella keyserlingii*, with the largest range of any amphibian, and such relic groups as West-Asian stream salamanders (*Paradactylodon*), East-Asian clawed salamanders (genus *Onychodactylus*), and *Hynobius* of East Asia. Morphological and molecular data together are used to discuss biogeographic and taxonomic patterns within the family of *Hynobiidae*.



PHYLOGEOGRAPHY

Genetic evidence for wild-living *Aspideretes nigricans* and a molecular phylogeny of south Asian softshell turtles (Reptilia: Trionychidae: *Aspideretes*, *Nilssonia*)

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Aspideretes nigricans was long thought to be one of the rarest turtle species of the world, being restricted to a single site in Bangladesh; its specific distinctness was repeatedly doubted. Using mtDNA sequence data of all four *Aspideretes* species, we demonstrate that *A. nigricans* is a distinct species that is sister to *A. hurum*. Furthermore, *A. nigricans* is not endemic to Bangladesh, but occurs also in Assam, India. While all applied phylogenetic analyses (Bayesian Analysis, Maximum Likelihood, Maximum Parsimony, Neighbour Joining) provide evidence for a wellsupported clade containing the four *Aspideretes* species and *Nilssonia formosa*, the monophyly of *Aspideretes* is not unambiguously supported. We suggest to synonymize the genera *Aspideretes* Hay, 1904 and *Nilssonia* Gray, 1872, resulting in an expanded genus *Nilssonia* with the species *Nilssonia formosa* (Gray, 1869), *Nilssonia gangeticus* (Cuvier, 1825), *Nilssonia hurum* (Gray, 1831), *Nilssonia leithii* (Gray, 1872), and *Nilssonia nigricans* (Anderson, 1875). Genetic structure within *N. nigricans* is weak, while we detected two differentiated genetic lineages within *N. gangeticus*, one occurring in the *Brahmaputra* River system and the other in the Ganges and Indus River basins.



EU money down the drain: non-functioning amphibian mitigation measures under roads increase fragmentation at the Parassapuszta Natura 2000 Site, Hungary

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The effects of road traffic on amphibians has been known for a long time. Besides habitat loss and alteration and the creation of edges, amphibians are also greatly influenced by pollution, road kill and the related barrier effect. To compensate these impacts, mitigation measures have been built since the late 1960s. Beginning in the mid-1980s it also became a topic in Central-European countries including Hungary. Parassapuszta is one of the best known sites for this activity as international toad rescue operation has been organised there since 1987 including efforts by foreign professionals and volunteers from nineteen countries. Mitigation measures were first proposed to be built in the early 1990s at that site and the main crossing sections were mapped with a 50 metre accuracy. With the financial help of the European Union, in 2005 a road modification scheme was launched for the area including the construction of the largest amphibian tunnel system under a lower road in the region. However, no expert advice was taken. As evidenced by the mass mortality of amphibians on the roadway during the spring of 2007, planning, construction and maintenance problems have lead to a complete failure of this amphibian mitigation project. As road construction is a priority activity in new EU accession countries, it is of continental importance to avoid such mistakes in the future and minimize the effect of new roads on amphibians. It should also be a priority to correct the amphibian passage system at Parassapuszta by the next migration period.



MONITORING

Efficiency of different methods in detecting amphibian and reptile species in Hungary: a national overview

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Herpetofauna mapping reached the target of having data from each of the 1,060 10 km x 10 km UTM squares in Hungary in 2007. The data base produced contains nearly 18,000 data entries by the middle of 2007. As most of the data have been collected in recent mapping projects of DAPTF(ARG) Hungary, methods used to detect the presence of amphibians and reptiles were also recorded. Significant differences were recorded in the efficiency of the applied methods for different amphibian species. Sound monitoring, for example, was the most effective method to find *Hyla arborea*, which has relatively loud calls and its calling period is long. Road transect surveys were especially effective for finding the nocturnal and burrowing *Pelobates fuscus* with quiet calls as well as visual encounter surveys for *Salamandra salamandra*. There were smaller differences in the efficiency of different methods detecting reptiles. At least 75% of the data were gathered by visual encounter surveys for each species. As a consequence, future investigations should be planned more carefully to select the most appropriate methods for the detection of amphibian species.



Age and sex based differences in the head shape of Moorish geckos: a geometric morphometric approach

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Since informations on the Moorish gecko (*Tarentola mauritanica*) sexual dimorphism are ambiguous, we investigated if sexes and age classes differ by respect to head shape and size. We analyzed the variation of head size and shape in adults, subadults and newborn of Moorish geckos (*Tarentola mauritanica*) from central Italy using a geometric morphometric approach. The heads of 38 individuals (11 adult males, 11 adult females, 7 subadults and 9 newborns) were photographed under standardized conditions and 10 topographically correspondent landmarks have been digitized on the dorsal image of the head. The centroid size differed significantly among age classes: adults had larger heads than both subadults and newborns, subadults had larger heads than newborns, while adult males had larger heads than adult females. The head shape significantly varied following an age-cline from newborns, which had more rounded heads with larger eye-regions to adults, which showed markedly triangular heads, with a higher prominent tympanum. Head shape significantly varied also between sexes, males having a more triangular-shaped head and heavier tympanum regions than females. In this scenario, intra- and intersexual behaviours could have played a role in the evolution of these morphometric trajectories by acting on skull, jaw muscles and tympanum development.

CONSERVATION

Pond requirements of coexisting newts: Why is *Triturus cristatus* more vulnerable than *T. vulgaris*?

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We studied two coexisting newt species – the declining crested newt (*Triturus cristatus*), and the more widely distributed smooth newt (*T. vulgaris*) – for possible habitat factors causing their contrasting trends. We described 29 ecological characteristics of 210 Danish ponds and their surroundings, and their occupation by newts. Altogether, *T. cristatus* was found in 99 ponds (47%) and *T. vulgaris* in 136 ponds (65%); while only 8% and 25% of the ponds with fish were occupied, respectively. In 140 ponds without fish, multivariate habitat models included three variables and classified correctly 74% of observations for both species. A diverse fauna of invertebrates (potential prey) and shorter distances to other ponds inhabited by conspecifics were positive for both species. The major difference was the importance of surrounding habitat for the crested newt, and of the sediment type of the pond for the smooth newt. Hence, in an area of frequent coexistence, habitat requirements of the two species differed in details, not the general extent of specialization. We suggest that the importance of surrounding habitat (notably natural grassland with forest) for the crested newt is a major factor why this species is more vulnerable than the smooth newt in many countries on North European Lowland.



Systematics and Distribution of the Iranian Plateau Species of *Tropicolotes* Peters (Sauria: Gekkonidae)

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The geckonid lizards of the genus *Tropicolotes* Peters, 1880 encompassing about 9-10 species, mainly occurring in north Africa and the Middle East regions. Of these, at least four species are distributed on the Iranian Plateau. These are as follows: *Tropicolotes latifi* occurring in the central Iranian Plateau as an endemic species, *T. persicus* is distributed in southern Zagros region as well as in extreme southeastern Iran, *T. helenae* occurs in the northern, central and southern Zagros range, and *T. steudneri*, as the least known species of *Tropicolotes* in Iran, occurs in extreme southern Iran in Bushehr and Hormozgan Provinces, and, so far, there are just a very few records of its occurrence in the Iranian Plateau.

The distribution range of *Tropicolotes* extends into south-eastern Iranian Plateau to Pakistan and eastern Afghanistan. At the same time, the Khuzestan Plain as well as the Mesopotamia are important corridors for distribution of *Tropicolotes* to Syria, Iraq, Jordan, Lebanon and Israel and Palestine.

Based on extensive study and research in various regions of the Iranian Plateau, systematics and distribution of the genus *Tropicolotes* Peters, with special reference to the Iranian Plateau species, are discussed. Some new records and new localities as well as new varieties for *Tropicolotes latifi* in the central Iranian Plateau are given. The exact borders of distribution of *T. helenae helenae* and *T. h. fasciatus* as well as their taxonomic status are questioned.

Distribution maps for all the Iranian Plateau species of *Tropicolotes* are provided.



Population structure of the Selvagens Gecko, *Tarentola boettgeri bischoffi*, at the Selvagem Grande island after the eradication of rabbits and house mice

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Tarentola boettgeri bischoffi is an endemic gecko of Selvagens Islands (Madeira, Portugal), restricted to the three small islands of that archipelago. Its largest population is found on Selvagem Grande, an island where rabbits and house mice were eradicated in 2002. The populations of endemic vertebrates have been monitored since then. In this work, we present the spatial distribution and population structure of the recovering gecko population from 2005 to 2007. The species was monitored in 34 areas distributed regularly in the central plateau of the island, from March to September. Gecko densities varied spatially, with the highest values found on the two regions with deep soil, while the lowest density values were found on the high altitude, bare regions. Climate is clearly very important for the successful reproduction and/or juvenile survival in these dry islands. In 2005 the <1yr old juveniles represented more than 1/3 of the captured individuals, while in 2006, after a prolonged drought, the number of juveniles was very small.

The size structure of this population suffered large oscillations in just 3 years. The production of large numbers of juveniles, as well as an increase in maximum adult sizes from 2005 to 2007 points to possible multiple effects of the rabbit and house mouse populations.



A new wave of declining of European amphibians following the distribution of introduced fish rotan *Perccottus glenii*

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The fish, rotan *Perccottus glenii* (Odontobutidae), a native of regions of East Eurasia, has become widely distributed in East Europe. This predatory species differs from native pond fish because it is able to tolerate considerable fluctuations in abiotic factors (water level, temperature) and can tolerate poorly oxygenated water, enabling it to persist in small, stagnant water bodies – favourable breeding sites of native amphibians. Impact of rotan on reproduction success of native amphibian species was investigated during 15-year monitoring of aquatic sites as well as by experiments. This fish entirely eliminates larvae of *Triturus* newts and *Rana* frogs from aquatic sites. This process dramatically transforms metapopulation structure of amphibian species. Some rare amphibian species may disappear. Presently non-native range of rotan is rapidly expanding to Central and West Europe. This fish species had been already recorded in Poland (since 1993), Hungary (1997), Slovakia (1998), Serbia (2001), Romania (2001) and Bulgaria (2005). Soon, rotan may reach the Western regions of Germany, territories of Austria and Czech Republic. Many European rivers are interconnected by a network of channels. There are therefore, no geographical barriers for preventing the further colonization by this dangerous invasive species. During the coming decades, a significant number of local amphibian populations will disappear in Europe as a consequence of rotan expansion. This investigation was supported by the Russian Academy of Sciences: Biological diversity and dynamics of genofonds (project 5.2.1.); Biological resources of Russia: fundamental bases of rational use.



DISTRIBUTION

Are land use and biodiversity associated at a regional scale? The case of Catalonia's reptiles (NE Iberian Peninsula)

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The distribution patterns of the species are shaped by the species ecological valence and by the biotic and abiotic factors of the environment. The human exploitation of land resources (land use) has been considered the factor with larger effects on biodiversity within terrestrial ecosystems once affects directly the distribution of the fauna. This study aims to test if the effects of the land use are profound enough to be detectable at a regional scale: the entire Catalonia (NE Iberian Peninsula). Reptiles were used as model organisms and data derived from the Catalan and Spanish Herpetological Databases. Using climatic, edaphic and altitude variables, the potential distribution of every reptile present in Catalonia was modelled and the resulting potential species' richness was compared with the observed one. Correlations between potential and current species' richness and land use were established. This study shows that land use disturbance over reptiles' distribution is detectable at a regional scale.



Moving Houses - Territoriality, site fidelity and pair bonding in *Allobates femoralis* (Dendrobatidae)

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Whilst territoriality is widely described among dendrobatids, males and females of *A. femoralis* exhibit some behaviour, not regularly observed for other members of this family and partly even new to anuran research. During a 3-month study in the Nouragues Nature Reserve, French Guyana, 52 males and 38 females within a 20,000m² plot were monitored and their positions mapped on a daily basis. While previously described territoriality and intra-seasonal site tenacity was confirmed for males, it was revealed that also females of *A. femoralis* exhibit strong site fidelity with some of them occupying stable positions for at least 11 weeks. Females further form aggregations, the nature of which is subject to a current study by a colleague. Data suggests lek-based mate choice where territorial males compete for choosy females that approach them from their stable positions. Intra-seasonal pair bonding was observed in at least 6 cases for up to 7 weeks, with the female commuting between her position and the initially chosen partner for repeated mating. Contrary to intra-seasonal observations, no site fidelity between consecutive years could be observed for males in an ongoing long term study. Females on the other hand moved only very little between years, with one female even occupying the exact branch like one year before. Most interestingly, two pairs with the very same partners were found exactly where they were encountered one year before. Long term pair bonding, either facultative or obligatory, has not been described for anurans so far.



LIFE HISTORY

Geographic variation in clutch size and female size - clutch size relationship in the sand lizard, *Lacerta agilis*

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Clutch size (egg number) and especially the rate to which clutch size increases with the increase of female body size (fecundity slope) are used as proxies for fecundity selection potential in lizard populations (Braña 1996; Cox et al. 2003).

Data on clutch size and maternal body length for 378 individual females from 12 geographic regions within the range of *L. a. agilis* (Western Europe) and *L. a. exigua* (Eastern Ukraine, Central Russia, North Caucasus, Eastern Kazakhstan, Altai, and South Siberia) were examined using the covariance and the regression analyses. We tested the hypothesis that a consistently female-biased sexual size dimorphism proper to *L. a. agilis* (Roitberg 2005, 2007) is associated with a higher fecundity selection potential in this subspecies.

In accordance with this prediction, samples of *L. a. agilis* exhibited higher fecundity slopes than those of *L. a. exigua*.



Phylogeny and Biogeography of a Malagasy Radiation: *Phelsuma* day-geckos

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Phelsuma are small to moderate-sized day geckos that typically exhibit bright green coloration with reddish markings and spots, although dark greyish species also exist. Together with the likewise diurnal genus *Lygodactylus*, it is one of the most species-rich gecko genera occurring in the western Indian Ocean region. *Phelsuma* contains around 42 described species, of which 26 are found in Madagascar, and 22 of these are endemic to this island. Taxonomy of these geckos is largely based on coloration, and many subspecies have been described only based on such chromatic characters. Despite a few previous works, intrageneric relationships of *Phelsuma* are mostly unknown and the validity of many taxa, remains to be assessed using molecular markers. Both nuclear (c-mos, Rag-1 and Rag-2) and mitochondrial (16s rDNA and cytb) genes (~2,7 kb) were sequenced for 94-140 individuals (nuclear or mtDNA datasets respectively) comprising all the described species except *P. masohoala*. For the most widespread species intraspecific diversity was also preliminarily screened, where possible including samples of all subspecies. Results point to a rapid diversification of the major groups after the colonisation of Madagascar, with many species harbouring highly divergent lineages. Results will be discussed in the light of emerging biogeographic and radiation patterns in Madagascar.



Population regulation of the Leaf-toed Gecko *Euleptes europaea* in a NW Italian Natura 2000 site

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The factors influencing population fluctuations of the leaf-toed gecko *Euleptes europaea*, a Mediterranean endemic listed on annex II of the European Directive 92/43/CEE, are poorly known. The population structure and dynamics of *E. europaea* were analysed in a Natura 2000 site (Liguria, NW Italy). Abundance was estimated in July, from 1996 to 2006, by capture-mark-recapture and age classes obtained by decomposition of SVL distributions. Density-dependence was assessed by numerical simulations (Pollard et al., 1987; Dennis and Taper, 1994), and the dynamics structure by time series analysis. Gecko abundance showed moderate interannual fluctuations. Population structure and adult sex ratio were relatively constant through the study period. Density dependence was confirmed by both simulation methods, and the structure of feedback dynamics, analysed by autocorrelation function (ACF) and partial rate correlation function (PRCF), showed evidence of strong first-order density dependent regulation. On the other hand, local climatic factors such as temperature and rainfall apparently did not influence gecko's growth rates. The results of this preliminary study suggest that the leaf-toed gecko population was fluctuating around the environmental carrying capacity, and that growth rates were regulated mainly by a negative endogenous feedback. First-order density-dependent regulation is typical of populations constrained by intraspecific competition for one or a combination of factors such as food, mates, shelters or territories. These results may have practical implications for the conservation of isolated leaf-toed gecko populations.



Examining the IUCN categories of species with modelling techniques: the case study of the Iberian Herpetofauna

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The IUCN Red List Categories provides an objective framework for the classification of the broadest range of species according to their extinction risk. Species are placed into the different threatened categories following several criteria that include quantitative data on population size, geographic range and demography. However the risk of extinction may be biased in some taxonomical groups as amphibians and reptiles since these species are often difficult to detect by their secretive habits and low population densities. Even in well-prospected areas as the Iberian Peninsula, some species are poorly known and their IUCN category could be biased. We propose the use of modelling tools to examine potential biases in the threatened category of Iberian amphibian and reptile species. The Ecological-Niche Factor Analysis (ENFA) is a modelling technique that only requires data on species presence, being the Tolerance one of the analysis outputs. Tolerance summarizes the ability of the species to live in very narrow range of conditions or to inhabit any of the conditions in the study area. In the Iberian Herpetofauna, Tolerance was positively correlated to Distribution (number of UTM squares occupied by the species in the study area). However some species showed negative residuals of the regression between Distribution and Tolerance, as they have high Tolerance scores although small and often fragmented distributions, hence suspecting that these species are probably threatened in the study area. The general trend is that species with negative residuals are often categorized as threatened. However, some species did not match this relationship, suggesting that their IUCN classification should be biased.

The genetics of isolation: island speciation, gene flow, and population structure in the *Bothrops jararaca* complex

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The pitviper *Bothrops jararaca* is a highly polymorphic viper endemic to the Atlantic Coastal Forest of Brazil. We compared genetic variation among 19 coastal populations of *Bothrops jararaca* and the two other members of this species complex, the endemic island species *B. alcatraz* and *B. insularis*. We used eight microsatellite loci to determine levels of population structure and divergence, historical and contemporary patterns of gene flow among coastal and island populations, and the distribution of genetic diversity among regions of Atlantic Coastal Forest. We found high levels of genetic variation among populations in northern and southern segments of the species range, which seem consistent with allopatric differentiation, possibly due to population restrictions in refuges during times of reduced distribution of Atlantic Forest habitats. In addition to differentiation along the coast, the two island endemic species, *B. alcatraz* and *B. insularis*, are believed to have originated from coastal populations. Our genetic analyses show that these island populations were bottlenecked at the time of population establishment, although the two species show different degrees of polymorphism. These differences may have been caused by the differences in initial population sizes that became isolated on these continental islands when sea level changes occurred. These genetic patterns also coincide with degree of morphological differentiation, venom characteristics, and population biology and ecology of the island species. Our study underscores the dynamics of isolation, both on continent and islands, and the genetic consequences of changes in the landscape during climatic fluctuations.



Surveying the distribution of a fossorial lizard that is not always available for detection

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Monitoring serves to assess the status of a species or natural resource. Obviously, status and trends will be assessed reliably only if the species is detected if it is truly present at a site. Otherwise non-detection will be confounded with absence or species decline. Although this may seem trivial, few monitoring programs account for this fact. Non-detection has two components: detection probability and availability for detection.

I will use data from the update of the Swiss red list of reptiles to illustrate the effects of imperfect detection (i.e. detection probability < 1) and low availability for detection on estimates of site occupancy of a fossorial lizard. Estimates of site occupancy are biased low if non-detection and availability for detection are not taken into account. Simple likelihood-based methods (MacKenzie et al. 2002, Ecology 83: 2248-2255) can (and should) be used to adjust for both components of non-detection.



MONITORING

Monitoring Amphibians and Reptiles in Europe

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The project EuMon “EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest” develops tools to optimize and promote biodiversity monitoring in Europe. These tools are relevant for the development of an EU Herpetofauna Monitoring Network and for the national duties concerning the reporting due to Article 17. We will highlight outputs that help designing such a network. We will give (i) general recommendations for survey design and data analysis for biodiversity monitoring, (ii) we will show examples from our database of existing herpeto-monitoring schemes in Europe, (iii) we will provide definitions of a comprehensive framework for integrating monitoring schemes across methods, species and countries, (iv) we will give guidelines how to promote volunteer involvement, and (v) we will explain methods determining national responsibilities and conservation priorities for species conservation.



Longevity in *Bombina variegata* (Anura, Amphibia)**B. SEIDEL***Department of Theoretical Biology, University of Vienna, Althanstraße 14, Austria**Present address: Ecology Research & Landscape Assessment Institute, 3680 Persenbeug, Austria;**Bernhard.Seidel@univie.ac.at*

The European Yellow-bellied toad, *Bombina variegata*, is known as opportunistic user of habitats with temporary breeding sites. From 1984 to 1988 a population was studied based on ventral patterns photo-registration of 1143 specimens. In the years 2000, 2002, 2003 and 2007 fifty-seven toads were reliably identified and at least 21 years old, three at least 25 years and two toads were at least 26 years old (data until May 2007). These results emphasize longevity as main factor for the persistence of this population among unpredictable aquatic breeding conditions.

The study found a 100% desiccation rate of eggs and tadpoles in most of the breeding pools, whilst only a few aquatic places enabled successful development. Therefore, high lifetime reproductive success needs, firstly, to dominate proper breeding places by territorial males and, secondly, females have to attract these males with highest possible body mass/number of eggs –these gender specific breeding characteristics are positively related to continuously body growth during life span. Thus, older individuals are the fittest. Protection of the European Bellied-toad and of anurans in general has to consider the longevity of specimens as important factor for individual selection and for natural populations.



DISTRIBUTION

The New European Atlas Project

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The European Atlas of Amphibians and Reptiles was published in 1997, using an UTM grid of 50 x 50 km. A new edition appeared in 2004, with a new chapter reporting the taxonomic changes from 1997 to 2004, but the species distribution maps were not actualized. Hence, the Societas Europaea Herpetologica decided to constitute a new Mapping Committee (MC) in order to produce a new atlas. The new database will be implemented in a Geographical Information System (GIS) which allows a higher quality control of data, eliminating the geographical location errors and producing automatically the species maps. Through the GIS, the species maps can be represented in different graphical representations, independently from the spatial resolution. We present here a species richness map for amphibians and reptiles and several species examples, compiled from all the national atlas published until now. These map are the base to decide which parts of Europe need sampling. The sampling effort in the continent is not similar. About 13 countries have distributional atlases: Austria, Belgium, Britain, Czech Republic, France, Germany, Italy, Luxembourg, Netherlands, Poland, Portugal, Spain, and Switzerland, but some of them were published far ago. Others, like Greece and a new edition of the French atlas are coming soon. For the other European countries there are more or less scattered distributional data; in a few cases (i.e. for Albanian reptiles) there are comprehensive distributional works useful to draw good distributional maps.



Structure of mixed *Rana ridibunda* – *Rana esculenta* population in the Barycz river valley, Poland

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The water frog *Rana esculenta* is a natural hybrid between *Rana lessonae* (LL) and *Rana ridibunda* (RR). The hybrids usually share a population with one of the parental species. Natural *ridibunda* – *esculenta* (R-E) mixed populations are rare, and the ratio between the number of *R. ridibunda* and *R. esculenta* individuals differ among populations studied, being usually higher for species. Therefore the question arises whether this is the result of different life span of the species and of the hybrid. We studied age structure, longevity, and age of sexual maturation of individuals sharing the same population in the Barycz river valley that is one of the most valuable regions in Poland involved in the Living Lakes Project. The age structure in this population may serve as a reference for water frog populations inhabiting areas with higher human impact.

The most numerous males and females of both taxons were 2 – 5 years-old. The youngest females were 3 years-old, and the oldest were 7 years-old. The youngest males were 2 years-old, and the oldest were 6 years-old. Measurements of yearly radial growth of long bones revealed that the frogs grew intensively before reaching sexual maturity (3 years for females and 2 years for males). Analysis of body length and age of juveniles indicated that there is a selection against smaller individuals during the first hibernation in *R. ridibunda*, but not in *R. esculenta*. Statistical analysis revealed that individuals of the species *R. ridibunda* do not live longer than the hybrid *R. esculenta*.



DISTRIBUTION

Contribution to the knowledge of the reptile fauna of the Former Yugoslav Republic of Macedonia

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Although the herpetofauna of FYR of Macedonia was the matter of interest for more than a century, detailed distributions of most of the species are still missing. According to published data, 32 reptile species inhabit FYR of Macedonia. Detailed distribution data of reptile species in FYR of Macedonia are presented. Research of herpetofauna of FYR of Macedonia was carried out from 1999 to 2007 and included more than 100 localities. For 32 recorded reptile species, exact localities, altitudes and UTM coordinates, as well as published records are given.

Results of this study and published records show that the most common representatives of Macedonian herpetofauna are: *Dolichophis caspius*, *Podarcis erhardii*, *P. muralis*, *Vipera ammodytes*, *Testudo hermanni*, *T. graeca*, *Lacerta trilineata*, *Natrix tessellata*, *N. natrix*, and *Anguis fragilis*. Species that were moderately distributed in our results and/or in literature data are: *Lacerta viridis*, *Podarcis tauricus*, *Elaphe quatuorlineata*, *Zamenis longissimus*, *Z. situla*, *Ablepharus kitaibellii*, *Platyceps najadum*, *Coronella austriaca*, *Telescopus fallax*, *Emys orbicularis* and *Malpolon monspessulanus*. According to current data, extremely rare reptilian species in FYR of Macedonia are: *Vipera berus*, *V. ursinii*, *Lacerta agilis*, *Typhlops vermicularis*, *Cyrtopodion kotschy*, *Eryx jaculus*, *Algyroides nigropunctatus*, *Mauremys rivulata*, *Zootoca vivipara*, *Pseudopus apodus* and *Hierophis gemonensis*.

Basic faunistic data are essential for future biodiversity studies and conservation strategies of Macedonian herpetofauna.



Why are there so many species? – Understanding hyperdiverse tropical tadpole communities

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One of the most fascinating features of tropical species communities is their high diversity. Nevertheless, knowledge of factors regulating these communities is scarce. Presumably, habitat features and species interactions affect richness, composition and structure of the community – but also random factors might play a significant role. We have currently started a research project to decipher the regulating processes in one of the most diverse anuran communities of the world in the montane tropical rain forest in Eastern Madagascar. In this habitat, more than 100 frog species occur sympatrically, and more than 30 anuran larvae (tadpoles) occur together within one small section of a stream. Anuran larvae as well as their potential predators were sampled and habitat features were recorded in 32 streams in the Ranomafana National Park in February and March 2007. Multivariate analyses deliver insight in how these hyperdiverse tadpole communities are influenced by (1) habitat features, (2) predation, and by (3) interspecific competition both, on a micro- (within a stream) and macro habitat (between streams) scale.



CONSERVATION

Strategies for habitat conservation

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Herpetological conservation aims at the sustainable survival of threatened and vulnerable reptile and amphibian populations. The most effective means for this is the conservation and management of their habitats. However, this can be hard to achieve as a result of conflicts with other, often economic, interests in the same area. Even in protected nature areas interests for herpetofauna may conflict with those of other species, such as plants or birds, or managers do not understand their needs.

A range of approaches is needed to ensure appropriate and sufficient results are achieved through conservation measures. The right conditions must be provided to sustain all life stages of the animals, and over a sufficiently large area to sustain populations into the future. This will require management of habitats, often at a landscape scale, but specific measures are often needed for herpetofauna, focusing on vegetation structure, hydrology and connectivity between areas. Conservation needs a strong policy and legislative basis; including designating important areas, providing means to ensure that they are appropriately managed in the long term and providing suitable 'buffer zones' to protect them. Changing climate brings further uncertainties that will have to be dealt with.

Conservation objectives need to be defined and explained. Setting realistic and measurable targets, and establishing the monitoring protocols to assess progress, helps determine the work needed to conserve amphibians and reptiles and set priorities.

Practical and policy measures, including translocation, and their relationship to target setting and monitoring will provide a basis for discussion in the workshop.



The fossil snake *Falseryx*: the last European dwarf boaZ. SZYNDLAR¹ & J.-C. RAGE²¹ *Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Slawkowska 17, 31-016 Krakow, Poland; szyndlar@isez.pan.krakow.pl*² *UMR CNRS 5143, UPMC, Département Histoire de la Terre, Muséum national d'Histoire naturelle, CP 38, 8 rue Buffon, 75231 Paris cedex 05, France; jcorage@mnhn.fr*

The recent distribution of dwarf boas (Tropidophiinae and Ungaliophiinae, “Tropidophiidae” in traditional classifications) is restricted to the western tropical America and Caribbean islands. They differ from other snakes, among others, by their caudal osteology. A number of fossil dwarf boas were reported from the Paleogene of Europe, Africa, and Americas, thus suggesting much broader (perhaps world-wide) geographical range of these snakes in the past. Of them, the fossil genus *Falseryx* is recognized on the basis of most complete and informative caudal portion of the vertebral column, approaching the unique morphological pattern characteristic of the living Tropidophiinae (*Trachyboa* and *Tropidophis*). *Falseryx* visited western Europe twice: in the beginning of the Oligocene (Szyndlar, Rage & Smith, submitted) and then at the end of the Early Miocene. The most reasonable explanation of its absence in the period between these two dates is that the Western European population of the genus became extinct shortly after its first appearance in the earliest Oligocene. The dispersal pattern of *Falseryx*, strikingly similar to those of some extinct and extant genera of the Colubridae, supports the hypothesis that in most phases of the Oligocene and Early Miocene West European snake faunas were effectively isolated from more eastern populations, which inhabited unidentified areas, and which were at the origin(s) of the colonisation(s) of Western Europe. Whereabouts of these areas, informally termed “a waiting room”, remain unknown. *Falseryx* or its close relative, occurring in southern Germany until the end of the Middle Miocene, was the last survivor of non-erycine booid snakes in the European continent.

Habitat selection of *Phrynocephalus persicus* (Agamidae) in the Goravan Sands Sanctuary (Armenia)

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Phrynocephalus persicus is used as a model species to study conservation approaches in intensively used lands. To ground conservation management for *P. persicus* in the Goravan Sands Sanctuary (Armenia) habitat and microhabitat requirements of the lizard were studied.

A total 106 specimens of *P. persicus* were sampled using visual encounter survey in March-June 2005 and registered using a GPS. Distances to the nearest plants, plant lists and plant sizes in locations of *P. persicus* were compared with those of syntopic *Eremias pleskei* and *Eremias trauchi*, using Kruskal-Wallis ANOVA. It is concluded that sparse vegetation (mean±SD=1.7±0.8m) with dominance of the semi-shrub *Achillea tenuifolia* is characteristic of microhabitats of *P. persicus* and seems to provide better conditions for thermoregulation.

Predictive model using Ecological-Niche Factor Analysis performed with the software Biomapper 3 (Hirzel et al. 2002-2007) allowed to conclude the following:

(i) *P. persicus* prefers finely rugged (FI=0.075±0.054) sandy patches and finely inclined slopes (5.98±5.49°), which, probably, allows it to better perform burrowing. (ii) Sandy patches with area ≤2 hectares probably have a small potential to sustainably support viable populations of the lizard. (iii) Finely rugged relief of sandy ravines has higher marginal score (-0.169) than aspect of the surface (-0.099), and probably provides necessary conditions for thermoregulation. (iv) Low habitat suitability for *P. persicus* was predicted by closeness of the reclaimed lands and the settlement, and may be a result of the general man-induced impact. Habitats with firm stony, rocky, clayey and brown soils were unsuitable for *P. persicus*.



Genealogy of the nuclear β -fibrinogen intron 7 across old, divergent mtDNA lineages of Bosca's newt (*Lissotriton boscai*): concordance between mt and nuclear DNA based on explicit spatial models

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Phylogeographic studies require the combination of nuclear and mitochondrial DNA datasets to construct robust hypotheses about the evolutionary history of taxa, to provide adequate, rigorous data for delineating species limits and, ultimately, to inform wildlife managers. In a previous study, we uncovered unexpected, deep genetic fragmentation in the Iberian endemic newt *Lissotriton boscai* using mitochondrial DNA (mtDNA) markers. In this work, we further explore the evolutionary history of the species using sequences of the nuclear β -fibrinogen intron 7 and additional mtDNA data across the species range to test the congruence between nuclear and mitochondrial datasets at the same level of spatial organization and evaluate the possibility that additional taxa should be recognized within *L. boscai*. We use a combination of phylogenetic, phylogeographic and spatially explicit models to reconstruct a plausible evolutionary scenario for the species and discuss the taxonomic implications of our findings. Despite notable overall congruence between nuclear and mtDNA datasets, we identified a new nuclear haplogroup not present in the mtDNA data set and extensive areas of admixture between populations from well-differentiated mtDNA lineages, suggesting widespread nuclear gene flow across mtDNA boundaries or incomplete lineage sorting of nuclear genes highlighting the importance of combining evidence from nuclear and mitochondrial data before deriving taxonomic conclusions.



Nuclear introns give evidence for reticulate speciation in the *Triturus cristatus* superspecies

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The newt genus *Triturus* was recently split into several genera. The six species of marbled and crested newts that are remaining have largely parapatric distributions across Europe and the Middle East. The evolutionary history of the crested newt group (*Triturus cristatus* superspecies) is not clear. Adding to existing mitochondrial data, we developed a set of five nuclear genetic markers to elucidate the phylogeny of the group. The sample consisted of 40 individuals representing four species over their entire range. We sequenced three introns and two anonymous markers for a total of ca. 3000 bp. The reconstructed phylogeny demonstrates that the sister species *T. cristatus* and *T. dobrogicus* from northern and central Europe are relatively homogeneous, pointing to recent range expansions. *Triturus carnifex* from Italy and the Balkans shows two major geographical groups. Finally, *T. karelinii* from southeastern Europe and adjacent Asia is the most variable and is possibly a paraphyletic species. High levels of introgression and low support for interspecific relationships are evidence for reticulate speciation. We will discuss our findings in a historical biogeography context.



The impact of longline fishery in juvenile loggerhead sea turtles: insights from 14 years of stranding data in the Valencian Community (eastern Spain)

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We undertook detailed analyses of loggerhead turtle (*Caretta caretta*) strandings over a 14 year period (1993-2006) from the Valencia Community (east Spain). We detected an increasing trend of strandings over the period, but suggest that this was driven primarily by the improvement of the stranding network developed for data acquisition. Turtles were mainly of juvenile size (CCL=53.1±12.8cm, range:16-80.2, N=327). Strandings were far more frequent in summer months (68.2% in June-September). Interaction with longline fisheries was by far the main cause of stranding detected (41.7% of 410 turtles with likely cause identified). Turtles affected by longline were on average larger than non affected turtles, and were more frequent in summer months, the time of main longline fishing effort in this area. Further data acquisition is necessary, since we detected a significant decrease in the proportion of turtles stranded affected by longline over the last five years, possibly due to reduction of longline fishing effort in this area. By-catch by longline fisheries has been reported as the main cause of sea turtle mortality in the Western Mediterranean yet, although on-board observer studies provide capture rates, very few studies are able to provide mortality rates. Although inferences from strandings data must be subject to a number of caveats, they can when over wide spatio-temporal extents, offer useful insights in the conservation biology of marine species. In this case, highlighting that long-line interaction is indeed a significant source of marine turtle mortality and that, depending on fishing effort, it's prevalence may change.



Reproductive strategies of high mountain snakes in the Caucasus

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In the high-mountain belts of the Great Caucasus high precipitations prevail, and a steady snow cover is saved more than semiyearly. Limited number of snake species can survive in such difficult conditions. *Pelias dinniki* and *Pelias lotievi* are obligatory oreophylous species of ophidiofauna of the Great Caucasus. As to the facultative oreophylous species, *Coronella austriaca* ranges along all Ridge being ubiquist, widespread from a seashore up to high-mountain belts: On the different segments of Great Caucasus this species can be found in the border between middle-mountain and high-mountain belts as well as *Natrix megaloccephala*, *Elaphe hohenackeri* and *Coluber najadum*. On the long-term scale of monitoring (more than 30 years), the birth of juvenile *Pelias dinniki* was studied both in nature and after the maintenance of pregnant females in terrarium marked at the end of August - beginning of September. Late birth of juveniles was recorded in terrarium: in the last ten-day period of September - to the first ten-day period of November. Average daily air temperature during this period in nature varied from 3 to 8°C. In high-mountain belts, snow starts falling in the middle of September and a steady snow cover beds since middle of October. In nature, female vipers were not in a position to give birth juveniles in this period and go to hibernation pregnant. Findings of new-born *Pelias dinniki* in nature at the end of June - beginning of July have been confirmed. Other interesting feature is the ability of females to give birth after one year from the last copulation. This has been recorded in terrarium for *Pelias dinniki* and *Natrix natrix persa*. The possibility of reproduction of snakes without males could be due to either parthenogenesis or viable sperm storage or delay of development of the fecundated ovules. Being parthenogenesis discarded because both species are bisexual, to discriminate between the other to phenomena would require further histological analysis. Similar adaptations are also known for tropical snakes, the density of populations of which, as a rule, is low and possibility of contacts is difficult. In any case, and possibility of delaying pregnancy across the period of hibernation and the possibility of giving birth without immediate copulation are unique reproductive strategies of alpine snakes of Caucasus, allowing them to cope with the Glacial periods when the overhead belts of mountains developed.



Molecular genetic analysis of the captive and natural populations of an endemic vulnerable species, the Jamaican boa (*Epicrates subflavus*)

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The Jamaican boa (*Epicrates subflavus*) is an endemic species whose natural populations greatly declined since the late 19th century, mainly due to predation by introduced species, human persecution, and habitat destruction. A captive breeding program was initiated in 1976 and during the last 30 years, more than 600 offspring, of which 80 are still alive today, have been produced and distributed among European host institutions and privates. First, using nine nuclear microsatellite loci and a fragment of the mitochondrial cytochrome b gene, we performed the first molecular genetic analysis on the diversity and structure of the natural populations of the Jamaican boa. Both types of markers (nuclear and mitochondrial) underline an Eastern versus [Western+central] pattern of differentiation in agreement with geological data and patterns of differentiation uncovered in other vertebrate and invertebrate Jamaican species. Second, we used the same molecular markers to analyse the captive breeding program: determine the natural population from which the founders originate, identify parental allocation errors and ambiguities in the studbook, and assess the genetic diversity and levels of inbreeding of the current captive population based on loss of alleles, variance in reproductive success, and relatedness among individuals. Combining measures of relatedness derived from multilocus genotypes with practical parameters such as age of animals and localization of host institutions, we propose mating groups that would produce minimum inbreeding in the captive population. Our results provide insights and guidance for an objective management, through both in-situ and ex-situ approaches, of this spectacular, yet poorly known and vulnerable, snake species.



Phylogeography of the endemic *Hemidactylus bouvieri* (Bocourt, 1870) geckos of Cape Verde islands based on mitochondrial and nuclear genes

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Three subspecies are recognized within *Hemidactylus bouvieri*, an endemic Cape Verdian gecko. A study of its genetic diversity is critical given the presence of two introduced *Hemidactylus* species on the islands. We sequenced cytochrome b and 12S rRNA fragments of *H. bouvieri* from seven Cape Verde islands and combined them with previously published sequences, to explore its phylogeny, evolution and biogeography after application of a molecular clock. Maximum-likelihood, maximum-parsimony and Bayesian analyses based on mtDNA revealed four well-supported clades from three major geographical units: a highly divergent southern group of samples from Fogo, separated from other forms 10.6 My ago; an eastern group (6.4 My) – subdivided between samples from Sal and Boavista; a group from S. Nicolau (5 My) and its sister group, with samples from the remaining northwestern islands. Analysis of a nuclear gene (RAG2) confirmed mtDNA results. These results are explained by geographical distances and connection of some islands during Pleistocene sea level falls. The deep phylogenetic divergence observed may indicate a species complex which would require much greater conservation effort.



Patterns of nuclear and mitochondrial DNA variation in Iberian populations of *Emys orbicularis* (Emydidae): conservation implications

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The European pond turtle (*Emys orbicularis*) is threatened and in regression in several regions of its widespread European distribution due to several threats which contribute to population fragmentation. We have focused our efforts on studying the genetic diversity and structure of Iberian populations with a fine-scale sampling (254 turtles in 10 populations) and a representation from North Africa and Balearic islands populations. Using both nuclear and mitochondrial markers (7 microsatellites, ~1048 bp nDNA and ~ 1500 bp mtDNA) we have carried out phylogenetic and demographic analyses. Our results show low values of genetic diversity at the mitochondrial level although our microsatellite dataset revealed relatively high levels of genetic variability with a latitudinal genetic trend decreasing from the South to Northern populations. A moderate degree of genetic differentiation was estimated for Iberian populations (genetic distances, FST values and clusters in the Bayesian analysis). The results in this study, combining mtDNA and nDNA, provide the population genetic data for *E. orbicularis* in the Iberian Peninsula, having implications for the management of this species.



Comparative phylogeography of widespread reptile species in Madagascar

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Using sequences of the mitochondrial 16S rRNA gene, we reconstructed the phylogeography of six widely distributed Malagasy reptiles: two gekkonid lizards, *Phelsuma lineata* and *Hemidactylus mercatorius*; two chameleon lineages, *Furcifer lateralis* and the *Calumma brevicorne* complex; and two skinks, *Trachylepis gravenhorstii* and *T. elegans*. These species resulted to display a clear and roughly congruent phylogeographic pattern, with a basal subclade in northern Madagascar, and distinct subclades in the south, along the east coast and in the central highlands. Genetic differentiation among major haplotype lineages was high and may in some cases indicate species status of the divergent populations. Maximum divergences were between 2.2 and 8.3% within the various species or species complexes. Haplotype lineages were exclusive to geographic regions, except in the commensal *Hemidactylus mercatorius* where in three anthropogenic habitats coexistence of haplotype lineages was observed, possibly due to human translocation. The geographic extent of the northern clade varies between species. The large eastward flowing rivers Mangoro and Mananara appear to be barriers to gene flow in the case of three species each. Species comprehensively sampled from humid eastern and arid western Madagascar (especially *Furcifer lateralis*) showed no differentiation between populations from these two regions; instead the pattern observed in four species was in agreement with a differentiation along a north-south axis, with populations in the northern fourth of Madagascar being most divergent. This observation is concordant with recent analyses from lemurs but the latitude and taxonomic levels at which the north-south divergence occurs differ, and the factors causing it remain unexplored.



Towards thermal land evaluation for species distribution mapping; thermoregulation and use of microhabitat by *Timon lepidus* (Daudin, 1802)

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Habitat suitability of cold-blooded species can be expressed by the degree the thermal requirements of a species are satisfied by the thermal properties offered by the landscape. A conceptual framework for species suitability mapping based on this principle has been implemented in a Geographic Information System (GIS) and validated against field observations.

Field observations were collected at “Torcal de Antequera” (Malaga, Spain) where a sub-adult *Timon lepidus* (Daudin, 1802) was monitored during 2-4 October 2006. Lizard activity periods, air temperature, insolation, wind speed and relative humidity were recorded simultaneously at an interval of one minute. Surface temperature and lizard (skin) temperature were recorded using a thermal imager at up to 1 frame per 0.1s. Level measurements were taken to create a relief map of the area and used in conjunction with LAI measurements of the vegetation to simulate insolation at the surface. The surrounding area was mapped with a series of still-images stitched into one geo-referenced mosaic and ingested with the other observations into a GIS.

Lizard body temperature, and lizard activity periods were modelled using a Generalized Linear Model (GLM) and a Surface Energy Balance for Cold-blooded Organisms (SEBCO) to allow comparison against the field observations. GLM for surface and lizard temperature explains 95.72% and 93.01% of the variance respectively. SEBCO explains 89.4% of the variance. Sensitivity analysis show highest influence of surface temperature in the prediction for the GLM while solar radiation has the highest influence in the SEBCO. Future work will attempt up-scaling of the results to national and regional scale, and assess the predictive value of the framework in explaining distribution of amphibians and reptiles.



Rapid diversification and dispersal during global warming periods by plethodontid salamanders

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We present a comprehensive analysis of phylogenetic relationships and historical biogeography of Holarctic representatives of the Plethodontidae, the most speciose family of salamanders. A phylogenetic framework and timescale for the evolution of all Holarctic genera is derived from multilocus nuclear DNA sequences.

Plethodontids are an old radiation whose common ancestor diverged from sister taxa in the late Jurassic and underwent rapid diversification during late Cretaceous. Our data support a North American origin of plethodontids followed by a continental-wide diversification, rather than one centered only in the Appalachian region. The colonization of Eurasia by plethodontids most likely occurred once, by dispersal of a single lineage during the late Cretaceous, but two dispersals are possible but less likely. Subsequent diversification in Asia led to the origin of *Hydromantes* and *Karsenia*, with the former then dispersing both to Europe and back to North America. North American dispersal events in *Aneides* and *Plethodon* partly overlapped in time during the Oligocene. Salamanders underwent rapid episodes of diversification and dispersal that coincided with major global warming events during late Cretaceous and again during the Paleocene-Oligocene thermal maximum. These rapid diversifications led to the establishment of the major clades, contemporaneously with similar phenomena in angiosperms, birds and mammals. Periods of global warming could have been particularly favorable for diversification and long dispersal in northern hemisphere salamanders, despite their low capacity of dispersal compared with other groups as birds or mammals, by making available terrain that shortened dispersal routes and offered new opportunities for adaptive and vicariant evolution.



Effect of UV-B radiation on the survival of amphibian larvae from coastal wetlands in SW Spain

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We have investigated during 2006 and 2007 the effect of UV-B radiation on the development of anuran eggs and young larvae of anurans and urodeles. Amphibians were exposed in 70 L tanks to ambient levels of UV-B in open-air locations at the sea-level in South-western Spain (Doñana National Park, Huelva). In these sites amphibians usually breed in late autumn or winter when levels of UV-B radiation are relatively low (lower radiation intensity and less hours of sun exposure) and water is usually clear and usually permit a significant UV-B penetration. Using Mylar and acetate filters, seven species were exposed in shallow and clear water to three levels of environmental UV-B: 100%, 86% and 4%. In *Lissotriton boscai*, *Triturus pygmaeus*, *Pelobates cultripes*, *Hyla meridionales*, *Rana perezi* and *Discoglossus galganoi*, UV-B caused a significant mortality between February and April. We have found a significant variability in sensitivity to UV-B among species. Urodeles were much more sensitive than anurans. In the urodele species (*L. boscai* and *T. pygmaeus*) 100 % mortality occurred within 2 and 3 days respectively, whereas anuran embryos and larvae did not show mortality till over 5 days of exposure. After the first day of sun-exposure, the mortality of *L. boscai* was on average 0,53 and 0,27 under 100% and 86% of UV-B respectively. The embryonic and larval development from these six species in clear and shallow waters can be seriously affected by UV-B radiation. Only in *Epidalea calamita* there was no significant effect on larval survival in March with a maximum daily rate of 1,295 W/m².



DISTRIBUTION

The ‘arid corridor’ distribution in Africa: a search for instances among reptiles

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The similarities between fauna and flora of the arid southwest and northeast corners of Africa have been pointed out by several authors and Poynton has underlined this distribution pattern of an arid corridor with instances from Bufonid amphibians. A strip of arid country still connects these two areas through Kenya, Tanzania and the northern party of Zambia and has allowed a faunal and floral exchange during dry phases of the Quaternary. The Luangwa Valley in northern Zambia has an important role as barrier and dispersal route within the corridor, which is shown by the historical distribution of rain forest in Africa. The importance of the arid corridor as typical distribution pattern in Africa will be shown firstly with evidences from reptiles, especially from agamid lizards.



***Allobates femoralis* (Dendrobatidae): a very handy fellow for anuran field bioacoustics**

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Fixed site attachment and a long calling period within an environment of little temperature change render the males of the diurnal Pan-Amazonian frog *Allobates femoralis* a rewarding species for field studies on both calling and hearing in anurans. The terrestrial calling positions are spaced at several meters, thus allowing one to move within the territories without disturbing the resident males. Vocally active males react with stereotypic phonotactic responses to the playback of conspecific and a large variety of synthetic calls. Thus, the highly repeatable positive phonotaxis make *A. femoralis* “handy” in obtaining reliable and repeatable data from an animal behaving in its natural habitat.

To test for interference effects of co-occurring species on the male-male communication system of *A. femoralis*, we compared the calls and the phonotactic reaction of territorial males at eight Amazonian sites: four where *A. femoralis* occurs together with *Epipedobates trivittatus* and four where *E. trivittatus* is absent. The occurrence of *E. trivittatus* gave rise to significantly narrower and more asymmetric frequency-response curves in *A. femoralis*, without concomitant differences in the call or in body size. To investigate the relative contributions of different evolutionary mechanisms to geographic differentiation of these populations, we compared calls, colouration, body shape, and the cyt-b gene. As expected, the studied traits did not evolve as a unit. Contrary to our expectations and in contrast to current models of speciation in the Amazon basin, most geographic variation in calls and cyt-b was attributable to geographic distance between populations.



LIFE HISTORY

Long-term observation on a breeding population of *Salamandra infraimmaculata* on Mt. Carmel

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A population of the rare, xeric-inhabiting salamander *Salamandra infraimmaculata* was monitored for 25 consecutive years (1974-1999) during the annual breeding season near the breeding ponds on Mt. Carmel. This is a fringe area of the genus' south-easternmost Palaearctic distribution. The breeding period extended between October and January but most females visited the ponds during November and December. Some salamanders came to the ponds time and again during the same breeding season. Consequently, it appears that these salamanders show site tenacity. A large number of them was recaptured several times (up to 40 times in males) over the years at the same site surrounding the breeding ponds. Some of them visited the ponds for several years (17 years in females, 19 years in males) some on a number of consecutive years (5 years in females, 10 years in males), and some were recaptured after intervals of years elapsing between visits to the ponds (up to 10 years in females, 8 years in males). Since some of the female salamanders visit the ponds on consecutive years, this may indicate a possible lack of sperm storage. It may also indicate multiple mating and fertilization by spermatophores originating in different paternal sources. Consequently, sperm mixing can not be ruled out. On the other hand, the long periods that sometimes elapse between visits may be an indication that several ponds far apart are being visited. This suggests that this salamander is not necessarily tenacious to a single pond. As these salamanders visit the breeding ponds only as adults and they become sexually mature only when reaching the age of 3-4 years, their age can be estimated. Consequently, longevity of individual salamanders monitored under natural conditions was 22-23 years in males and 20-21 years in females. The number of salamanders fluctuated during the study period not showing any particular pattern. However, the sex ratio that was male biased during most of this period showed a drop in female numbers during the last years. The interpretation of the species' status is dependent on the capture-recapture rates as well as on the duration of the study. In the first few years no salamanders were recaptured, later on the number of salamanders recaptured increased but in later years there seems to have been a decline. Although, this could be a phase in normal population cyclic oscillations it could also indicate a decline in this population numbers.



Molecular phylogeny of Cophylines: regional endemism and parallel miniaturization in Madagascan Microhylid frog

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We provide a nearly complete species-level molecular phylogeny for Malagasy cophylines, where we could identify a new genus (formerly assigned to *Stumpffia*), confirming the parallel evolution of miniaturization in these frogs. The genus *Plethodontohyla* proved to be paraphyletic, therefore 6 *Plethodontohyla*-species were transferred to the formerly monospecific *Rhombophryne*.

Furthermore we identified biodiversity hotspots and regions of endemism: latitudinal species richness of Malagasy cophylines follows a bimodal distribution with maxima in the south-east and north-east. However, centers of endemism only partially correspond to these centers of diversity - we identified additional hotspots of endemism in the central-west and Sambirano regions. This unusual pattern requires explanation. 27 cophyline species show range sizes smaller than 100km², and range sizes get significantly smaller with increasing distance to the center; we tested whether the observed pattern could be explained by the Mid-domain effect (MDE), or be the result of historical or ecological factors.



PHYLOGEOGRAPHY

Get an eyeful of this: phylogeny and biogeography of cobras and the origin of venom spitting in elapid snakes

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We use phylogenetic analysis of 1333 b.p. of mitochondrial DNA sequence to investigate the phylogeny and historical biogeography of the cobra-like elapid snakes with special reference to the evolution of spitting and the phylogeography of the African spitting cobras, a radiation of elapid snakes widespread in open vegetational formations throughout sub-Saharan Africa. Our results suggest that spitting adaptations appear to have evolved three times in cobras, but alternative scenarios cannot be rejected. The Asiatic *Naja* are monophyletic and originate from a single colonisation of Asia from Africa. The radiation of the African spitting cobras appears to date back to the early Miocene and many speciation events in the group predate the Pliocene expansion of grasslands and the radiation of large grazing mammals in Africa. The cladogenic events in this complex appear to have been triggered by both ecological changes and tectonic events associated with the formation and expansion of the African Rift Valley. Taxonomically, our data confirm the inclusion of *Boulengerina* within *Naja*, and reveal a clade of African rainforest cobras including *N. melanoleuca*, *Paranaja multifasciata* and *Boulengerina*, which constitutes the sister clade of the African open-formation non-spitting cobras. *Naja nigricollis* is polyphyletic, and we therefore recognise *N. nigricincta* as a separate species, and note the presence of at least one undescribed species in the complex.



On gaits and locomotor diversity within the Yellow Anaconda (*Eunectes notaeus*)**B.A. YOUNG**

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Previous studies of locomotion in snakes have generally emphasized single modes of locomotion, particularly those associated with distinct environmental conditions (e.g., sidewinding), and the kinematics of more gracile species. This study centred on a large thick-bodied species, *Eunectes notaeus*, generally regarded as an ambush forager. Locomotor arenas were constructed that provided the snakes with either: a uniform very low friction substrate; isolated contact points (pegs) at varying intervals; a uniform high friction substrate; shallow water over a soft substrate; and deep water. Unrestrained locomotor performance of the specimens was recorded using standard (30 fps) and high-speed digital video systems. The results demonstrate that there is far more locomotor diversity and complexity in snakes than has been previously described. On land, and particularly with low friction, the animals exhibit distinctive gaits, transiting between different locomotor modes including a previously undescribed form of locomotion. The presence of contact points or uniform friction increased the snake's velocity regardless of the mode of locomotion. As with previous pegboard studies, the contact point advantages gained from the pegs diminished as peg spacing decreased.



DISTRIBUTION

Distribution of *Vipera berus nikolskii* Vedmederja, Grubant et Rudaeva, 1986 in Western and Central Ukraine, Moldova and Eastern Romania

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Using discriminate analysis specimens *Vipera berus* complex from the territory of Western Ukraine, Moldova and Eastern Romania were determined. In the Western Ukraine *V. b. nikolskii* is found in Kirovohrad, Cherkassy and the northern part of Odessa regions. In Moldova it lives along right bank of the Dniester in the Northern Moldova and in Kodry height. In Romania *V. b. nikolskii* findings are situated in the territory between the Siret and the Prut rivers from Epureni and Larga vicinities (region Iasy) in the north to Birlad vicinities (region Vaslui) in the south. *V. b. nikolskii* borders upon *V. b. berus* along external edge of Carpathian range (the Siret river valley), than, presumably, along border of forest-steppe and forest zones (to the South-East from Hotin height in Chernivtsy region and to the south from Kiev on the right bank of the Dnieper). Intermediate between *V. b. berus* and *V. b. nikolskii* specimens have been found in Chernivtsy, Ivano-Frankivsk, Ternopil and Kyiv regions in Ukraine and external edge of southern and eastern Carpathians (Vilcea, Dimbovitza, Covasna, Vrancea, Neamt and Suceava regions, Romania).

Investigated populations differ from known populations of *V. b. nikolskii* presence of *berus*-like, not melanistic adult specimens: 5,9-11,2 % in Kaniv, Cherkassy region, Ukraine – Zinenko, Ruzhilenko, 2003); about 50 % in Kodry heights in Moldova; 100 % in the Northern Moldova. This very uncommon to *V. b. nikolskii* type of coloration, however, combines with pronounced diagnostic characters of the taxa (Molto, Zinenko, 2005) – polymerized pholidosis, pattern of coloration, similar with newborns in Eastern Ukraine, weekly pronounced sexual dimorphism in coloration, colorless venom. *V. b. nikolskii* here demonstrates the similar habitat preference and list of sympatric species as in Eastern Ukraine (Zinenko, 2006).



Food intake and energetics in the European Whip snake, *Hierophis viridiflavus*

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The food intake energy has been not yet investigated in snake species. Patterns of food intake energy may then represent an excellent tool to monitor at the same time (i) geographic variation as well as (ii) interpopulation comparison.

Insects, reptiles, and mammals, whose total corresponds to 72.75% of total prey spectrum in Central Italy and to about 76% in insular habitats, were selected. Ten crickets, 10 adult lizards and 10 immature house mice, were sacrificed (permission # DPN/IID/2005/28177), and processed.

Despite crickets and lizards were significantly lighter than mice, lizards were much richer in proteins (Mann-Whitney, $p=0.0001$), mice were richer in lipids (Mann-Whitney $p = 0.004$), and more caloric than lizards (Mann-Whitney, $p=0.049$). Considering males and females lizards, proteins were equally distributed in both sexes (Mann-Whitney, $p=0.114$), while lipids are more abundant in females (Mann-Whitney, $p=0.011$), as well also higher values of calories (Student t-test, $p=0.003$). Kcal tritration in females lizards did not differ also when compared to mice (Student t-test, $p=0.501$).

The calculated energy estimation for a diet composed of 6 prey items*month⁻¹, for the known or the estimated periods of activity, divided between continental Italy and insular habitats is summarised below:

Central Italy, Sardinia and Corsica (9 months): Kcal 2246.37.

Small Mediterranean islands (9 months): Kcal 1095.56.

Southern Italy and Sicily (10 months): Kcal 1743.00.

A more caloric diet could be adaptively selected in northern populations (shorter activity season), while a lesser caloric diet could be typical in southern populations and small islands (longer activity season).





5. Poster Presentations

***Emys orbicularis* movement along a temporal stream in a Zamora population (Spain)**

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The knowledge about habitat use for a species is very important as a conservation key. In this work we examine the movement and stream section fidelity in *E. orbicularis* population. We take the localization of captured individuals along four sample years a temporal stream of 3 Km. The maximum movement observed (1400 m) corresponded to a young male of 127 mm carapace length, captured three times along three years. Of 66 terrapins, more than 50% were not recaptured to more than 200 m away from the original pool stream. 18% of observed individuals were in the same pool stream throughout four years. Despite the movements along the stream observed, movement areas tend to be restricted, normally not exceeding 500 m along this stream.



Presence of Iberian Terrapins depending on land characters in two regions of Spain (Zamora & Salamanca)

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In “Distribution and Conservation Project of terrapin in Castilla y León (Spain)”, 365 aquatic sites in Zamora and Salamanca provinces (Central Spain) were sampled in search of terrapins in order to determine the presence of these species. Observations were related to habitat variables to determine negative factors which could constraint its presence, as the habitat type, structure of river wood, land use around the site and anthropological factors (change of course, canalizations, drainpipe, sport fishing, near urban areas, ...). The descriptive scores show higher use of different aquatic mass by *M. leprosa* than by *E. orbicularis*. The European terrapin is less frequent in larger rivers and dams than *M. leprosa*. The riverine was the habitat type more frequently used by both species and it is more common within lands used as cattle pasture and traditional kitchen gardens. *E. orbicularis* is absent in land with intensive farming, irrigated and with modified streams, but appear in streams with drainpipe in more proportion than *M. leprosa*.



Body temperatures and terrestrial movements of natterjack toad during spring and winter in a semiarid zone

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Temperature-sensitive transmitters were implanted into the abdominal cavity of seven *Bufo calamita* adults. They were tracked during and after the cold season of the zone (winter: January to March) and during and after the breeding period (spring: March to June). The study area is a semiarid zone with an important deficit of precipitation (about 370 mm) and high air temperatures (average summer temperatures of 24,7°C and winter temperatures of 5.3°C). Locations of the animal and core temperature were recorded daily. Preliminary results suggest a significant relationship between environmental temperature and core temperature in winter, but not in spring. During spring core temperature remained more or less constant and independent of environmental temperature. The movements of the toads depended on the precipitations, and like the precipitations of the zone, these were few. The number of movements by toad in winter was around 5 (range: 2-9) with a total average distance of 761 m but with high variability between individuals (SD= +/-431). The number of movements in spring was lower than in winter, toads moved only once after toads were released in the field. The average for distance of the toad was 278 m (SD= +/-101 m).

Results suggest that after reproduction or precipitations toads took refuge in stone embankments, near the breeding-pond, and remained in these shelters during summer. Probably, they moved within the crevices to feed and they conserved a constant temperature. In winter, however, toads are more active than in spring and summer due to lower air temperatures and greater humidity. We conclude that high temperatures are a more significant challenge for survival than low ones, at least in this study area. These results are consistent with skeletochronological studies on the same population that found multiples growth marks in bones of reproductive toads indicating the winter activity of *Bufo calamita* in the study zone.



Cross species amplification and characterization of DNA markers developed for *Podocnemis unifilis* in *Peltocephalus dumerilianus*

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The freshwater turtle, *Peltocephalus dumerilianus*, Big-headed Amazon river turtle “cabeçudo”, living in the north of the South America, is a member of the Pelomedusidae family, infraorder Pleurodira. With the intention to carry out comparative genetic analyses in *Peltocephalus dumerilianus*, and between genus, had been tested the viability of microsatellites developed for *Podocnemis unifilis* in *P. dumerilianus*. Of 19 loci tested on for cross species amplification, in 6 individuals of *P. dumerilianus* was verified that 1 locus (Puni_1D11) is monomorphic and 2 loci (Puni_1E1 and Puni_1H9) are polymorphic, with a low number of joined alleles (2). New loci developed for other species will be tested in *P. dumerilianus*, to have a reasonable number of loci changeable, for use in genetic analyses in this species.



Variation in the body mass condition of the populations of *Testudo graeca* in southeast Spain

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The body mass condition (mass relative to the size) is a biometric descriptor that, despite its simplicity, may yield abundant information about the biology and functioning of terrestrial tortoise populations. In the present work we study the seasonal, interannual and interpopulation variation of the body mass condition of the populations of the spur-thighed tortoise *Testudo graeca* in southeast Spain. Results showed that the three considered factors (season, year and population) cause variations in the body mass condition index of the individuals. The interannual analysis pointed out variations in both the average values of the index and in its seasonal variation pattern. These results could be related to variations in annual rainfall and its distribution along the year. Finally we explored the causes of the interpopulational variations in the body mass index in relation to climate, relief, lithology and land uses.



The ratio of blood parasites between hybrids and their parental species of rock lizards of genus *Darevskia*

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The parasitological observation of blood smears of hybrids *D. valentini* x *D. unisexualis* and *D. valentini* x *D. armeniaca* and their parental species from sympatric zone near village Kuchak (central part of Armenia) has detected at least five forms (or species) of blood parasites of genus *Karyolysys* (Sporozoa, Coccidia, Adeleida, Haemogregarinidae) which was previously described by Beyer et al. (1961-1984).

Comparative analyze of abundance of blood parasites has shown that all studied hybrid lizards (N=23) with exception one adult and two subadults individuals were infected by them. The average percent of infected erythrocytes was $2,85 \pm 0,27$. The blood of all lizards of the paternal species *D. valentini* (N=11) was infected and have similar average percent of infected erythrocytes ($2,82 \pm 0,35$). Contrariwise, the blood of the both maternal species *D. armeniaca*, *D. unisexualis* was quiet clear. There were not notice infected erythrocytes on smears of individuals of *D. unisexualis* (N=19) from studied samples. Only 4 infected lizards among 11 individuals of *D. armeniaca* were detected and their average percent of infected blood cells was equal $0,09 \pm 0,02$.

Thus, the prevalence of infection was significantly higher either in bisexual species *D. valentini* or hybrid individuals than in parthenogenetic lizards. This result problematical for explain, although we have some presupposition like positive relationship between body size and abundance of parasite, and also greater intensity of parasite infection in males than in females.

Computed tomography and magnetic resonance imaging anatomy of the salt gland of the loggerhead sea turtle (*Caretta caretta*)

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In order to provide an overview of the computed tomography (CT), magnetic resonance (MR) images and macroscopic cross sections of salt glands in two loggerhead sea turtles (*Caretta caretta*) CT and MR imaging were performed at the Radio Diagnostic Service of the Santa Catalina Clinic. In CT exploration, a soft-tissue window was used. In MR, a human head coil was used. CT and MR images were compared to cross sections and anatomical dissection, and compared to the CT and MR images. In window soft-tissue CT and MR, anatomical details of the salt gland were obtained, and provided excellent discrimination of the associated tissues. The location and extent of salt gland are often difficult to define by clinical and radiographic exploration. Both CT and MR images are recommended to evaluate salt gland and associated tissues that can not be observed by conventional radiography. The sectional anatomy allows a correct morphologic and topographic evaluation of the salt gland. With developing technology in the wildlife rehabilitation centres, CT and MR imaging may soon become more readily available for sea turtles imaging. We consider it quite useful to be able to establish some references on salt gland, in order to scan only selected parts during clinical or experimental applications. These images should serve as an initial reference to evaluate CT and MR images of the salt gland of loggerhead sea turtle head and to assist interpretation of lesions of this region.



Growth rate of juvenile males and females of the grass frog *Rana temporaria*

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Data of growth rate of juvenile amphibians are scarce. In 2002, we studied growth rate of 122 individuals (66 males and 56 females) of *Rana temporaria* from south west Poland (50°55'N, 16°40'E). Every 2 weeks we randomly selected 6 – 10 individuals that were used for another study. The age was estimated skeletochronologically and the sex was checked by morphology and histology of gonads.

Each specimen was measured (SV length) at the beginning of the experiment and at the moment of sacrifice, when animals were also weighted. At the beginning, SV length ranged from 25.17 to 55.36 mm. At preparation, SV length ranged from 27.9 to 59.60 mm, and their weight ranged from 1.72 to 15.56 g.

Individuals below 35 mm SV length were 1 year-old, and above 43 mm were 2 years-old. Animals within the range 35.1 – 42.9 mm belonged to both age groups. Body weight of 1-year-old frogs ranged from 1.7 to 12 g, and that of 2-years-old frogs ranged from 3 to 16 g. There were no differences between sexes neither in body length nor in body weight. These results indicate that discrimination between 1- and 2-years old individuals of *Rana temporaria* according to body size is not accurate and should be tested by other methods. The growth rate varied individually and there was no difference in growth rates between 1- and 2-years old frogs. This indicates that there is no compensation of growth during the second year of life.



New approach of herpetological investigations with biophysical methods

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Spontaneous and photoinduced chemiluminescence (ChL), lipid peroxidation and superoxid-dismutase (SOD) activity was studied in homogenates and lipid fractions from nervous, heart, liver and muscular tissues of representative of amphibians: marsh frog (*Rana ridibunda*), green toad (*Bufo viridis*); and reptiles: Caucasian agama (*Stellio caucasicus*), giant green lizard (*Lacerta trilineata*) and dice snake (*Natrix tessellata*). Also, the electrical properties of artificial membranes (BLM) formed from lipids of marked vertebrate's tissues were investigated. Levels of homogenate and lipid luminescence were higher in amphibian brain when compared to reptile tissue. This fact is also confirmed by the decrease in SOD activity accompanying phylogenetic changes in lipid peroxidation processes. Present results testify the low degree of electrical conductivity of BLMs from brain lipids as compared with lipids of heart, liver and muscular tissues, what perhaps depend of high content of cholesterol in nervous tissue. It was shown that penetration of BLMs from lipids of amphibians lower then reptiles.

We have demonstrated the utility of biophysical methods to assessing the changes of lipid membranes condition concerning the level of developmental organization of the organism.



Microsatellite instability in parthenogenetic rock lizard *Darevskia unisexualis*

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Caucasian rock lizards of the genus *Darevskia* are truly parthenogenetic, all-female, diploid species derived by the hybridization of different bisexual species, and characterized by a certain degree of clonal diversity.

Recently a polymorphic locus containing a (GATA)_n microsatellite (designated Du281) was isolated from a genomic library of *D. unisexualis*. PCR analysis revealed 6 allelic variants of Du 281 in populations of *D. unisexualis*.

To understand the molecular mechanisms underlying allelic variability of this locus we analyzed parthenogenetic families of *D. unisexualis* using a set of primers found for Du281. In total we screened DNA samples of 217 lizards representing 49 families. In 4 families all offspring were mutant for Du281 locus. The observed changes were caused by deletion/insertion of one monomer, which fits well the stepwise mutation model of microsatellites.

Our results directly show that microsatellite mutations make a significant contribution to the population variability in parthenogenetic lizards of the genus *Darevskia*.



BEHAVIOUR

An experimental test of sexual selection on colour and morphology in green lizards (*Lacerta viridis*)

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Morphological traits and elaborate colouration may play important roles in inter- and intrasexual communication, but sexual signalling has been little studied in reptiles. We conducted experiments of female choice and male competition in green lizards (*Lacerta viridis*), a species from which no information on sexual selection is available. We performed 24 mate choice trials using a total of 57 males, and allowed 12 males to compete in all potential pairwise combinations. Correlated aspects of morphology and colour were condensed into principal components. Only the body shape of males predicted the outcome of female choice trials. Females preferred males with longer body and narrower head. However, both morphology and colour seemed important in male competition. Larger males with higher blue and UV chroma on the throat as well as UV chroma on abdomen were more successful in the trials. If males were more alike in the above mentioned characteristics, the trial took longer and the individuals were more aggressive during the contest. Our results suggest that the expression of multiple ornamental colouration and morphological traits of green lizard males may serve as inter- and intrasexual signals advertising individual quality honestly.



Reproductive strategy of satellite males of European tree frog (*Hyla arborea*)

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Many animal species have unequal operational sex ratio and mating probability is strongly deflected to more powerful or bigger males only. Female prefer and choose male according to attribute/feature representing his fecundity or social status. Other males try to avoid this strong selection and use alternative reproductive strategies to attain some mating.

We focused on satellite behaviour, typical alternative reproductive strategy in European tree frog (*Hyla arborea*), and try to ratify previous ecological hypotheses. We investigated how body size influences reproductive tactics (satellite, caller, host) and explored relationship between satellites and hosts. We also tested how number of competitors affects the choice of practiced reproductive strategy.

Statistical analyses give very strong answers on the questions stated. Our results indicate that males with smaller body size became satellites more easily than other males. Noteworthy, their hosts were significantly larger (more attractive) than average calling male. Satellite males also occurred only in nights with sufficient number of calling males and number of satellites increased with number of callers.

These findings pointed out that males have very good information about their competitors and their own mating opportunity and this allows them to choose optimal reproductive strategy. Even more the ability to recognise the most attractive males provides to satellites possibility to choose host with greater chance to attract female. In this way, satellite could (indirectly) influence/raise their chances on reproduction.



MORPHOLOGY & SYSTEMATICS

Geographical Herpnames

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Some genus names and several specific epithets refer to the geographical region, the country where the species was supposed to come from or to the accurate spot where type material has been actually collected.

The meaning may be completely clear if the word ends in –ensis or if a continent is named but more often the whereabouts are less clear if not to say bewildering for the not introduced reader.

It is my intention to translate into Dutch and publish alphabetically such names and epithets for anyone who is interested to know about the nomenclature used in herpetology.

Names and epithets – which (it has to be stressed again and again) in their self are not names and NEVER must bear an initial capital – are listed with a meaning followed by several species names.

The contents are meant to be published on paper and on the Internet as well.



Occurrence of *Hepatozoon* sp (Apicomplexa, Hepatozoidae) in different species of Brazilian snakes recently caught and donated to the Butantan Institute, São Paulo, Brazil

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The goal of the current study was to observe the occurrence of *Hepatozoon* sp infection in recently caught venomous Brazilian snakes donated to the Butantan Institute, São Paulo, Brazil, from September 2000 to June 2004. Blood was collected from all snakes by ventral coccigeal venipuncture and blood smears were performed, air dried, fixed with methanol, stained with modified May-Grünwald-Giemsa (Rosenfeld, 1947) and microscopically examined. A total of 668 blood smears were examined from snakes belonging to four genera and 13 species: *Crotalus* - *C. durissus* (n=167), *Lachesis* - *L. muta* (n=3), *Micrurus* - *M. corallinus* (n=14), *Bothrops* - *B. jararaca* (n=61), *B. jararacussu* (n=65), *B. alternatus* (n=81), *B. moojeni* (n=168), *B. neuwiedi* (n=63), *B. insularis* (n=2), *B. cotiara* (n=2), *B. fonsecai* (n=5), *B. erythromelas* (n=7) e *B. leucurus* (n=30). *Hepatozoon* sp infection was detected in 191 animals (28,6%). The occurrence in snakes was 18,6% for *Crotalus*, 100% for *Lachesis*, 7,1% for *Micrurus* and 32,2% for *Bothrops*. The highest occurrences were observed in *L. muta* (100%, 3/3), *B. leucurus* (60%, 18/30), *B. moojeni* (48,2%, 81/168) and in *B. jararacussu* (44,6%, 29/65). Due to the fact that this parasite is frequently seen in the peripheral blood of Brazilian venomous snakes, more studies are needed to elucidate its life cycle, as well as the effects caused in its possible hosts.

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Diet of the painted frog (*Discoglossus pictus*) in the oases of Kettana (Gabes, Tunisia)

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Discoglossus pictus, the only species known of the family Discoglossidae present in Tunisia. Hitherto considered a rare species of the Northern and Central Tunisia, it is presently recorded for the first time in the Southern part of the country. In fact, in the early 2005 we have found and collected specimens from abundant populations in the coastal oases of Gabes (South-Eastern Tunisia). In order to clear up this phenomenon and to study the species' strategies helping the colonization and the maintainance in new recesses, the stomach contents of 142 specimens (among which 36 juveniles) as well as 58 of *Rana saharica*, were collected from Kettana oasis and examined using a stereo microscope.

D. pictus shows a diverse diet dominated by Isopoda, Myriapoda, Heteroptera and Coleoptera. Furthermore, no significant correlation between the prey and predator sizes was found for the adults (males and females) of both species, while a significant positive one was recorded for juveniles.

Moreover, the comparative study of the diet of *Discoglossus pictus* and *Rana saharica* shows a medium interspecific overlap (0.63). The opportunistic strategies of *D. pictus* seem to be an adaptive response to seasonal changes affecting both availability and prey abundance, providing advantage for its sympatric life with the other species.



A test of the risk allocation hypothesis in tadpoles: responses to temporal change in predation risk and group size

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The risk allocation hypothesis predicts that temporal variation in predation risk can affect how animals allocate activity among situations that differ in danger. We studied this prediction with tadpoles of the common toad *Bufo bufo*. We tested our tadpoles in four experimental setups. Tadpoles were kept and their activity was measured either in permanent presence or absence of a predator (*Aeschna larvae*) or the activity of tadpoles kept with the predator was measured without the presence of the predator (safety impulse) or vice versa (danger impulse). We performed all four scenarios twice – in a small group (six tadpoles) and in a larger group (50 tadpoles). Altogether 30 tadpoles were measured for each treatment. We found significant difference between the activity in the small and large group. The comparison of activity between pairs of experiments with the same predation risk showed that apart from the pair with permanent predator absence all pairs differed significantly and tadpoles in the large group were significantly more active. In the small group treatment the tadpoles with permanent presence and permanent absence of the predator differed in their activity, although the activity in ‘safety impulse’ and ‘danger impulse’ scenarios was apparently (but not significantly) lower than that of tadpoles with permanent predator absence. In the large group treatment tadpoles did not differ from each other. Our results are partially consistent with the risk allocation hypothesis, but in the large group the differences disappear probably as a result of dilution effect of predation risk.



Species composition and similarities among anuran assemblages of four forest sites in south-eastern Brazil

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We have studied the anuran fauna of four forest sites belonging to different biomes in south-eastern Brazil: the Cerrado (Estação Ecológica de Assis - EEA), the Semideciduous Seasonal Forest (Estação Ecológica dos Caetetus - EEC), the Atlantic Rain Forest (Parque Estadual Carlos Botelho - PECB), and the Restinga Forest (part of the Atlantic Coastal Forest; Parque Estadual da Ilha do Cardoso - PEIC). Inventories were based on two complementary techniques (visual encounter survey and survey on breeding sites) applied simultaneously to these sites. A total of 60 anuran species belonging to eight families was recorded: Brachycephalidae (2 species), Bufonidae (6), Cycloramphidae (3), Hylidae (28), Hylodidae (2), Leiuperidae (6), Leptodactylidae (8), and Microhylidae (5). Species richness and levels of endemism were higher in sites of the Atlantic Forest Domain (PECB, PEIC). Sites located in the Cerrado domain (EEA, EEC) were more alike than those located in the Atlantic Forest Domain. Similarity in anuran species composition was negatively correlated with geographical distance among sites, which explains part of similarities in species composition. One species is considered Data Deficient by IUCN, but it is not included in the Brazilian list of threatened amphibians. The occurrence of certain species with special habitats and microclimate requirements (bioindicators) suggests we are working in well-preserved ecosystems.



Test of a new method for Hermann's tortoise population monitoring

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Natural population monitoring are largely developed in birds and mammals. They are necessary to assess animal population dynamic, their evolution and to conduct conservation policies. For reptiles, monitoring on a large scale are nearly inexistent, notably for declining species like most of the tortoises. In the context of conservation actions conducted in France on the Hermann's tortoise, we tested the effectiveness of the "detection probability" technical, recently developed by MacKenzie *et al.* 2006.

This method was applied in 2006 and 2007 in the main French population (plaine des Maures, southern France). 90 sites of 5 hectares each were covered three times during the spring. This area represents 7.5% of the population occupation (6000 hectares). The total number of tortoises contacted was 750. The contact probability of the species on a site is 76.8% for each hour session. After 3 censuses on a site where the tortoises are present, there is only 2.4% maximum risk of a non-detection of the species while it is present. The population size is estimated to 9564 individuals (6948-12168), largely inferior to the estimation made with robust methods like capture-recapture in closed population (37800 individuals, between 29500 and 49700). The causes of the under-estimation of the population size with this method are elucidated and discussed.

MacKenzie D. I., Nichols J.D., Royle J.A., Pollock K.H., Nailey L.L. & J.E. Hines, 2006. Occupancy estimation and modeling. Inferring patterns and dynamics of species occurrence. Elsevier 324 p.



CONSERVATION

Habitat preference of *Podarcis sicula* in agricultural landscapes (Central Italy)

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Podarcis sicula is a lacertid lizard widely distributed in Italy. In Tuscany, central Italy, *P. sicula* is quite common inside anthropised areas and, considering the species present in the region (*P. sicula*, *P. muralis* and *Lacerta bilineata*), it is the lacertid lizard most widespread inside agricultural habitats. This is partly due to biological characteristics such as high thermophily, that make this species particularly apt to live in open habitats. In spite of the numerous reports of its “ubiquitarian” presence, however, very little is known about *P. sicula* ecology in agro-environments. Our first aim was to understand how the species distributes in agricultural landscapes and, in particular, how distribution patterns change inside cultivated areas with different farming disturbance and structural features. We performed transecting activity in two intensively managed land uses, vineyards and cereal fields, both typical of Tuscan agricultural landscape. In the surveyed areas we also sampled epigeal arthropods to gain data on food availability.

P. sicula showed very different distribution patterns in the two kinds of surveyed areas. The clearest evidence we found was the difficulty in “using” cereals fields: lizards seem to avoid the exploited area, entering just the very first meters close to the uncultivated margins. On the contrary vineyards hosted more individuals, spread all through the area. Also in these areas, however, the distribution was not uniform and highest density was found in the marginal zones. Food availability did not show significant differences in the two land uses thus, probably, structural features were the principal causes of the registered patterns.



Comparative head osteology and myology of *Elaphe* Fitzinger (Serpentes: Colubridae)

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Recent extensive molecular studies led to the deep revision of the former genus *Elaphe*. Currently, *Elaphe* includes only 10 snake species: *anomala*, *bimaculata*, *carinata*, *climacophora*, *davidi*, *dione*, *quatuorlineata*, *quadrivirgata*, *sauromates* and *schrenckii*. *Elaphe* is now restricted only to the terrestrial and semi arboreal Palearctic species. According to one of the hypothesis, *Elaphe* comprises following lineages: (*quadrivirgata*, *quatuorlineata*, *sauromates*, *schrenckii*) and (*bimaculata*, *dione*, *carinata*, *climacophora*). Concurrent hypothesis groups these snakes in the alternative way: (*bimaculata*, *dione*, *sauromates*, *quatuorlineata*) and (*quadrivirgata*, *anomala*, *schrenckii*, *carinata*). Here I describe the head osteology and myology of most of *Elaphe* members. Based on the comparison of bones and muscles I present the hypothesis about the relationships of these snakes. I compare the relative value of the osteological and myological data to the reconstruction of phylogeny. The hypotheses based on the morphological data sets are compared with the results of published molecular phylogenies. I also discuss the trends in the evolution of morphology of those snakes.

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Do environmental variables related to hydroperiod of ponds influence in the tadpole community structure?

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We studied the importance of some environmental variables in the structure of tadpole communities in temporary and permanent ponds. The study was carried out in the Municipality of São Francisco de Paula, southern Brazil. We sampled three permanent and three temporary ponds monthly between October/2005 and September/2006. The Canonical Correspondence Analysis (CCA) was used to test the relation between the communities' structure and five variables: predator abundance, electric conductivity, pH, depth and water temperature. The Indicator Species Analysis (ISA) was performed to verify the occurrence of indicator species for the different hydroperiod. We collected 19.431 tadpoles of 20 species belonging to four families: Bufonidae (n=1), Hylidae (n=15), Leiuperidae (n=2) and Leptodactylidae (n=2). The cumulative explicability was 24.7 % in the three first axis of CCA. The autovalues and the correlations between species and environment variables were all significant ($p < 0.01$). The occurrence of the majority of species was associated to high conductivity, high predator abundance, low pH and minor depth, features observed in temporary ponds. The species indicator analysis was significant for 50% of the species: seven species indicated temporary ponds (*Dendropsophus minutus*, *Hypsiboas faber*, *Physalaemus cf. gracilis*, *Scinax aromothyella*, *S. granulatus*, *S. perereca* and *S. squalirostris*) and three species indicated permanent ponds (*Hypsiboas bichoffi*, *Phyllomedusa* sp. and *Scinax catharinae*). The features positively associated to the occurrence of the majority of studied species were related to temporary ponds. Our results demonstrate the prime importance of temporary ponds in maintaining the richness and diversity of anuran communities.



New finding in the natural history of *Rhinoderma darwinii*

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Rhinoderma darwinii is the only known living amphibian species in which males breed their tadpoles in their vocal sacs until metamorphosis is finished.

R. darwinii is distributed through the Valdivian temperate rainforest in the South of Chile. The frogs show cryptic coloration and designs that remind forest tree leaves, in colors ranging from brown to green.

During our study we analyzed two populations in the Municipality of Coñaripe (South of Chile), for a period of two years and distinguished four design varieties: White forelimbs, M, Leaf and V. The two last ones were dominant, being the V pattern highly dominant, however the leaf pattern was correlated with the presence of bamboo in the habitat.

The males showed significant differences in their microhabitat use. Males breeding tadpoles were found in habitats that were significantly warmer than those used by vocalizing males, while these last ones were found in microhabitats significantly more humid than those used by males without tadpoles. Males carrying tadpoles in their vocal sac were often found in aggregations. We presume that those aggregations were not formed due to an ecological advantage of gathering together and more likely were the result of limited optimal microhabitats for breeding processes. The smaller individuals (less than 10 mm) were often found at places with a high humidity or next to puddles, in aggregations up to 15 individuals.

R. darwinii showed high site fidelity (more than 50 %) except for juveniles.



The conservation aspects of seasonal and daily activity of Hungarian Meadow Viper (*Vipera ursinii rakosiensis*) in Hungary

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Within the frame of Hungarian Meadow Viper Conservation Project we have the opportunity to study the activity of the highly endangered Hungarian Meadow Viper (*Vipera ursinii rakosiensis* Méhely, 1893). The research is carried out in the Hungarian Meadow Viper Conservation Centre, where 76 captive-bred vipers can be observed in seminatural enclosures.

The main goal is to describe the seasonal and daily activity, especially the differences between the breeding and non breeding seasons. We test correlations between several weather and microclimatic conditions (precipitation, temperature, air movement, light intensity) and the activity of the vipers. We are able to determine the activity of certain snakes, gender, and age groups. We are also trying to describe microhabitat preferences of individuals; and to determine the degree of response to various levels of disturbance. As general knowledge is scarce on this subject, we expect to provide useful results for monitoring of wild populations, and for the planned reintroduction of captive-bred vipers in the future.



Conservation of *Bombina bombina* in the Baltic Sea Region

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The fire-bellied toad (*Bombina bombina*), was a common inhabitant of the agricultural landscape around the Baltic Sea, but recent land consolidation in the arable fields has affected it severely.

In Sweden the species went extinct and in Denmark there were a 90% decline from 1940 to 1980 nevertheless 7 populations survived, in Schleswig-Holstein a severe decline was documented and in Latvia 2 small populations were known in 2004.

In LIFE project “Consolidation of *Bombina bombina* in Denmark” running 1999-2003, 6 mirror/reserve populations was made in order to conserve the genetic diversity of the species. In 2005 the Potsdam University has evaluated the gene transfer and gene conservation in these mirror populations.

Based on the Danish experience from LIFE projects a wider corporation has been established to protect *Bombina bombina* on its edge distribution in Germany, Denmark, Sweden, and Latvia.

A set of actions has been introduced to provide a long term sustainable management of fire bellied toad populations around the Baltic.

The genetic analysis aims to assess the genetic diversity in order to evaluate population viability in respect of management activities. Habitat management is seen as essential and habitat quality will be improved by converting arable fields into grassland; creating new ponds and restoration of eutrophised ponds; the building hibernation sites and the establishment of a whole year grazing regime. A population management is carried out to secure the survival of small populations, to build up new mixed populations, and to build up mirror/reserve populations as a genetic reservoir of unique, isolated populations.



A valid individual marking technique for amphibians

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We have tested in the field an individual marking technique with soft visible implant alpha tags (VI Alpha Tags; Northwest Marine Technology Inc.), this is a low cost, non-invasive marking method, commonly used in fish but poorly used in amphibian.

We have studied a treefrog (*Hyla sarda*) population that reproduces in a small pond at Caprera Island (Sardinia). During two consecutive reproductive seasons (spring 2006 and 2007), all the males found at night at the reproductive site were caught. The animals were then anaesthetised with MS-222 Sandoz, weighted and their SVL (Snout Vent Length) was measured. Each animal was then marked both by toe clipping and by inserting the small tags under the skin of the ventral side of the left hind limb thigh.

During the first year study starting from the 5th of April to the 19th of May, 43 males were captured, 27 were recaptured at least one time, overall 54 recaptures were effectuated. The retention of alpha tags proved to be very high. No individual has shown inflammation signs at the hind limb inserting site.

During the second year study, the water at the reproductive site lasted only from the 4th to the 13th of April; in this period 25 males were captured; 8 males were already marked from the previous year. Compared to the previous year the already marked animals showed a significant increase in SVL and in body Condition Index (weight/SVL³). The marking technique seems not to have affected animal survivorship.



Age structure and some growth parameters of the green toad, *Bufo viridis* (Laurenti, 1768), from an island and a mainland population in Giresun, Turkey

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This study aimed to compare the age, growth, age at maturity and longevity of an island and a mainland population of *Bufo viridis* from the Giresun island and Giresun province in Turkey by using skeletochronology. We studied 56 toads (41 ♀♀, 15 ♂♂) from island and 44 (5 ♀♀, 39 ♂♂) from mainland population. Specimens were captured from breeding site and sex, snout-vent length and weight for each animal was recorded. We counted the number of lines of arrested growth (LAG) in cross-sections taken from phalanges. In both populations, age at sexual maturity was 2-3 years in both males and females. Age was ranged from 2-8 years for females and 3-6 years for males in island while 4-7 and 3-8 years in mainland population, respectively. SVL ranged 60.00-90.06 mm (mean 79.46 mm) in females and 64.54-85.93 mm (mean 77.12 mm) in males in island toads; and 56.09-80.24 mm (mean 69.24 mm) and 55.12-77.80 (mean 66.12mm) in mainland toads, respectively. The mean weight of island toads was 48.59 g for females and 43.37 g for males while 30.30 g for mainland females and 24.04 g for males. Males and females did not differ in the mean age while SVL and weight were significantly different between males and females in two populations. We conclude that in the same age class island toads were either significantly or tend to be larger and heavier than mainland toads. In addition, we found positive correlations between age and SVL in both sexes for both populations.



SEA TURTLES

First olive ridley sea turtle (*Lepidochelys olivacea*, Eschscholtz, 1829) in the Canary Islands

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On February 8th 2007, a sportsperson driving a jet ski between Santa Cruz de Tenerife and Puerto de Sardina (Galdar, Gran Canaria) found a turtle floating in the water which seemed to be ill. It was neither sinking nor swimming, and was in a lethargic state. Turtle was handed over to a nearby fishing boat and submitted to the Tafira Wildlife Rehabilitation Center. The coordinates of the capture were 2817693 North; 1554705 West.

In the Centre they were able to confirm that they were dealing with a subadult specimen, a female Olive Ridley sea turtle (*Lepidochelys olivacea*). The statistics of the turtle were: Weight: 21.3kg and the following dimensions: LRC = 51 cm, LCC = 55cm, ARC = 50.5cm, ACC = 59 cm.

Clinically chronic ocular lesions consisting of blepharoconjunctivitis with puss as well as deposits of puss in the mouth and throat were observed. In the pool the animal swam weakly. In addition it floated excessively which impeded it from supporting its back end and therefore was inclined to lean to the right hand side. The x-rays of the lungs did not reveal any changes to this area. The blood tests were carried out on the following dates giving as a result a hto. 33% and leukocytosis.

It was started on a treatment consisting of intracelomic fluid, antibiotics of a wide range and topical treatment of the dermatitis with chlorhexidine and the conjunctivitis with permanagate diluted to 1/500. The specimen died after 33 days, during this period in captivity it was held in a pool in a sunny atmosphere and fresh air. The pool was filled with marine water at 20 degrees centigrade and left in the open.

The principle lesions observed in the necropsy included severe diffuse fibrinous coelomitis, severe fibrinous perihepatitis and severe fibrinous splenitis.

Even though an initial reference exists of a sighting of the Olive Ridley sea turtle in the sea in Mar de Las Calmas (El Hierro), this is the first captured turtle confirmed as a specimen of this species in the Canary Islands.



Geographic patterns in the distribution of amphibian and reptile species richness in the Iberian Peninsula and Morocco

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The number and range of amphibians and reptiles currently found in the Iberia Peninsula (IP) and Maghreb are thought to have been influenced by the opening of the Strait of Gibraltar, which acted as a vicariant agent of diversification. At present, 20 species occur at both sides of the Strait, 9 pairs of sister taxa occur at different sides of the Strait and 117 species occur only at one side of the Strait. The distribution of 33 amphibians and 122 reptiles in the IP and Morocco was analysed to: a) identify diversity patterns (gradients and hotspots); b) analyze relationships between diversity patterns, environmental parameters and historical factors; and c) identify regions of low herpetological knowledge. Species distribution data were collected from the most recent atlases of Portugal, Spain and Morocco, other scientific publications and fieldwork. These data were georeferenced to the 10x10 km UTM grid and assembled in a Geographical Information System. Predicted distribution for each species was derived using 17 environmental factors, including topographic, climatic and habitat variables, with maximum entropy modelling (MAXENT). Topographic and climatic factors were mostly related with the distribution of species richness. Species-rich areas were identified for the IP in the lower Tejo river basin, Algarve, around the international Douro river valley, Sierra Morena and the Spanish Mediterranean coast, and for Morocco in the Atlantic coast, south of Agadir and around Tangier, and in the Atlas and Rif mountains. Regions of low herpetological knowledge were identified mostly for Morocco.



Morphometric characterization of blood cells of loggerhead sea turtles (*Caretta caretta*)

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A morphometric study of the blood cells of 35 loggerhead sea turtles (*Caretta caretta*) is described. Twenty erythrocytes and fifteen leukocytes from each turtle were measured using an image analysis program obtaining the maximum length, minimum length, area, and perimeter for the cells and the nuclei.

The morphometric characteristics of erythrocytes were similar to those reported in green turtles. The erythrocytes from our loggerhead turtles were 19 µm long and the nucleus: cytoplasm area ratio was 0.12. Six types of white blood cells were identified: heterophils, eosinophils, basophils, lymphocytes, monocytes and thrombocytes. Neutrophils were not identified in our study. This study showed that eosinophils had the biggest area of the white blood cells, followed by heterophils, monocytes, lymphocytes and thrombocytes. Lymphocytes showed the biggest nucleus: cytoplasm area ratio, followed by thrombocytes, monocytes, eosinophils and heterophils. Eosinophils were homogeneous in size, unlike eosinophils from green turtles, which are large as well as small. Lymphocytes were also homogeneous in size. Basophils were slightly smaller than heterophils and no statistical analysis was made due to the scarcity of basophils in the blood of loggerhead turtles.

This study provides a useful reference for future haematological studies of this endangered species



Environmental factors, distribution and abundances of terrestrial reptiles in Latvia

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The distribution and abundance of reptiles in Latvia is determined mostly by habitat and climate factors, while anthropogenic factors have mainly a local effect. *Lacerta agilis* is rare species in Latvia. It prefers relatively xeric sites with sparse low pine stands, where herb cover is dominated by grasses, heath, and also *Sedum* acre, and lichens often present. The species is more abundant in areas with hot summer climate, and a high proportion of various dry forests habitats. *Zootoca vivipara* is the most abundant and widespread reptile species. Habitats are diverse, typically with grassy, medium-height vegetation with some wooded vegetation cover. The species is more abundant in forested areas with relatively cool summers. *Anguis fragilis* is rare in regions with a high proportion of agricultural lands, and is more often found in forested areas. The most suitable are dry or drained pine forests, and wet stands are avoided. *Coronella austriaca* is very rare and mostly confined to the Coastal Lowland of western Latvia. Typical habitats are sparse and dry stands of low pine and birch where ground cover is dominated by heath and grasses. The regional abundances of other snakes are determined mostly by climate factor. *Natrix natrix* is common only in lowlands, where winters are milder, but *Vipera berus* in the regions with harsher winters. Typical summer microhabitats of both are characterized by the presence of some shrub layer, and tall grasses in the herb layer, often with the high coverage of broad-leaved herbs (i.e. umbellifers).



CONSERVATION

Using a point density Kernel equation and GIS to identify the principal hotspots of amphibian mortality in a road of west Spain

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In order to quantify and mitigate amphibian road-based fatalities it is imperative to determine where individuals are most likely to be killed. To this end we have used the Kernel Density method to identify the hotspots of amphibian mortality on the local road CL-527, in the province of Zamora, Western Spain. The data were collected in two migratory seasons between February 2006 and April 2007 during sunrise driving surveys at low speed after wet nights or immediately following rain. The observations correspond mainly to two species: the western spadefoot toad *-Pelobates cultripes-* and the natterjack toad *-Bufo calamita*. We used a Geographical Information System to apply the Kernel equation, selecting zones where casualties were concentrated. The Kernel Density method obtains the density of point features around each raster cell through a curved surface fitted over each point, the surface maximum value being at the point and decreasing with the distance from it.



New Red Data List for herpetofauna in the Netherlands

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The Dutch Ministry of Agriculture, Nature and Food Quality commissioned a proposal from the Foundation RAVON (Reptile Amphibian Fish Research and Protection the Netherlands) for updating the Red List for amphibians and reptiles in the Netherlands. Species were evaluated by both national criteria as well as international IUCN-criteria.

23 indigenous species were evaluated, based on more than 400.000 individual records. Not evaluated are exotic, introduced species or/and non-reproductive species. The status of species was determined by comparing the present distribution (1996-2006) to data of a reference period (situation around 1950). The lack of data in the reference period was compensated for by corrections on the data. Different statistical methods were tested and compared, combining data from atlas surveys with monitoring data. Thus an estimation could be made for the nationwide decline of species and their present distribution.

The main threat to Dutch herpetofauna is intensified agricultural land use, causing the disappearance of suitable habitats, and isolating the remaining habitats. Moreover, acidification, eutrophication, desiccation, inadequate management and invasive species are putting a large pressure on the remaining populations.

The decline of populations of some critical species is halted and sometimes populations are growing again. Habitat management and restoration is a crucial factor for the increasing populations of these species. A close cooperation of volunteers, professional herpetologists, nature conservation institutes and the Dutch government is likely to rescue several other threatened species from further decline or even extinction.



LIFE HISTORY

Bergmann and converse Bergmann clines in amphibians: what can we learn from the Common toad *Bufo bufo*?

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Large-scale patterns of body size variation are described by well known generalizations such as Bergmann's rule. Intraspecific extension of this rule was tested in various ectotherms, including amphibians, and evidence was found for both Bergmann and converse Bergmann clines. In this study, we explored patterns of adult body size and age variation in the Common toad (*Bufo bufo*) along a 2240 km latitudinal gradient across Europe using field and literature data. Analysed populations represented altitudinal range of approx. 1840m. Specifically, we examined whether common toads follow Bergmann's rule. We applied correlative approach to infer proximate factors affecting these patterns, using data about climatic conditions (temperature and precipitation) and the length of activity period. Climatic variables analysed were: minimum, maximum and mean temperature (Tmin, Tmax and Tmean), as well as mean monthly precipitation during the activity period (AP), mean annual temperature and annual precipitation. In analysed populations AP varied from 12 to 33 weeks and Tmean during AP from 6.6°C to 15.6°C. AP and Tmean significantly decreased with increasing altitude, but did not exhibit similar trend with latitude untill removing the effect of highest altitudes. Our analysis shows that *B. bufo* exhibited a converse-Bergmann cline along latitudinal gradient, while altitudinal variation in adult body size was not significant and the main effect observed was that on age. Age parameters significantly increased as elevation increased and the length of activity period decreased. Body size did not vary correspondingly with latitudinal and altitudinal gradient. The obtained results are discussed with respect to environmental causes and mechanisms that may explain these different patterns of clinal variation.



What are cold winters good for – the effect of climatic conditions on post-hibernation body condition and reproductive traits of female Common toads

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Body condition and the climatic factors affecting it have attracted research interest, especially in the context of changing climate and its impact on amphibian populations. Among temperate zone anurans, the Common toad (*Bufo bufo*) has proved a good subject for investigating the relationships between the environmental conditions and the variation in body condition and reproductive success. The aims of the present study were: to examine the interannual variation in post-hibernation body condition, fecundity and egg size in common toads from the vicinity of Belgrade, Serbia (studied in period 2001-2004), and to investigate the relationships between these traits and climatic conditions experienced previously. The climatic data were: mean monthly temperature and precipitation during previous activity period, hibernation and the month preceding spawning, as well as mean annual temperature and cumulative annual precipitation. Body condition index, calculated as weight/length relationship ($BCI = 104 \times \text{mass} / \text{SVL}^3$), varied over the study period. Although this variation did not prove statistically significant, analysis of contrasts showed that BCI in 2003. was significantly higher ($p < 0.05$) compared to values in previous years. Egg size showed highly significant variation among years ($p < 0.01$), contrary to egg number ($p > 0.05$); again, the highest values of mean egg diameter were found in 2003 sample. With respect to climatic conditions, it appears that winter temperatures had the strongest impact on BCI. The highest BCI was in 2003, following the cold winter: mean monthly temperature during hibernation was -0.170°C , and mean temperature for the month preceding spawning was -2.10°C , thus showing that mild, relatively warm winters may be more stressful to hibernating amphibians than cold winters.



Metamorphosis rate of paedomorphs in a natural newt population

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Facultative paedomorphs is a developmental process in which larvae opt for metamorphosis before maturity or reach sexual maturity while retaining larval traits (e.g., gills). Although metamorphosis is not reversible, the paedomorphic state is not a dead end as branchiate adults are able to metamorphose. However, the extent of this process has never been quantified in the wild. Our aim was then to estimate switching rate by carrying out a 3-year monitoring survey of a population of Alpine newts (*Triturus alpestris*) inhabiting an alpine lake. The data were analysed using a multi-state capture-recapture model. While morph switching did occur in this population, it involved only 12% of the paedomorphs each year (i.e., 17% of recaptured individuals), suggesting that metamorphosis was not favoured in this population during the study period. This rate is lower than in laboratory experiments during which newts from the same population were placed in water drying conditions, but as shown previously paedomorphs can avoid metamorphosis in migrating to permanent water bodies when their pond dries out. These results are in agreement with other studies showing an advantage of a dimorphism in heterogeneous habitats. The ontogenetic pathway of wild Alpine newts is thus characterised by two forks in the developmental pathway. The first occurs during the larval stage, and the second occurs in paedomorphic adults. Such a two-level decision process may allow individuals to cope with environmental uncertainty. This may be particularly adaptive as aquatic conditions can deteriorate over time as shown by yearly changes in body condition of newts.



**Ecological thresholds and estimates of breaking points in newt populations:
a useful tool to categorise habitat use and apply conservation measures**

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Ecological thresholds are defined as points at which a rapid change occurs from one ecological condition to another. Their determination in species–habitat relationships has important implications because they allow to understand ecological requirements of species and to provide efficient conservation measures. However, there is a lack of concordance across studies and this method was not yet applied to newts. In this study, we sampled 371 ponds to gather occurrence data on the palmate newt *Triturus helveticus* and the Alpine newt *Triturus alpestris*. We tested for the existence of significant thresholds for three variables: distance to forest, forest and crop covers. We found significant thresholds for both landscape configuration and composition, with relationships between distance to forest and occurrence of *Triturus alpestris* and *T. helveticus*, and forest and crop cover and *T. helveticus*. Both species require breeding ponds within a given distance from the forest, but *T. helveticus* is more dependent on forest availability than *T. alpestris*: its ecological threshold is located at lower distance from forest edge, and requires also higher values of forest cover. Crops have a negative influence on palmate newt distribution with a significant breaking point, but not for *T. alpestris* in the studied area. These results indicate that thresholds can be a useful concept from which tools may be developed. They are particularly pertinent to focus conservation effort for threatened species and their habitats as quantitative measures of the most required habitats for species can be obtained from statistically determined breaking points.



Variation in reproductive phenology of amphibians: A 30 years perspective

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Amphibian community in Doñana National Park exhibits interannual differences in timing of reproduction, which are associated to variations in the characteristics of breeding sites. We have analyzed the variation on the onset and duration of temporary ponds in the last three decades, and related it to the reproductive success of amphibian species.

In wet years, heavy rains fall in autumn and ponds are flooded from October to June, favouring species of long larval period (*Pelobates cultripes*, *Pleurodeles waltl*). High reproductive success of *Hyla meridionalis* and *Triturus pygmaeus* is observed in years of scarce rains in autumn, when ponds do not flood until winter. In contrast, in dryer years, when temporary ponds only persist during short periods in spring, high reproductive success is mainly observed in species of short larval period.

In recent years, we have observed differences in the reproductive phenology of some species, compared to observations 30 years ago. The main differences were observed for species with autumnal reproduction, as *Pelobates cultripes*, which is presently observed to spawn repeatedly from October to March while, formerly, spawns were mainly observed after autumnal rains. Also, reproduction of *Pelodytes ibericus* formerly occurred in autumn, while at present they can delay breeding to late winter and spring. The frequency of dry periods with no reproduction of amphibians has increased in the most recent decade. These differences have probably contributed to reduce the abundances of several species (i.e. *Pelobates cultripes*, the most abundant species 30 years ago); while others increased (i.e. *Pelodytes ibericus*).



Comparative analysis of survival in early ontogenesis of two populations of common toad (*Bufo bufo*) in Moscow region

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Embryo's survival and developmental rate in two populations of common toad were compared under experimental conditions. The first population is located on the Moskva River bank in 12km to the west of Zvenigorod. Toads spawn in a small artificial pond which area is 100m². The second population spawns in the Glubokoe Lake situated in 20 km to the west of Zvenigorod. The Glubokoe is a glacial lake with pure water having area 0.5 km².

Two survival strategies of embryos appeared as a reaction of certain spawn on the increase of egg density were revealed during long-term investigation of the first population. In some spawns at the hatchling stage the relationship between the survival and egg density has a shape of monotone curve, and in other spawns this relationship has a shape of non-monotone curve with two maximums of survival rate. These strategies were not observed in the second population. Correlation between the mortality of hatchlings and egg density in the first population was higher than in the second one. The populations do not differ in developmental rate.

These results can be explained by the fact that conditions of embryonic development in the lake are much better than in the pond. In the lake water is cleaner, there are more suitable places for spawning and more space for the loose distribution of egg cords. Small area of the pond results in the denser packing of egg cords, therefore the additional mechanism of survival appears as an adaptation to high egg density.



Molecular and morphological differentiation of rapid racerunner *Eremias velox* (Lacertidae) with comments on taxonomy and biogeography of Middle-Asian racerunners

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Eremias, or racerunners, is a genus of lacertids inhabiting deserts and steppes of Near East, Middle and Central Asia. The genus consists of ca. 40 species and up to now their phylogenetic relationships were not studied molecularly. We studied mtDNA sequences (Cytochrome B, Cytochrome Oxidase I and 16S-rRNA, ca. 1800 bp altogether) and morphology to clarify this matter. Our data indicate that morphological and molecular schemes of subgeneric structure do not coincide. Among several subgenera recognized (*Eremias*, *Ommateremias*, *Pareremias*, *Rhabderemias*, *Scapteira*), the subgenus *Eremias* seems not to be monophyletic. Rapid racerunner (*E. (Eremias) velox*) is the most wide-spread species of the subgenus. Within this species we found unexpectedly deep molecular differentiation, probably a Paratethys-related vicariance event. Morphologically some marginal southern populations of rapid racerunner were found to be different from nominative subspecies. Transcaucasian populations (*E. v. caucasia*) group together with nominative subspecies from Central and Eastern Kazakhstan (*E. v. velox*), while Western Chinese populations from Xinjiang (*E. v. roborovskii*) form a sister-clade to southern populations from Uzbekistan and Iran. We will discuss probable phylogenetic relationships between *E. velox* complex and other *Eremias* members (*E. suphani*, *E. persica*, *E. regeli*, *E. nikolskii*), give some considerations on taxonomic structure of *E. velox* complex and discuss probable phylogeographic scenario for the group. North - South split, corresponding to the Paratethys basin is a common pattern of geographic variation for several Middle-Asian desert-dwelling lizard groups: examples include various representatives of *Phrynocephalus* (Agamidae) and *Eremias* (Lacertidae).



Cuban *Tropidophis* (Serpentes, Tropidophiidae): descriptions, distributions and natural history

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Cuba has the greatest *Tropidophis* diversity, with 16 endemic species, which certainly will increase in the future. Several Cuban species have described and some subspecies have been elevated to species recently. Consequently, a new guide to their identification, distribution and natural history is necessary. For each taxon the following information is reported: the correct name in use with author and date, the complete citation of the original description, synonyms, holotype or syntypes, description, geographic range and comments about their natural history (e.g. habitat, reproduction, endangered status, parasites).



MORPHOLOGY & SYSTEMATICS

New giant species of the blind snakes (Scolophoridae, Typhlopidae, *Typhlops*) from Cuba

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A new giant species of the genus *Typhlops biminiensis* species group sensu stricto is described from Pinar del Río Province, Western Cuba. It has large size, sharp-pointed to rounded snout, broad rostral with curved-sides in dorsal view, broader than long, preocular in contact with second and third supralabials, greater number of middorsal scales (629) than any other Antillean scolophoridian, and 26 longitudinal scale rows anteriorly reducing to 22 posteriorly at 42 % total length. It could be the largest Antillean scolophoridian or even among the largest species of the world.



Seasonal reproduction in males of the Cuban lizard *Anolis lucius* (Polychrotidae)

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Gonadal and fat body cycles, and their relationship to environmental factors are described for Cuban male *Anolis lucius*. Sexual maturity was reached at 52.0 mm snout-vent length and an age of about seven months. Male *A. lucius* shows seasonal reproduction; reproduction occurring from February to July. The non-reproductive season, identified by absence of animals undergoing active spermatogenesis, lasts from August to January. Larger, heavier testes and abundant mature sperm in the seminiferous tubules characterize the peak reproductive interval (May to July). In contrast, fat body mass diminishes from May through July and reaches its highest values from August through December. Increased photoperiod, environmental temperature and relative humidity appeared to induce increased testicular activity, whereas declines in relative humidity and reduced photoperiod produced testicular regression.



Ranaviruses: potential agents of extinction in amphibian communities

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Aims of The Study:

1. To examine the potential for the ranavirus to be an agent of extinction in amphibian communities in the UK. 2. To determine the phylogeography of the ranavirus present in *Rana temporaria* populations in the UK. 3. To examine the host diversity and potential sources of introduction of the ranavirus into the UK.

Materials and Methods:

Firstly, animals will be screened for the ranavirus using PCR primers for the major capsid protein (MCP) of frog virus 3 (FV3). Animals which show the presence of the MCP will undergo further analysis including a PCR screen for 2 other FV3 specific loci and sequencing of the relevant viral genes. The sequence data will then be used to analyze the relationship between the ranavirus(es) found in the UK. The virus will be isolated from infected individuals using established methods in the fathead minnow (*Pimephales promelas*) cell line.

Anticipated Results:

The elucidation of the relationship between the ranavirus(es) present in *Rana temporaria* populations and other species which are affected in the UK. Also, the determination of the potential of other species to act as reservoirs/alternate hosts or vectors of the virus.

Discussion and Conclusions:

Emerging infectious diseases have the potential to cause both local extirpation and extinction of species. Ranaviruses exhibit several characteristics which have the potential to result in disease induced extinction. This makes the Ranaviruses a concern for conservation efforts in many amphibian species, especially *Rana temporaria*, as they seem to be the most adversely affected species in the UK. Therefore, it is imperative that research into the phylogeography of the ranavirus, the alternate hosts, and the evolution of the ranavirus present in the UK is performed.



Molecular perspective on the evolution and barcoding of toad-headed agamas (genus *Phrynocephalus*, Agamidae) in Middle Asia

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The COI–barcoding was applied to the diverse and taxonomically complicated group of Asian toad-headed agamas (*Phrynocephalus*). We investigated 130 samples of ca. 35 different *Phrynocephalus* taxa by mean of COI partial sequences (600 – 750 bp). The COI-barcoding can be successfully applied for identification of toad-headed agamas and also provides a preliminary molecular basis for phylogeographic and taxonomic assessment of Middle-Asian *Phrynocephalus* species. According to obtained COI-sequence data the most basal position in the phylogenetic tree consists of the clade of Iranian species (e.g. *Ph. scutellatus* and *Ph. maculatus*), the sister clade joins Middle-Asian and Central-Asian taxa. Within the latter clade the representatives of the subgenus *Megalochilus* form a monophyletic group (*Ph. mystaceus*, *Ph. interscapularis*, *Ph. sogdianus*) of probably Irano-Turanian origin. The monophyletic Tibeto-Himalayan subgenus *Oreosaura* joins viviparous *Phrynocephalus* species (*Ph. vlangalii*, *Ph. theobaldi*, *Ph. forsythii* etc.) and is grouped together with oviparous *Phrynocephalus* species of Central Asia. Within Middle-Asian taxa three main species groups can be distinguished: i) the group of sun-watcher agamas (*Ph. helioscopus*, *Ph. persicus*), ii) *Ph. ocellatus* - *Ph. strauchi* group and iii) *Ph. guttatus* - *Ph. versicolor* group. COI-sequence data are useful for preliminary phylogeographic reconstructions for widespread species with trans-Asian distributions like *Ph. guttatus* and *Ph. helioscopus* complexes. Various biogeographic events might cause diversification of *Phrynocephalus* in continental Asia – starting with orogenetic processes on the territory of present-day Iranian and Tibetan plateaus, transgressions of Paratethys as major factors for old-splits, and up to aridisation processes and dynamics of major river valleys as factors determining recent speciation processes.



CONSERVATION

Presence and population data of the pond-terrapins of the Bay of Txingudi (northern Spain)

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The Bay of Txingudi is situated in the oriental end of the Gulf of Biscay, at the mouth of Bidasoa River. The bay is the natural border between Spain and France and a major communication way between the two countries, thus resulting developed, altered and modified, although two wetlands of great naturalistic value have been recovered. The studies conducted to date reveal the absence of autochthonous pond-terrapin populations. However, introductions of exotic pond-terrapins often occur, even of individuals of Iberian species, not naturally present in the area. The monitoring program of the turtle population of the Bay of Txingudi began in 2005. Direct sighting censuses detected the presence of the following species: *Trachemys scripta elegans*, *Trachemys scripta scripta*, *Emys orbicularis*, *Graptemys* sp. and *Mauremys leprosa*. Here we show the first data on distribution, population structure and reproduction of exotic turtles in the area.



Combined effects of ammonium chloride, sodium nitrite and sodium nitrate on larvae of the frog *Pelophylax perezi* (Seoane, 1885)

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The impact of the combination of three nitrogenous compounds on the larvae of *Pelophylax perezi* was studied. Larvae from four different populations were exposed for 21 days to four different combinations and a control treatment. The levels of ammonium chloride, sodium nitrite and sodium nitrate used in this study correspond to naturally occurring concentrations of ammonium, nitrite and nitrate in the Segura River basin (south-eastern Spain). The response variables studied were mortality, habitat use (number of times each tadpole was detected on the bottom of the beakers during the experiment), inactivity (number of times each tadpole was found inactive during the experiment), and food consumption and growth rate. Mortality was analysed using a Cox regression analysis (covariates: population of origin and treatments), while the rest of the variables were analysed using two-way ANOVAs (fixed factors: population of origin and treatments). Exposure to the combination of fertilizers significantly increased larval mortality. Larvae exposed to pollution were more active, remained far from the bottom of the experimental beakers and consumed less food than control larvae. However, contrary to expectations, only some of the fertilizer combinations significantly decreased larvae growth rate. The results obtained show that exposure to fertilizer combinations produces a multiplicative response, rather than an additive one, on *P. perezi* larvae. Summarizing, lower larval survival, increased activity and exposure to predators and reduced growth rates suggest that organic pollution could be responsible, at least partially, for the regression of *Pelophylax perezi* populations in the Segura River basin.



Impact of three nitrogenous compounds on larvae of the European water frog *Pelophylax perezi* (Seoane, 1885)

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The effects of ammonium chloride, sodium nitrite and sodium nitrate on larvae of *Pelophylax perezi* were studied. Larvae from four different populations from the southern Iberian Peninsula were exposed to increasing concentrations of these nitrogenous compounds, which represent ecologically relevant concentrations of ammonium, nitrite and nitrate in the Segura River basin (south-eastern Spain) for 21 days. The response variables studied were mortality, habitat use (number of times each tadpole was detected on the bottom of the beakers during the experiment), inactivity (number of times each tadpole was found inactive during the experiment), and food consumption and growth rate. Mortality was analysed using a Cox regression analysis (covariates: population of origin and treatment), while the other variables were analysed using two-way ANOVAs (fixed factors: population of origin and treatment). Each nitrogenous compound was analysed separately. Only ammonium chloride significantly increased larval mortality. Larvae exposed to fertilizers showed a general trend to be more active and to prefer areas further from the bottom of the beakers than control larvae. In addition, although nitrogenous compounds significantly affected food consumption, this effect did not involve lower growth rate. The results obtained suggest that environmentally relevant concentrations of fertilizers could be responsible, at least partially, for the regression of the *Pelophylax perezi* populations in the study area.



Microsatellite DNA markers for *Podocnemis unifilis*, the endangered yellow-spotted Amazon River turtle

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Many chelonian species are threatened with extinction as a consequence of the excessive harvesting of eggs and adults, as well as the destruction of their natural habitat. In South America six species of the *Podocnemis* genus are found: *Podocnemis vogli*, *P. lewyana*, *P. expansa*, *P. unifilis*, *P. sextuberculata*, and *P. erythrocephala*, of which the last four are found in Brazil. At present, molecular genetic analyses have been carried out only for the largest species of the genus, *P. expansa* and for *P. lewyana*. *Podocnemis unifilis*, the yellow-spotted Amazon River turtle, popularly known in the Brazilian Amazon as “tracajá”, is classified as Vulnerable in the IUCN Red List and is listed in Appendix II of CITES. It is the second largest and the second most popularly consumed species after *P. expansa*, its increase in popularity coinciding with the drastic decrease in census sizes and local extinctions of *P. expansa*. *Podocnemis unifilis* is more of an ecological generalist than *P. expansa*, and thus appears better suited to captivity and ranching schemes. As with most Amazonian vertebrates, no genetic profile exists for this species, and we have little knowledge of its system of mating. Therefore, the main aim of this study is to develop primers for DNA microsatellite loci of *P. unifilis* and to test their utility for population and paternity analyses of this species. We also tested the applicability of these markers in other *Podocnemis* species (*P. sextuberculata*, *P. expansa*, *P. erythrocephala*, *P. vogli*) and a closely related genus represented by *Peltocephalus dumeriliana*. We developed specific primers for microsatellite DNA regions of *Podocnemis unifilis* and tested their utility in population genetic and paternity studies in *P. unifilis* and other closely related Amazonian chelonians. Seventeen microsatellite loci were polymorphic in *P. unifilis* and all plus two monomorphic microsatellites in *P. unifilis* were polymorphic in at least one additional chelonian species, including *Peltocephalus dumeriliana*.



MONITORING

How detection probabilities of *Lacerta agilis* change with the weather

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At present, there is no standard field survey method to monitor the UK's populations of *Lacerta agilis*.

Counts from a closed captive population of *L. agilis* were taken at regular intervals through 2005 and the weather data were recorded every thirty minutes for the whole year. Analysis has been conducted using AIC values and weights to investigate which individual and combinations of environmental variables are linked to the high *L. agilis* count values. The influence of these variables on the detection probabilities of *L. agilis* within this population will be discussed.

Real life examples of how the variance of detection probabilities affects the population estimates of *L. agilis* on heathland habitat will be presented with data collected from three seasons of field work (2005 – 2007).

Suggestions and considerations will be made for those looking towards developing a “standardised” field survey method for reptiles and implications will be discussed for those looking to develop the method with a minimum/limited number of site visits.



Evolutionary history of a threatened species: the meadow viper (*Vipera ursinii ursinii*) in France

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The meadow viper (*Vipera ursinii*) is an emblematic species of Provence mountains in southern France. However, it is currently considered at risk of extinction by UICN. This study is conducted within the scope of a Life-Nature European program which aims at the conservation of viper populations in France. We had two main objectives: (i) to unravel the evolutionary history of French populations; (ii) to make some practical management recommendations. The reconstruction of a mtDNA phylogeny showed that French and Italian populations form a monophyletic assemblage that is highly divergent from other taxa included in the present study. Coalescent-based population genetics analyses suggested that most French populations diverged simultaneously during the penultimate interglacial period, when their grasslands habitats became isolated on top of mountains following altitudinal upwards shift of forested landscapes. In addition, current gene flow between populations seems to be driven by landscape topography. Last, preliminary analyses suggested that French populations exhibit ecomorphological local adaptation. These results are used to identify seven ESUs and we further discuss the way operational management units could be identified.



CONSERVATION

Mortality of *Bufo calamita* embryos as a consequence of a *Saprolegnia diclina* infection

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Global climate change seems to have increased the occurrence of emergent diseases on wildlife. Thus, ‘*Saprolegnia* infections’ have been observed on embryos of many amphibian species. However, it is often unknown whether these infections constitute the ultimate cause of die-off. In addition, no specific determinations of the strain producing these infections have been made, with the only exception of *Saprolegnia ferax*. In this study it was observed a high incidence of ‘*Saprolegnia* infections’ on eggs of *Bufo calamita* inhabiting mountainous areas of Central Spain. The agent responsible for these infections was isolated and characterized morphologically, physiologically and molecularly, and identified as *Saprolegnia diclina*. The zoospores of the strain isolate could infect live embryos of *B. calamita*, and symptoms observed were the same as observed in natural infections. This is the first report of the species *S. diclina* occurring in amphibian eggs, as well as the first case in Spain of demonstrated virulence of a *Saprolegnia* species in amphibians. The results emphasized the need to carrying out isolations and characterizations of species and strains involved in development of this emergent disease. This is important in order to design strategies to prevent the impact and spread of strains (or species) potentially pathogenic to amphibians.

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Historical distribution of fringed-toed lizards *Acanthodactylus boskianus* in northern Africa since the last Glacial Maximum

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The Sahara desert alternated dry phases with humid periods throughout time. At the Last Glacial Maximum (LGM, 18000 yr B.P.), the climate was arider and sand dunes were further extensive than today. At the mid Holocene optimum (MHO, 6000 yr B.P.), the desert was replaced by steppes and temperate forests. Aridity raised afterwards, follow-on present conditions. Habitat modifications over time induced fast adjustments in species range. This was probably the case of *Acanthodactylus boskianus*, a lacertid lizard occupying semi-arid to desert ecosystems but avoiding extreme desert areas. This work aimed to identify the distribution at the LGM/MHO and historical refuge areas for *A. boskianus*. Niche-based modelling techniques, Logistic Regression and Maximum Entropy Modelling, and 282 localities were used to correlate current distribution with environmental conditions. Derived variables and weights were applied to LGM/MHO scenarios of temperature, precipitation and land cover. Current distribution was negatively correlated with rainfall, extreme hot temperatures, sandy and rocky deserts and closed shrub areas, and positively correlated with semi-arid regions of bare rock and open grasslands. At the LGM, *A. boskianus* was confined to Mediterranean coastal areas, Atlas Mountains, isolated Sahara mountains and a sub-Saharan continuous belt of open grasslands. At the MHO, the range was almost continuous from the Atlantic to the Red Sea coast, but the species was absent from the more humid Maghreb. Putative historical refuges include a continuous band from coastal Mauritania to Egypt (but south of the Atlas mountains) and isolated Saharan mountains (Hoggar, Tassili, Tibesti).



PHYLOGEOGRAPHY

Systematic and phylogeographical assessment of the *Acanthodactylus erythrurus* group (Reptilia: Lacertidae) based on mitochondrial and nuclear DNA

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The systematics of the genus *Acanthodactylus* was classically based on external morphological traits, osteological characters and morphology of the hemipenises. Although the identification of species complexes has not been controversial, recognition of species within some groups is complicated by high variability of external morphology. Partial mitochondrial (12S and 16S rRNA) and nuclear (β -fibint7) sequences were analysed from 60 and 22 specimens, respectively, of the *A. erythrurus* group from North and Central Africa, and the Iberian Peninsula including previously described species: *A. blanci*, *A. guineensis*, *A. lineomaculatus*, *A. savignyi* and *A. erythrurus* with three subspecies *A. e. belli*, *A. e. atlanticus* and *A. e. erythrurus*. Several highly distinct genetic units were resolved, but with little support for relationships among them. These units did not coincide with recognised species, but showed geographic structuring. Based on our results, *A. guineensis* and *A. savignyi* should not be included in the *A. erythrurus* group and some forms, such as *A. blanci*, *A. lineomaculatus*, *A. e. atlanticus* and *A. e. belli* do not constitute monophyletic units. Diverse microevolutionary patterns due to the recent contraction/expansion phases of the habitats in North Africa associated with the high dispersal capabilities of these lizards probably are related to the complex phylogenetic patterns observed.



Diversity of frogs in the eastern Guianas

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Frogs are vanishing from all the world's ecosystems. Extinctions in the tropics of the new world, which harbour the highest number of species, are particularly precipitous. Despite their global decline, amphibians present a paradox because they also have the highest rate of new species descriptions among vertebrates. The Guianas harbour the largest continuous tract of virgin tropical rainforest on Earth but its biological diversity is poorly known and its evolutionary history poorly understood. We used molecular data to estimate the diversity of frogs in the eastern part of the Guianas. We estimated that the number of species might be 1.5 to 2 times higher than previously thought in Amazonia and Guianas. Consequently, the endemism is probably also much higher and the potential threat to these species more important. Two of these "species" *Scinax ruber* and *Rhinella margaritifera* have been studied in more detail. They appeared highly polyphyletic with at least six and 11 lineages respectively. Evidence of sympatry without interbreeding among the lineages occurring in French Guiana supports their status as species. We are currently extending the genetic data for a further 20 species in the eastern Guianas; comparing phylogeographic patterns among them to determine the mechanisms and the temporal context of this diversification.



CONSERVATION

Repercussion of the land use on amphibians and reptiles distribution

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The reduction in the amphibians and reptiles distribution is a fact stated at world-wide level. The land use of a specific area can condition the presence of certain species. A smaller specific richness of amphibians and reptiles is expected in an area with a high level of human pressures (agricultural, cattle or urbanized zones) than in a conserved zone. The colonization or/and the populations viability can be affected as a consequence of an intensive land use. More than 50% of the Jaén province's surface (South of Spain) is used for the intensive olive tree agriculture which is generating modification and deterioration of amphibians and reptiles natural habitats. The present study uses the results obtained during a period of six years of sampling on amphibians and reptiles' species richness together with the land uses description in 10x10 Km UTM squares of the Jaén Province. The squares have been classified into categories according to the main type of land use: altered squares (agricultural, industrial, cattle..), squares with natural vegetation, and squares with the presence of small wetlands (natural or artificial). The results have shown that the areas with lower specific richness are those that have squares classified as "altered".



Artificial ponds for irrigation: the alternative habitats for amphibians in the south of Spain

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One of the proposed causes to explain the amphibians' decline is the destruction of their habitats. The number of artificial ponds for agricultural irrigation is ever-increasing. The use of this kind of aquatic systems by birds and vegetation alternately to natural wetlands has been previously documented and linked to wetland destruction. This study was developed during 2006- 2007 and shows how amphibians have started a colonization process of the artificial ponds used for irrigation in the intensive olive tree agriculture developed in the south of Spain. The species that colonized these aquatic systems faster were *Rana perezi* and *Pleurodeles waltil*. That rapid colonization is probably associated to their wider natural distribution. The effect on amphibian decline by aquatic systems destruction could be being attenuated by the presence and the progressive increase of these artificial ponds which could become alternative habitats for amphibian populations.

Genetic characterization of a nesting population of *Caretta caretta* in southern Italy: identification of a new relevant management unit

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The main Italian nesting ground for loggerhead turtles *Caretta caretta* (Ionian Calabria) was monitored from 2000 to 2006. Non-invasive sampling was performed on non-hatched eggs, egg remainders and dead hatchlings, summing to 2,471 specimens. We resequenced the mtDNA D-loop in one subject per nest. Out of 26 sequences, haplotype CC-A2 was the commonest (65%) as in other Mediterranean rookeries, followed by CC-A20 (31%) and CC-A31 (4%). CC-A20 may indicate female-driven gene flow with the Atlantic. However, this must be compared with the low frequency of CC-A1 and the possibility of an independent origin for the Calabrian haplotype CC-A20 (C172T as compared to CC-A2). CC-A31 was never found in Mediterranean nesting sites and only once in juveniles from South-eastern Italy. Haplotype diversity (0.50) equals that of Turkish rookeries as the highest in the Mediterranean. Haplotype composition differentiates Calabria from the well-studied rookeries of Greece, Cyprus and Turkey (F_{st} = .15, .29 and .32, respectively). These data identify this nesting population as a relevant source of diversity, characteristic of the central Mediterranean and distinct from both eastern and southern colonies.

We also developed multiplex fluorescent PCR reactions to type the dinucleotide microsatellites CC7, CC141 and CCM2. These are used to identify a possible genetic contribution by multiple males to the same clutch and to identify the genotype of females returning to nest in the area on the same or subsequent years.

Our data urge the recognition of the loggerhead population of Calabria as a relevant management unit for conservation purposes.



Care and rehabilitation of the loggerhead sea turtle (*Caretta caretta*) in Italy

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Caretta caretta is the most common turtle submitted to marine rescue centres in Italy. Survivorship of this chelonian is threatened by human activities on nesting beaches, coastal erosion and sea pollution. Bycatch during fishing and sea traffic activities are also responsible for declining. A thorough veterinary examination of all the specimens admitted is a precious source of information on health status and an invaluable tool to collect biological data and information on sea pollutant. Most of the casualties submitted are of anthropic origin (10 to 50% of the samples). Trauma is the main cause for *Caretta caretta* hospitalization in Italy: these are related to ingestion of fishing hooks, lines and other foreign bodies, collision with small and large ships, trapping in nets.

Other diseases are cold stunning, and infectious and parasitic diseases. Surgery and hospitalization out of water (sometimes for weeks) is often the only solution to save them. During hospitalization force-feeding, antimicrobials and pain control are often necessary to ensure a sufficient body conditions for a fast recovery.

Studies have been performed by the authors to collect data regarding serum biochemical values, electrophoretic patterns and hormonal levels in the loggerheads. Recently new technologies such as computed tomography, low level laser therapy and echodoppler have proven useful to improve both diagnostic and therapeutic procedures.



LIFE HISTORY

Distribution of amphibian larvae within various breeding types in northern Israel

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Ecological and biological conditions of ten breeding sites; winter ponds, rock pools, springs and streams inhabited by amphibian larvae in northern Israel were investigated in an area where all six species exist. The larval growth period was found to vary in different habitats. Most breeding sites studied included *Salamandra infraimmaculata* larvae, but they were found throughout different periods of the year. The larvae of *Hyla savignyi*, *Buffo viridis*, *Rana bedriagae*, *Pelobates syriacus* and *Triturus vittatus* inhabited the winter ponds and rock pools. In most cases, the *S. infraimmaculata* and *T. vittatus* larvae were not observed at the same time in the same breeding spots; however, in some winter ponds, salamander larvae were found together with *B. viridis* in the winter. In other winter ponds, *H. savignyi*, *P. syriacus* and *T. vittatus* were seen at the same time during the spring, and *R. bedriagae* in the summer.

Among the various water quality parameters measured at the breeding site: temperature, pH, dissolved oxygen, electrical conductivity, ammonia (NH₄) nitrite (NO₂), turbidity, chlorophyll a and invertebrate biomass, temperature seems to be most important parameter. *S. infraimmaculata* and *B. viridis* were found in ponds at the temperature range of about 5–18°C, and all other larvae were observed at temperatures above this range, up to 28°C. Based on this and previous data, we have examined the ecological conditions, in which various amphibian larvae can survive in Israel.



Cytonuclear associations in *Bombina* hybrid zones from the Danube Basin

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The fire-bellied toads, *Bombina bombina* and *Bombina variegata*, are parapatrically distributed species which hybridize along their contact. Each species is composed of geographically differentiated groups. In central Europe, the lowlands along the Danube are occupied by the southern *B. bombina* group, which interacts with the Carpathian *B. variegata* along the southern slopes of the Carpathians, and with western *B. variegata* along the southern and western boundaries of the Danubian plains. Six transects across hybrid zones in Austria, Hungary and Slovakia were analysed for variation at five unlinked allozyme loci and mtDNA. Sampling across transect varied; central or marginal populations are lacking in particular transects. Southern *B. bombina* established contacts with the western *B. variegata* lineage in one transect, and with the Carpathian *B. variegata* lineage in the five others. Current distribution of *Bombina* is heavily affected by human activities. Population structures in the hybrid zones deviate somewhat from a clinal pattern; in some transects bimodal distributions of hybrid genotypes were found, in other transects a recent shift in hybrid zone position is likely. In all transects, mtDNA haplotypes and allozyme markers showed similar patterns of transition. Haplotypes of both species were found in the central sites, whereas marginal populations were mostly homogenous and contained haplotypes expected from toad morphology and allozymes.



BEHAVIOUR

Antipredator behaviour in *Alytes cisternasii* tadpoles: a comparison between responses to natural predators (*Leuciscus pyrenaicus* and *Natrix maura*) and to an exotic predator (*Procambarus clarkii*)

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One of the causes for the worldwide decline of amphibian populations is the introduction of exotic predators. The assessment of current amphibian antipredator behaviour, as well as of its flexibility in the face of a new predator will permit a correct evaluation of the threat caused by the introduction of that predator. The aim of this work was to compare the responses of the tadpoles of *Alytes cisternasii* when faced with the chemical stimulus of an exotic predator, *Procambarus clarkii*, with the responses to chemical stimulus of two of its main native predators with different predation strategies - the snake *Natrix maura* and the fish *Leuciscus pyrenaicus*.

Antipredator behaviour was assessed experimentally in aquaria. The alteration of the use of the vertical axis of the aquaria was the most common behaviour used as a response to the chemical cues of the predators. During the diurnal period, the tadpoles responded more intensely to the chemical cues of the natural predators *L. pyrenaicus* and *N. maura* and during the nocturnal period the responses were more intense to the chemical cue of *P. clarkii*. *Alytes cisternasii* tadpoles recognised *P. clarkii*, a predator recently introduced (less than 20 years ago in our study area), and the adopted behaviour was adequate to the period and to the predation strategy of each predator.

Our results provide some insight into the evolution of antipredator behaviours in tadpoles of *A. cisternasii* facing a new predator, which can be important to understand its impact in the populations of this species.



10 years amphibian monitoring in the Netherlands: preliminary results

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In 1997 a national monitoring program on Dutch native amphibian species (16 species) is established in order to detect changes in national amphibian populations. This program is carried out with mainly the help of volunteers, but for some species professionals do the monitoring. Almost 200 volunteers are active all over the Netherlands and more then 2700 breeding sites are part of the program.

All data is analysed with a statistical program based on Poisson regression designed for fauna monitoring data with missing values. On the poster the preliminary results are presented of this national monitoring program. All species will be discussed and, to date, we can detect national trends of 11 native amphibian species; *Lissotriton vulgaris*, *L. helveticus*, *Mesotriton alpestris*, *Bombina variegata*, *Bufo bufo*, *B. calamita*, *Hyla arborea*, *Rana esculenta synkleopton*, *R. lessonae*, *R. arvalis*, *R. temporaria*.



Genetic Structuring of Loggerhead Sea Turtle (*Caretta caretta*) in Turkey

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Mitochondrial DNA (mtDNA) D-loop sequences were analyzed for 23 *Caretta caretta* hatchlings collected from East (Göksu Delta) and West coast (Dalyan) of Turkey. The goal of this study was to elucidate genetic structure of these two distant nesting populations. Two haplotypes, CC-A2 and CC-A3, which were previously described from the Mediterranean region, were found in the populations in question. The frequency of CC-A2 haplotype observed in Göksu Delta and Dalyan populations were 76.9% and 70.0%, respectively. On the other hand, while observed frequency of CC-A3 haplotype was 23.1% in Göksu population, it was 30.0% in Dalyan population. Intrapopulation genetic diversity was different in Göksu and Dalyan populations both in terms of nucleotide diversity ($\pi = 0.00129$ in Dalyan, $\pi = 0.00106$ in Göksu Delta) and haplotype diversity ($h = 0.467$ in Dalyan, $h = 0.385$ in Göksu Delta). Especially CC-A3 haplotype frequency in Mediterranean population is the highest in these two nesting coasts. These findings further proved the existence of natal homing behaviour for *Caretta caretta*. Two populations might be considered as “evolutionary significant units” for conservation.



Updating data on distribution of herpetofauna with the use of volunteers

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RAVON (Reptile Amphibian Fish Research and Protection the Netherlands) is the Dutch foundation for study and protection of reptiles, amphibians and freshwater fish. RAVON has around a 1000 volunteers who are supported by a team of 28 professionals. One of the current projects of RAVON concerns updating data on the distribution of several amphibian and reptile species that are relevant for development of policy.

For European standards this is a unique project as the fieldwork is carried out by volunteers. The volunteers are coordinated, motivated and stimulated to collect data in the field. From the RAVON-database, old records are selected. These record are represented on a website (www.ravon.nl) in the form of square kilometres. These square kilometres can be selected by volunteers, willing to participate in the project. For each species a certain number of visits has been determined. If the species hasn't been found after the recommended number of visits, it is concluded that the species has disappeared from that specific square kilometre.

We will show the results of the past three years and an overview of the methods to motivate and coordinate volunteers.



CONSERVATION

Road mortality of Milos viper (*Macrovipera schweizeri*) and the efficiency of underpasses

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Milos Viper (*Macrovipera schweizeri*) is one of the most threatened reptile species in Europe. An increased mortality level is a serious threat for the main population of this species on Milos island. During the last 15 years, the main source of human caused mortality is road casualties. Between 1993 and 2006, it has been estimated that 183-537 vipers are killed annually on the road network of Milos, a mean of more than 10% of the total viper population per year. As an experiment for a viable long-term solution to this problem, concrete barriers with total length of 800 m were constructed during December 2005, in three parts of the road network with high mortality rates. Six underpasses were built in between the barriers. Four different designs of underpasses were used in order to test their effectiveness.

To evaluate the efficiency of the barriers and underpasses, monitoring of their usage from the vipers was carried out during most of 2006 active season, with daily inspection of tracks on a sand layer and the use of an IR-camera. No vipers were found on the road surface in the areas where barriers were constructed. The underpasses permitted the vipers to pass safely under the road with no significant signs of avoidance. Between May and October 2006, a daily rate of 0,8-1,8 viper passages per day was recorded. 73% of the vipers that met an underpass, used it to cross the road. The results are considered very positive and if no new roads will be constructed on western Milos, underpasses could be a long-term solution to road mortality.



Genetic structure of the isolated populations of *Bufo calamita* in northeast of Iberian Peninsula

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The toad *Bufo calamita* is found throughout most of the Iberian Peninsula but is absent from a large extent of the Euro Siberian portion of the Cantabrian region. In this region its presence is limited to coastal or relatively dry zones. The populations on the Basque coast are threatened due to their high degree of isolation and fragmentation. In order to clarify the processes of this isolation and determine conservation criteria, we have studied genetic differentiation and phylogeography of Iberian Peninsula populations using mitochondrial gene fragments, including part of the control region and cytochrome oxidase I. In addition, we present preliminary data obtained from species-specific microsatellite markers. Finally, the observed patterns of genetic diversity are discussed in the context of historical and recent events affecting the distribution of this species. This information will contribute to the conservation of endangered populations of this species.



MONITORING

Long-term study of demography of population of moor frog, *Rana arvalis* Nilss

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During 1977-2007 the investigations of numbers of mature frogs, spatial structure of populations and age structure were carried out in moor frog at Middle Urals. The population under study occupies territory about 30-35 square kilometres. Natural annual dynamics of numbers of spawning females consist of 6,000 - 36,000 specimens. At the same time spatial structure of population varies strongly and non-synchronously in different patches. Age structure of different patches varies strongly in different years and these differences are comparable with geographical differences. There are three types of breeding ponds at the territory under study, namely drying up obligatory, temporal and stable ponds. Independently of numbers of population 40-80% of females spawn in drying up ponds every year. Hence, the large part of any generation spawn in places where they did not complete metamorphosis. As a result the successful monitoring of population including analysis of mortality is possible only at all territory occupied by population. It is especially important the successful analysis of age structure must be monitored on the data of on age structure and numbers of animals in different patches (breeding sites) of population. The nearest similar populations are located in 7-10 km and they are good isolated by swamps and waterlogged forests.



Mating call structure of *Rana* in north eastern Libya, as compared with *Rana ridibunda* in Thrace region of Turkey

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The water frog of the genus *Rana* in North Eastern Libya (Wadi Alkuf) begin their calling activity at the end of February and continue until the end of September, the males produce their mating calls in series, each mating call being composed of (7-13) pulse groups. At a water temperature of 20°C, the duration of a call averages 450ms. When the calls recorded in Wadi Alkuf compared with that of *Rana ridibunda* recorded in Thrace region of Turkey, the call period considerably longer in the calls from Wadi Alkuf than *Rana ridubunda* from Thrace, and the number of pulse groups per call are higher in Wadi Alkuf population than in *Rana ridibunda* population. The pulse group period, duration of pulse group, and intervals between the pulse groups are considerably shorter in the calls from Wadi Alkuf than that of the calls from *Rana ridibunda*. Principle component analysis and the histogram of the discriminant function scores for the Libyan *Rana* and *Rana ridibunda* show that, Libyan populations (Wadi Alkuf) are completely separated from Thrace populations (*Rana ridibunda*). From these results, we found that there are clear differences between Libyan water frogs and *Rana ridibunda* in the basis of mating call structure and the *Rana* of the North Eastern part of Libya should be assigned to *Rana saharica*.



DISTRIBUTION

Ecological affinities and potential distribution of *Podarcis* lizards in north Africa: effects of modelling techniques and data precision

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Modelling of species distributions and evaluation of potential occurrence areas highly depends on the resolution of the environmental data used, as well as on the precision of species' records. Here we investigate ecological affinities of the lizards of the genus *Podarcis* in North Africa, trying to evaluate the efficacy of different modelling techniques. The lizards *Podarcis* of North Africa belong to the Iberian/Maghrebian species complex; the members of the group found in Morocco were recently recognised as *P. vaucheri*, while the forms found in North Algeria and Tunisia still wait for taxonomical clarification. To examine the effect of data precision we used two different sources of records: records collected directly by the authors, for which the exact locality was marked with GPS, and data from Atlases and other publications, at a 10x10km² scale. Additionally, we investigated the performance of presence-only vs presence-absence modelling by applying Maximum Entropy and Logistic Regression Modelling respectively. Finally, to analyse the effects of Spatial Autocorrelation on the models, we analysed two datasets: one including all the observations available and another in which points with high spatial autocorrelation were eliminated. All techniques gave concordant results concerning the environmental variables that mostly explained the distribution of *Podarcis* in North Africa. These lizards are dependent on relatively high humidity and temperatures moderate considering the study area, which also seem to be related with a preference for localities of either a high altitude or a proximity to the Mediterranean coast. The potential distribution areas predicted by different models highly overlapped, with a higher geographic resolution of high- over low-precision data.



Exploring phylogenetic relationships within the family Lacertidae

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Lacertidae family is one of the most diverse and widespread families throughout Eurasia and Africa. Several studies so far have attempted to unravel the phylogeny of Lacertidae using DNA sequence data, while in some of them those datasets were also compared to alternative sources of evidence, primarily morphology. However, the intra-family relationships remain unclear. During the last few years constructing DNA phylogenies has become highly popular, leading to the accumulation of a large number of available sequences in genetic databases. In an effort to explore the relationships within the family of Lacertidae, we retrieved from GenBank all published sequences (c-mos, 16S rRNA, 12S rRNA, cyt b, ND1, ND2, and COI), forming a concatenated dataset, in which each genus is represented by one chimeric sequence. Phylogenetic inference analyses were conducted using Maximum Likelihood (ML) and Bayesian inference (BI).



DISTRIBUTION

Amphibians in the city of Wrocław, Poland

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Wrocław is one of the biggest cities in Poland (area 293 km², about 635 000 inhabitants). Our observations of batrachofauna in Wrocław range from late 80'ties of the 20th century till the present day. Altogether 126 sites with amphibians were examined (mostly breeding sites), and 11 amphibian species were found (in parentheses number of sites): *Triturus cristatus* (10), *Triturus vulgaris* (16), *Bombina bombina* (22), *Bufo bufo* (44), *Bufo viridis* (16), *Hyla arborea* (26), *Pelobates fuscus* (6), *Rana esculenta* (57), *Rana lessonae* (18), *Rana arvalis* (36), *Rana temporaria* (38). Most widely distributed is *R. esculenta*, but on most sites it is not abundant (no more than a few dozens individuals). Second in number of sites is *B. bufo*, its abundance ranging from few individuals in small pools within housing estates, to around 1000 individuals in water bodies outside the city. *R. temporaria* and *R. arvalis* have similar number of sites, however *R. arvalis* is more numerous (on some sites even few thousands individuals). Sites of *H. arborea*, *B. bombina*, *R. lessonae* and *T. vulgaris* are located farther from human settlements, near the administrative borders of the city. *B. viridis* is a species which can survive and breed in concrete basins without any vegetation, calling males are sometimes encountered even in puddles on parking lots of large housing estates. Finally, least encountered species are *T. cristatus* and *P. fuscus*. The number of sites of the latter species, however, may be underestimated, owing to its secretive way of life.



Reproductive cycles in *Bufo mauritanicus* (Schlegel, 1841) of wet area of Beni-Belaïd (Jijel, Algeria)

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Bufo mauritanicus is an anuran amphibian living in North Africa. Reproductive cycles of this species are not still very well known, especially in populations living in Algeria. This study was devoted to the knowledge of reproduction in a population living in the wet area of Beni Belaïd (Jijel, Algeria), under a Mediterranean climate characterized by two rainy season, January until May and September -December.

Several male and female toads have been monthly captured throughout the years 2003-2004 in order to study the reproductive patterns. Histological studies of testes and ovaries have shown yearly continuous sexual cycles in both males and females. In testes, all the categories of germ cells, and especially spermatozoa, were observed throughout the year; lipids were always detected in Leydig-like cells. In females, all the follicle categories were observed at each month of the year. Immunocytological methods allowed us to show the presence of 17 β estradiol in the follicles containing previtellogenic and vitellogenic oocytes. Breeding is observed at rainy season in April.

Sexual cycles of *Bufo mauritanicus* living in Beni-Belaïd area are similar to that of other African species.



Terrestrial migration of Alpine newt (*Mesotriton alpestris*) during breeding phase

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The course of breeding phase of the Alpine Newt (*Mesotriton alpestris*) was studied in three localities in the Pardubický region, Czech Republic, in 2004 and 2005. Each locality consists of several ponds. Environmental conditions of ponds were unstable in two localities, i.e. these ponds were apparently threatened by desiccation, while ponds in the third locality were deeper. Newts were marked individually by toe clipping and monitored by capture-mark-recapture (CMR) methods. Every individual captured for the first time was weighed and also measured (SVL and TL).

Newt populations in two localities with unstable pond conditions did not show fidelity to one pond and newts migrated among ponds during breeding phase more than in the third locality. Performance of migration was independent on sex (in both localities and in both seasons), but males migrated more often. Body mass index (BMI, weight / TL) of migrating males was significantly higher than BMI of sedentary males. BMI of migrating and sedentary females was not significant. Rate of migration activity was significantly different between seasons 2004 and 2005. Higher number of individuals migrated in the drier year of 2005. Alpine Newts in localities with unstable conditions preferred only one pond characteristic – volume, whereas other five monitored characteristics (feed mass, plants, predators, pH and temperature) were not significant.



Molecular phylogeny of the Ocellated skink, *Chalcides ocellatus* (Sauria: Scincidae) in the Mediterranean

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The Ocellated Skink, *Chalcides ocellatus* Forskal, 1775 (Scincidae) is one of the 19 species that belong to the genus *Chalcides*. Five different species groups have been defined by Pasteur (1981) within this genus, on the basis of their morphology and geographic distribution, including the *C. ocellatus* group. The taxonomic status of this genus and its defined groups and species is ambiguous, due to the highly conserved morphology of its representatives and the insufficiency of available specimens. *Chalcides ocellatus* inhabits the coastal strips of Northern Africa (from Morocco to Somalia), Asia (from Turkey to Pakistan) and Europe (found in Cyprus, France, Greece, Italy, Malta and Spain), while it is also distributed along the banks of the river Nile (from Egypt to Tanzania). Despite its wide distribution and the arising questions concerning its taxonomy, its origin and the way it spread through the Mediterranean, few studies have been conducted so far towards its phylogeny and phylogeography. This study represents a phylogeographic approach of *C. ocellatus* populations of the Mediterranean, with the use of mitochondrial molecular markers. Specifically, we chose 12S rRNA gene as a molecular marker, with which we evaluated the phylogenetic relationships between 65 individuals from various localities of the Mediterranean (namely Morocco, Tunis, Libya, Egypt, Syria, Cyprus, Sicily, Crete, Rhodes and the Aegean islands) and propose a possible biogeographic scenario to explain its Mediterranean distribution.



The Inter-SINE-PCR (IS-PCR) method for the study of molecular systematics of Caucasian lacertid lizard (Sauria: Lacertidae)

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IS-PCR method reveals a set of DNA sequences separating copies of short interspersed repeats (SINE) [Buntjer, 1997]. The resulting electrophoretic patterns possess taxon-specific features at a intra-generic level. Degrees of molecular genetic diversities have been tested by the values of DNL coefficients and roughly range between 0.0 - 0.20 for intrapopulational levels, 0.3 - 0.5 for intersubspecies of one species, and about 0.6 - 0.9 for known good species. These values were obtained in our study of populations of *Darevskia raddei* complex and their two systematic subspecies in comparison with some other species of *Darevskia* group (*D. rudis*, *D. chlorogaster* and “*D. tristis*”). On the basis of these features for 17 *D. raddei* populations we show that the difference of south-western Azerbaijan (Talysh) population from other populations by DNL (0.4) is similar to that between *D. r. raddei* and *D. r. nairensis*. This observation supports the subspecies status for Talysh sample. The same values of molecular genetic diversity were found for *D. rudis obscura* and “*D. tristis*” from North-Pontic Ridge of Turkey that could argue for the subspecies level for “*D. tristis*” within the *D. rudis* complex, as was suggested by Bohme and Bischoff [1984]. Both groups mentioned differ from *D. raddei* by the values of DNL of 0.6 - 0.7. Nearly the same correlations were obtained when some populations of *D. praticola* and *D. derjugini* were studied. Some of the known systematic subspecies of these species were supported by IS-PCR markers, the others were not: the data will be presented. In another species complex studied by IS-PCR – *Lacerta* s. str. – 12 populations inhabiting a vast territory (from Baltic States and Ural Mountains to Caucasus) differed by DNL ranging from 0.02 to 0.2 apparently belong to *L. agilis exigua* subspecies as was deduced by morphology. The same DNL values characterize intrapopulational similarity in the *L. a. chersonensis*, but the differences between these two systematic subspecies reach the values of around 0.6. The samples from Munchen (presumably *L. a. argus*) also differs from the first two by 0.6 - 0.7. The most important is that the molecular differences between each of these subspecies and *L. strigata* and *L. media* were characterized also by the same order of values. In other words, the genetic distances between *L. strigata*, *L. media*, and three subspecies of *L. agilis* have the same level and all of them could be considered either as subspecies of *L. agilis*, or the three subspecies of this species could be evaluated as a separate species.



Genetic structure and microsatellite variation in a fragmented tree frog (*Hyla arborea*) population

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The European tree frog *Hyla arborea* is categorised as threatened in the IUCN Red List. Dramatically declines of populations and abundance were recorded since the 1950s. The main reasons for the decline are habitat destruction and habitat fragmentation. In the Hannover district, Lower Saxony, Germany, few populations including one resettlement are remaining. These former linked populations are probably isolated from each other since more than 30 years. The aim of our study was to validate the population structure and genetic variation in this area. DNA samples were taken by buccal swabs from 293 individuals at eleven sample localities: ten localities in the district of Hannover and additionally, as a control, in one large population 140 km in the northeast of Hannover. To analyse the population structure we used nine highly polymorphic microsatellite loci. Bayesian analyses indicated that the tree frog occurrence next to Hannover is fragmented into five populations. The genetic structure was supported by previous bioacoustic surveys. Pairwise RST values between sample localities varied between 0 and 0.43 and indicated high gene flow within populations but nearly absent gene flow among populations. Moreover, for an artificially resettled population in the southwest of Hannover we identified a potential source population. A significant reduction in genetic variation (bottleneck) was detected in one small isolated population. Our data highlight the importance of a dense network of suitable reproduction ponds and demand the reconnection of the remaining habitat fragments for maintaining genetic diversity in this ecological sensitive species.



DISTRIBUTION

Distribution and status of *Rana latastei* populations in Croatia

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As a part of the National Program for Monitoring Biodiversity, Croatian Herpetological Society - Hyla started a research on *Rana latastei* populations in Croatia, with emphasis on distribution, present threats and status of the populations and habitat. The data presented is gathered during breeding seasons 2006/2007.

In Croatia, this species is restricted to the central and northern part of Istrian peninsula. The biggest population inhabits area of Motovun forest (Mirna valley) which is relatively recently divided to several parts by a fast road and new courses - canals of rivers Mirna and Butoniga. There are also several smaller subpopulations in the wider area and five separate populations situated on the edges of the species distribution range in Croatia.

Today 51 breeding sites are known and on these last year we recorded 8265 of spawn balls. 67 % of the breeding sites belong to the population/s in Motovun forest (area of 1000 ha). There are several types of breeding sites, commonest ones being shallow canals inside or at the edge of the forest and small streams with pool-like widenings. Quality of habitat greatly varies between sites but most of them are to some extent under the anthropogenic influence. Major threats for *Rana latastei* in Croatia are habitat destruction and fragmentation, use of pesticides and fertilizers, but also road-kills, invasive species and development of new touristic offers.



Morphological variability of the Siberian newt *Salamandrella keyserlingii*

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We have investigated 213 sexually mature individuals (99 females and 114 males) from 5 populations of *Salamandrella keyserlingii* from Western, Middle, Eastern Siberia and Far East: I – Tomsk population (in latitude 56°21' – 57° North, southern taiga); II – Novosibirsk (55°33', northern forest-steppe); III – Krasnoyarsk (58°28', middle taiga, 600 m a. s. l.); IV – Northern-Baikal (55°39', larch taiga); V – Magadan (59°33', tundra). Morphological differentiation of *S. keyserlingii* was estimated by 10 characters. Sexual dimorphism was revealed in Tomsk population by 6 characters and 4 indices (6/4), Novosibirsk – 6/2, Krasnoyarsk – 7/2, Northern-Baikal – 2/1, Magadan – 4/1 ($p \leq 0.1-0.05$). Maximum values of plastic traits and their indices are characteristic for males and females from Tomsk population, minimum – for the very northern population – Magadan. A relationship between the average annual temperature of the native zones and L, L.ga, L-L.c/L.c, P.a/P.p ($r_s = 0.21-0.27$, $p \leq 0.005$) was detected in females from all populations. PCA results revealed that the differences in L.cd, L.t, L.c, Lt.c, L.ga, At.cd, P.a, P.p, L/L.cd, L-L.c/L.c, P.a+P.p/L.ga (68.4 % of dispersion) are the main variability direction in I – V populations. Discriminant analysis of differences between females and males of geographical populations showed five groups; one of them – Magadan population – is situated apart from the others. According to similarity measure males from northern populations – Krasnoyarsk and Magadan – form a cluster, while females of Magadan population stand apart in a separate cluster. Thus, evidence of zonal environmental factors determine intraspecific and geographical variation of *S. keyserlingii* morphological peculiarities. Growth conditions of this species are optimal in the centre of its area (southern taiga) but suboptimal at the northern periphery of its natural habitat (tundra).

CONSERVATION

The Common Spadefoot – Frog of the Year 2007

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The German Society for Herpetology and Herpetoculture (DGHT) declared the common spadefoot, *Pelobates fuscus*, the Frog of the Year 2007. The DGHT, with about 8.000 members the biggest herpetological association worldwide, is an approved association according to the German Law for Nature Protection. One of the major aims of the DGHT is enhancing conservation issues in reptiles and amphibians, and promoting education in the field of herpetology. By means of the declaration of alternately a “Reptile of the Year” or a “Frog of the Year”, the DGHT refers to the general threat of European amphibians and reptiles and hopes to draw attention to the need to protect their habitats. In 2007, the common spadefoot was chosen because this subterranean species is the least known anuran in Germany and its populations in Middle Europe are declining steadily. However, this dorsally grey to beige-brown toad is listed as Least Concern by IUCN because of its wide distribution in the plains and hilly regions from eastern France to western Siberia and its presumed large overall population. Basic information on the common spadefoot is provided in our free 24-sided, coloured guideline with data on biology, threat, and protection, a small flyer contains condensed information, and a high gloss poster draws attention to our action. Additionally, the AG Feldherpetologie (working group Field Herpetology) of the DGHT will hold an international symposium in November 2007. Frog of the Year 2007 is supported by NABU (German Nature Conservation Society) and ÖGH (Austrian Herpetological Society), and by several sponsors.



A molecular phylogenetic approach of Cretan snakes

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Four snake species are presently found on the island of Crete (Greece): *Telescopus fallax*, *Natrix tessellata*, *Zamenis situla* and *Hierophis gemonensis*. The origin and dispersal pattern of these species, found on the island still remain to be elucidated. For this reason sequence data derived from the partial cytochrome *b* mitochondrial gene were used and populations from the island of Crete and its satellite islets were compared with populations from continental Greece, Peloponnisos, Cyclades and East Aegean islands. The aim of this study is to infer the distributional pattern of these species in the Aegean region and to clarify, if this is possible, the evolutionary history of populations presently found in Crete in relevance with the known paleogeography of the island.



Asymmetry in *Podarcis bocagei* and *P. carbonelli*: a preliminary study

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Developmental stability can be assessed in an indirect but simple way by identification and measurement of the type and degree of asymmetry displayed by individuals in a population. The overall developmental stability of an individual results from the combined action of natural and sexual selection, that tend to increase developmental stability, and the maintenance of plasticity to adapt to new environments or biological stresses, that tends to decrease developmental stability. So, developmental stability expressed in terms of asymmetry can be considered a life history trait. Even minor asymmetries which are supposed to be adaptively neutral have the potential to evolve in to functional directional asymmetry.

Asymmetry studies had revealed that this character is important to several lizard species as it affects several aspects of their life such as mate choice, escape performance, and interspecific aggressive interactions. Therefore asymmetry has critical implications on individual survival, as it can affect individual behaviour and alter the overall organism fitness.

In this study we aim to identify the presence of asymmetry expressed by two species of *Podarcis* lizards (*P. bocagei* and *P. carbonelli*) present in the north-west of the Iberian Peninsula, exploring its occurrence in allopatric and sympatric populations. We studied both meristic and linear biometric traits because of their potential to distinguish between embryogenetic and ontogenetic events, respectively. We analyse our findings in the context of the most recent ecological and biogeographical knowledge of this two closely related species.



Extending the reproductive habitat of the loggerhead turtle into the Macaronesian waters: viability study

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The marine turtles are threatened all around the world. The contamination, incidental fishing and climate change are the new causes who are affecting seriously to turtle's survival.

Some populations of loggerhead turtles are found in the North-Atlantic west coast, while, in the east coast there is only one: the Cape Verde nesting population. Thanks to historical references we knew that there was a nesting population in the Canary Islands in the past.

An important project has been developed by the Canarian and the Cape-Verdian governments to extend the reproductive habitat of the loggerhead in the Macaronesian waters (east coast of Atlantic), by the restoration of the extinct Canarian population.

In this work we describe the viability study that we have carried on between 2006 and 2007 for the development of this project and their results.



Head-starting technics used on captivity loggerheads (*Caretta caretta*) in the Canary Islands

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The marine turtles are threatened all around the world. Actually some techniques were newly developed for their protection and conservation. One of this is the head-starting, which consist in increasing the survival possibilities of the hatchlings thanks to the captivity growth during their first year of life.

In the Canary Islands a project for the reintroduction of loggerhead population like reproductive community was started. Inside this project we have developed techniques of *head-starting* to increase the survival possibilities of the hatchlings, so, to boost the success possibilities of the project.

Because of the logistics possibilities and to find the best technique to growth hatchling of loggerhead in captivity, we have tried two different methods for it. First we have used individualised tanks and natural feeding (fish, crustaceans, molluscs). In the other hand we have growth the hatchlings in 30-35 individuals' tanks and two types of feeding: pellets and natural.

In this work we compare the results of the two techniques used and we evaluate the possibilities to use each one of this for future works.



Retreat site selection and thermoregulation through one year in sharp-snouted rock lizard (*Dalmatolacerta oxycephala*)

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The Sharp-snouted Rock Lizard, *Dalmatolacerta oxycephala* (Duméril & Bibron, 1839) is an endemic species of the Eastern Adriatic coast. Distribution area is very narrow, expanding through Southern Croatia, East Hercegovina and Southern Montenegro. As saxicolous species, it is distributed on almost all localities with rocks and cliffs in eumediterranean and submediterranean climate in this region, including most of large and small islands. As very narrow distributed specialist, studies involving this species are very scarce.

The goal of this study was to investigate some ecological aspects of this species. Study areas were localized on Island of Vis, Croatia. During four years data on 105 specimens were collected and several ecological parameters of microhabitat were recorded during 24 hours cycles, all year round. Results on refuge selection by night, night thermoregulation and refuges and thermoregulation in winter months were obtained. Also there are some evidences of night activity of this species. Although the Sharp-snouted Rock Lizard was not main target of the research, data collected here can contribute to understand the behavioural patterns of this endemic species.



LIFE HISTORY

Geographical and local variation in age distribution and growth rate in brown frogs: the results of long-term skeletochronological study

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Age distribution and growth were studied in mature *Rana temporaria* and *R. arvalis* from a northern (Kirov province), a central (Moscow province) and two southern localities. In the southern locality of Bryansk province (Russia) the highest growth rates in both sexes of both species were revealed. But in another southern locality with similar length of activity season (Minsk province, Belarus) the growth rate in both species was much lower and comparable with those in northern locality. The age distributions in both southern populations were similar and noted for highest proportion of two-year-old individuals. In each of two species the growth rate in central population was significantly higher than in northern population. In *R. temporaria* the maximal sexual size differences were revealed in central locality. These differences were much weaker (not significant) in northern and especially in southern localities. The same trend of geographic variation in sexual size differences was revealed in *R. arvalis*. In all populations of each species the relative shin diameter was significantly larger in males than in females. In both species this characteristic was larger in southern localities. According to back-calculated data, the sexual size differences (within each species) and between-species differences have already formed before first wintering. Among two-year-olds the individuals that reproduce for the first time were larger than immature. In *R. temporaria* the positive correlation of annual body length increment with fecundity and with relative clutch mass indicates that reproductive expenditures constrain the somatic growth weaker than in *R. arvalis*.



Quantification of road-mortality for amphibians and reptiles in a future protected area of northern Spain

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There are an increasing number of studies quantifying and evaluating the potential impact of road mortality in wildlife populations and ranking roads according to mortality indexes. This worked quantified road mortality in the “Hoces del Alto Ebro y Rudrón” (“Natura 2000” network of European priority conservation areas), an area classified to be a future Natural Park, located in the high course of the Ebro river, northern Spain. Mortality indexes (MI, number of specimens/10km sampled/number sampling sessions) were used as descriptors of the mortality risk on wild species. In 2005, three roads (two secondary and one main road) were sampled by car in order to detect road-killed specimens. A total of 291 specimens were recorded (114 amphibians and 177 reptiles), belonging to 3 amphibian species and 14 reptiles species. *Bufo bufo* represented more than 88% of the amphibians with MI peaks in spring and autumn. *Vipera aspis* and *V. latastei* were the most frequently found road-killed reptiles (40%) with a MI peak in spring. *Natrix maura* presented a relatively constant MI and accounted for 14% of the reptiles. MI was significantly higher in secondary roads than in main roads (n= 250 and 41, respectively). Three hotspots of road mortality were identified with a Geographical Information Systems (GIS), all located in secondary roads. Management actions to reduce and/or eliminate the intensity of road mortality should addressed in the Natural Park’s Management Plan and detailed studies should be performed to evaluate the effectiveness of installing traffic signs, road barriers and/or under-road passages.



CONSERVATION

The importance of non-matrix fragments for the reptile community of cork-oak landscapes

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Habitat fragmentation is known to be one of the main modern menaces to biological diversity and may refer to natural or anthropogenic habitat patchiness. This work is part of a project aiming to demonstrate the contribution of non-matrix habitat fragments, such as olive groves and riverine forests to the overall diversity of cork oak landscapes.

Reptile sampling took place from April to June 2006. Sampling points corresponded to the points “center of the fragment” (0m), 50m and 250m from the fragment. Starting in each point, two observers systematically searched the area (turning all manageable rocks or logs) for 10 minutes. A total of 41 points were sampled around riverine forests and 75 around olive groves. Sampling of lacertids was improved by census along 39 transects located between the points 0m and 50m, as well as between the points 50m and 250m.

A total of 113 individuals of seven species was recorded in both sampling points and transects. Ninety three per cent of the recorded individuals were lacertids from the following three species: *Psammodromus algirus*, *Psammodromus hispanicus* and *Podarcis hispanica*. The blind snake, *Blanus cinereus*, was also recorded, as well as three colubrids: *Coluber hippocrepis*, *Macroprotodon cucullatus* and *Natrix natrix*.

There was an increase in lacertid numbers away from the fragment and towards the cork-oak woodland matrix, whatever the type of fragment considered. This is an indication that olive groves and riverine forest may decrease the quality of the surrounding matrix habitat for “typical” cork-oak woodland species.



Amphibians and reptiles of Buçaco National Forest, Centre of Portugal

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Buçaco's National Forest (wall fenced area with approximately 105 ha) constitutes an exclusive natural heritage in Portugal and in the World, due to its history, architecture and nature values. Biologically, it represents one of the best dendrological collections in Europe. However, an unknown fauna is associated to the amazing and well-described flora diversity. The last faunistic study of this forest took place more than 100 years ago, comprising a survey/inventory of the animals present at that time.

In this project, an inventory and the determination of the herpetological species distribution present in this singular area of the Centre of Portugal was conducted. To reach these goals, we applied several methodologies, such as nocturnal and diurnal surveys; capture of adults by hand and with a net (amphibians); identification of amphibians' larvae; pitfall trapping; identification of dead animals (natural deaths, road killings and predation) and gathering of had-oc observations.

24 species (Amphibians: 10; Reptiles: 14) were confirmed and their distribution mapped.

Since it is a very humid and dense forest, the occurrence of such a diversity of reptiles is very impressive.

The occurrence of protected (e.g. *Chioglossa lusitanica*, *Discoglossus galganoi* and *Vipera latastei*) and endemic species such as *Triturus boscai*, *Rana iberica*, *Blanus cinereus* and *Lacerta schreiberi* reinforces the importance of this natural area in terms of Portuguese herpetological populations' conservation.

The knowledge and dissemination of Buçaco's National Forest's biodiversity can contribute to the environmental sensitization of the visitors (more than 100 thousand/year) in what concerns to the maintenance of natural balance and the protection of ecosystems.

Preferences for male call parameters in the strawberry poison frog, *Dendrobates pumilio*

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Female frogs have often been shown to exhibit preferences for certain male call traits in laboratory experiments. However, the same kind of experiment has rarely been conducted in the field. We tested receptive female strawberry poison frogs for their preferences for several call parameters (high vs. low call rate, high vs. Low dominant frequency, near vs. far distance between female and call) in playback experiments within their natural home ranges. Females preferred the nearest speaker as well as low frequency calls, but did not discriminate between low and high call rate. Consequently we gave each female a choice between a near speaker emitting high frequency calls and a distant speaker emitting low frequency calls. Significantly, more females showed a preference for the near speaker. Thus, they accepted the less attractive high frequency calls in favour of distance. Based on behavioural observations of females in the field, we hypothesize that females are not seeking the best available male but mate with the closest caller probably to reduce search time.



Individual quality, parasites, home-range: harem size in green lizards (*Lacerta viridis*)

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Territorial behavior is present in many species of reptiles. In these cases, morphological, colour and other attributes of the individual may carry information about the size of the territory, and thereby affect mate-choice and reproductive success. We investigated the relationship between the size of territory and individual quality in the green lizard (*Lacerta viridis*). Recent observations showed strong territorial behaviour. Observations were made in the breeding seasons of 2005 and 2006. In addition to territory size, we also determined the number of females to be found on each male's territory as an estimate of the number of the male's potential reproductive partners. Ectoparasite load, colour and morphological characters did not correlate with the size of the territory. Parasite load showed negative correlation with the number of reproductive partners, while colour, morphological variables and territory size correlated positively with the number of females. In addition we found positive correlation between the robustness of males and their asymmetry, which may suggest that, contrary to many previous findings, asymmetry may be a neutral property in this case, or a cost of robustness. However, the intensity of blue colour on the throat showed positive correlation with the above-mentioned index for robustness. According to these results, though territory size cannot be predicted by morphological and colour characteristics, individual characteristics do predict the number of the male's potential reproductive partners.



SEA TURTLES

The eastern Atlantic juveniles of loggerhead sea turtle: Where do they come from and how do they distribute?

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After hatching, loggerhead sea turtles (*Caretta caretta*) enter in the sea and start the ocean phase of their lives, where juveniles inhabit pelagic feeding areas during 6-12 years. In the Atlantic Ocean, the central and the eastern feeding grounds harbor loggerhead juveniles from different nesting populations, constituting the designated mixed stocks. We studied the distribution of juveniles in the Eastern Atlantic comparing mtDNA sequences from canarian individuals with samples from Azores, Madeira and the Atlantic coast of Andalusia. The Canary Islands mixed stock analysis (2001-2004) revealed that they are mainly originated in South Florida (0.74), Northwest Florida (0.02), Quintana Roo (0.19) and Northeast Florida-North Carolina (0.03). Few individuals were not assigned to any considered nesting populations and some of them may have their origin in Cabo Verde nesting beaches. The relevant contribution of the Mexican population to the southern areas, like Canary Islands (0.19) and Madeira stocks (0.13) could be explained with the possible influence of magnetic parameters on the juveniles' distribution. The minor contribution of this southern nesting area (Mexico) to Azores and Andalusia stocks, corroborate this idea (0.03 and 0.04 respectively). We also investigated the temporal and size class variation of juveniles in the Canary Island foraging ground. During 2005-2006 we found an important number of haplotypes (30%) that were almost not present in earlier years, 2001-2004 (1%). Our results show for the first time, a temporal variation in a feeding area and a geographical structure in the juveniles' distribution.



GIS - based modelling for site suitability identification of sea turtle nesting areas in south-western Atlantic

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This study aims at selecting probable sites suitable for sea turtle nesting, based on 44 environmental cues identified in several reports dealing with sea turtle behaviour. Of these, 6 site characteristics were selected and integrated in a preliminary model including a multi-criteria evaluation. The results were presented as a poster at the XII Latin American Marine Sciences Congress held in Florianópolis in April 2007. The preliminary model has been tested using some proxy layers (fifty percent) and shows results compatible with actual sea turtle nesting sites previously recorded for the northern beaches of the state of Rio de Janeiro, Brazil.



Calpains-like expression during *Xenopus laevis* development

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Calpains are cytoplasmic proteases activated by calcium; they are implicated in motility, cell proliferation, cell differentiation and in apoptosis. The best-characterized calpains are two ubiquitously expressed isozymes, μ - and m-calpain, which can be distinguished by their in vitro requirement for different levels of calcium for activation. μ -Calpain and m-calpain require micro- and millimole concentrations of calcium, respectively. Calpain 3 (also known as p94) implicated in the limb-girdle muscular dystrophy is also well characterized. Calpain 1 and 2 are composed of a large catalytic subunit (80-kDa) and a common regulatory subunit (30-kDa). They have a specific endogenous inhibitor, the calpastatin. Calpains 3 is only formed with the large subunit which includes specific sequences and a nuclei translocation motif. It is not sensitive to the calpastatin.

The aim of this work is to study the role of calpains during the development of *Xenopus laevis*. For that, we localised by immunochemistry the calpains 1, 2 and 3 during the development of an Amphibian. At the first time, we showed that these proteases were expressed at the early stages (morula) and until the metamorphosis. Localizations of calpains 1 and 2 were similar. Their weak expression in the young stages increased during midblastula transition and stabilized in tadpole to metamorphosis. So, the calpains could have an influence on the whole of the development of *Xenopus laevis*.



Glutamate induced calpains-like expression in *Xenopus laevis* development

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Glutamate receptors activation increases the cellular permeability to calcium. This last can then induce apoptosis, transcriptional regulation and protein activation. Calpains constitute a family of enzymes present in all vertebrates. The most studied are the calpains 1 (or μ -calpains), 2 (or m-calpains) and 3 (or p94). As these enzymes are implicated in cell death and differentiation, and as glutamate receptors are functional in a great number of bodies in *Xenopus laevis*, we thus studied the indirect effect of glutamate on embryonic modelling. For that, we quantified the expression of calpains according to increasing glutamate amounts (0.1 to 20 mM) in the various bodies of tadpoles in growth phase (stage 46). A significant increase in the expression of calpains was observed, more particularly in the organs strongly affected by metamorphosis. It is thus probable that calpains take part in embryonic modelling by conditioning certain organs to metamorphosis.



PHYLOGEOGRAPHY

Phylogeography of an isolated population of the Aesculapian snake (*Zamenis longissimus*)

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The present isolated population of the Aesculapian Snake along the Ohře River valley in the western Czech Republic has long provoked debate over its origin. Fossil records suggest that the scattered isolates in the Czech Republic, Germany and Poland, may represent fragmented relics of a wider distribution during warmer conditions now surviving under a sub-optimal climate. Because snakes were kept in the temples built by the ancient Greeks and by the Romans in honor of the god, an alternative hypothesis has been suggested that the isolated populations may represent descendants of escaped snakes conveyed to health resorts by the Romans, or even more recently by members of a noble family from Italy or France. To examine these issues we compared mitochondrial DNA sequences of 52 Aesculapian snakes from 20 localities throughout Europe and western Asia. Phylogenetic analyses identified three main phylogeographical lineages with distributions suggesting that they originated from separate glacial refugia that were most likely located in the western Europe, in the Balkans, and along the eastern Black Sea coast, respectively. Snakes from the Ohře valley were genetically close to snakes from the Carpathians and northern Balkans, and they were only distantly related to the snakes from the western Europe, the Apennine peninsula and southern Balkans. These findings are consistent with the native origin of the Ohře population and suggest that it may represent a relic of a wider distribution that the eastern European lineage attained during warmer post-glacial conditions by colonization from the Balkan refugium.



Distribution of the fire salamander *Salamandra s. salamandra* (Linnaeus 1758) in lower Silesia (Poland) in the past and present time

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The fire salamander *Salamandra s. salamandra* (Linnaeus 1758) is one of the 11 subspecies of salamanders that occur in the western, central and southern Europe, north-western Africa and south-western Asia. In Poland there is only *Salamandra s. salamandra*, which occupies the southern part of Poland (Carpathian, Tatra, Beskidy and Sudeten Mountains). The northern boundary of the salamander range in Poland constitutes the northern boundary of the the species range in this part of Europe. The occurrence of the fire salamander in this region was studied in the past (1831–1925). At present times the data were confirmed in the Carpathian Mountains, but there is still a gap in the data concerning Silesia. The aim of our work was to update the information about the salamander distribution in this part of Europe. Here we summed up all available data from past and recent studies. Our work revealed that 29 populations of salamander were described before 1979; 20 populations were described in 1980 – 1989, from which 17 were new, and 3 were known from past; 34 populations were described in 1990 – 1999, from which 27 were new, 3 were known from past, and 4 from 1980-89. From 2000 till 2007, altogether 36 populations were described, 23 of which were new, and 7 were known from the past. The results are presented on two maps. The first map shows the occurrence of salamander in Silesia up to 1979, whereas the second map presents the occurrence of salamander in Silesia in 1980-2007.



Body form and habitat use of neotropical pitvipers of the *Bothrops atrox* species complexM.E. OLIVEIRA¹ & M. MARTINS²

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The pitvipers of the *Bothrops atrox* species complex occur throughout most South America. The morphology and habitat use of different Brazilian species of the *B. atrox* complex were analyzed in order to describe differences among them, and how these characters evolved in this lineage. We explored the relationships of body size and form (tail-body proportions and stoutness) with macrohabitat use in four morphologically distinct populations: *Bothrops atrox* from central Amazonia, *Bothrops marajoensis* from eastern Amazonia, *B. leucurus* from the Atlantic forest of eastern Brazil, and *B. moojeni* from gallery forests in savanna areas of central Brazil. The phylogenetic reconstruction of the morphological characters and habitat use indicated that, during the evolutionary history of the group, the tendency towards arboreality slightly decreased in *B. leucurus*; practically remained unaffected in *B. marajoensis* and in *B. moojeni*; and considerably increased in *B. atrox* from central Amazonia.



Commercial fishing impact on *Caretta caretta* in south Sardinia (Italy), 1997-2006G. OLLANO¹; D. FADDA¹; G. LENTI¹; S. PIOVANO² & C. GIACOMA²¹ Cetaceans and Sea Turtle Rescue Centre "Laguna di Nora", Pula, Italy² Dipartimento di Biologia Animale e dell'Uomo, Università di Torino, Torino, Italy; cristina.giacoma@unito.it

With this paper we present data recorded during the 10 years of activity of the Cetaceans and Sea Turtles Rescue Centre "Laguna di Nora" (Sardinia, Italy).

162 loggerhead sea turtles were rescued: 33% of the total *Caretta caretta* specimens were stranded turtles, 75% of them were dead animals. Besides, 39% of all specimens were directly caught as professional fishing bycatch, with an incidence of dead specimens of 6%. Trammel nets directly caught 86% of all loggerheads, while only 1 turtle was caught by bottom trawl net and only 1 by drifting longline. Notwithstanding this, 40% of the specimens entrapped in trammel nets showed a previous interaction with a longline gear (e.g. hook presence).

Complete data on 111 specimen show that longline fisheries have a highly negative impact on *Caretta caretta* in this area, with a peak of catches at a loggerhead size of 46-60 cm CCLn-t.

As regards hook location, 81% of turtles presented deep embedded hooks: 43% were found in the oesophagus, 12% in the stomach, and 26% in the intestine. Generally, each specimen had no more than 1 hook.



Preliminary molecular phylogeography of wide-spread steppe-runner lizard – *Eremias arguta* (Lacertidae) and considerations on its subspecific structure

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Steppe-runner (*Eremias* (*Ommateremias*) *arguta*) is one of the most widespread species of the Asian racerunners (genus *Eremias*), inhabiting steppes and semi-deserts of Eastern Europe and Middle Asia from Romania to Western Mongolia and China. Several subspecies were traditionally recognized, however morphological variability is so high that delimitation of these subspecies was always problematic. Here we apply Cytochrome B sequencing (50 samples from all the subspecies, 900 bp partial sequences) together with thorough morphological analysis for reconstruction of species history and reassessing its subspecific structure. The southernmost populations (*E. a. uzbekistanica*) from Uzbekistan both molecularly and morphologically form a clearly separated clade, very different from all other subspecies. Within more northern populations there is a split between populations from Northern Caucasus, Europe and Eastern Kazakhstan (*E. a. deserti*) and Central Kazakhstan populations (*E. a. arguta*). Transcaucasian (*E. a. transcaucasica*) steppe-runners group with Middle Asian populations. Finally, within the nominative subspecies the most basal clade is formed by populations from the Ustyurt plateau, and easternmost samples, assigned as '*E. a. potanini*' are deeply nested within *E. a. arguta* branch. Cytochrome B is a good marker for resolving subspecific structure of *Eremias*. Our data indicate an old split between *E. a. uzbekistanica* and all other taxa, probably coming from the area of Ustyurt plateau. This vicariant event is likely to have been caused by Paratethys regression. We assume that later, from the area of Ustyurt, steppe-runners may have dispersed in three main directions – westwards to Northern Caucasus, south-westwards across the Apsheron-isthmus to Transcaucasia and eastwards to Central Kazakhstan; moving further to the east the clinal variation pattern '*arguta-potanini*' was formed.



Immunohistochemistry as a tool for the accurate diagnosis of systemic mycotic infections in sea turtles

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There are relatively few reports of mycotic diseases in sea turtles compared with other reptiles, birds, and mammals. Fungal skin diseases are thought to be of major importance (*Fusarium solani*, *Aspergillus* sp., *Geotrichum* sp., *Penicillium* sp., *Scolecobasidium* sp., *Fusarium* sp., *Drechslera* sp.). Systemic mycoses have involved several fungi such as *Paecilomyces* sp., *Scolecobasidium constrictum*, *Sporotrichium* sp., *Cladosporium* sp., *Fusarium scirpi*, *Penicillium* sp., *Candida* sp., and *Fusarium* sp.

Systemic mycotic infections in sea turtles are difficult to diagnose clinically, and the diagnosis is usually achieved by culture or histopathology. However, fungal elements are often only stained with haematoxylin and eosin and may remain unnoticed unless special fungal stains such as periodic acid-Schiff or Grocott's methenamine silver nitrate stains are applied.

We describe several immunohistochemical studies on sea turtles stranded due to systemic mycoses. Fungal cultures were not taken at the time of necropsy. Immunohistochemical studies were carried out in order to determine the aetiological agents involved in the lesions, using a panel of specific monoclonal and heterologously absorbed polyclonal antibodies.

Immunohistochemistry has proved to be a powerful tool for the accurate diagnosis of mycoses in sea turtles. Immunohistochemical diagnosis depends on the production of appropriate primary antibodies and the availability of monoclonal antibodies. Efforts should be made to develop standardized and commercially available specific monoclonal antibodies against fungal species described in reptiles.



CONSERVATION

Necropsy findings in La Gomera giant lizards (*Gallotia bravoana*)

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The La Gomera Giant Lizard (*Gallotia bravoana*) is listed as Critically Endangered by the IUCN Red List. The rediscovery of this species, presumably extinct, in the Risco de La Mérica (Valle Gran Rey, La Gomera) in 1999 drove to establish a specific recovery plan and a captive breeding programme in order to increase the number of individuals.

Since then captive lizards have been monitored closely and several anatomopathological studies have been carried out in order to determine the causes of mortality and main diseases affecting this species.

The most important lesions observed in the lizards necropsied during the period 2000/2005 included: multifocal granulomatous hepatitis, multifocal granulomatous poliserositis, fibrinopurulent poliserositis and fibrinopurulent pleuritis. Lesions caused by *Salmonella arizonae* in an outbreak during the summer of 2005 are also described and briefly discussed.



Influence of ammonium nitrate on anuran larval responses to predation pressures

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Sublethal effects of toxicants may upset normal behavioural responses to predators, leading to increased predation. For example, sensory capabilities may be impaired by toxicants, leading to difficulty in detecting predators or other threats. Alteration of locomotor abilities by pollutants may also explain the difficulty of tadpoles to escape from predators. Here we assess the effects of ammonium nitrate exposure on the response to predators shown by anuran tadpoles. In a first experiment, we analysed the ability of *Discoglossus galganoi* and *Pelobates cultripes* tadpoles to avoid predation by *Procambarus clarkii*. Tadpoles that had been previously exposed to the fertilizer were consumed by the crayfish faster than controls (Mean time of predation –Dg: non exposed = 18.03 h, exposed = 7.48 h. $P=0.059$ –Pc: non exposed = 16.12 h, exposed = 9.46 h. $P=0.022$). Analysis of *P. cultripes* larval behaviour showed how in the presence of predator cues, control tadpoles responded more actively to stimuli (activity index: crayfish = 1.17; no crayfish = 0.90; $P<0.05$) while exposed tadpoles did not show predator-dependent responses (activity index: crayfish = 0.572; no crayfish = 0.567; $P>0.05$). In a second experiment, we analysed the combined effects of ammonium nitrate and predator stress on *P. cultripes* tadpoles. A significant interaction of both factors was detected on larval growth. Whereas tadpoles exposed to the fertilizer were smaller and slighter than controls, the presence of adult newts, *Triturus marmoratus*, increased larval growth rates. Our results emphasize the importance of considering environmental stresses on the ecotoxicological studies with amphibians.

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Preliminary study of the distribution of *Batrachochytrium dendrobatidis* in interest areas in the Basque Country (Spain)

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Batrachochytrium dendrobatidis is a chytrid fungus which causes a highly infectious and rapidly extending amphibian disease, chytridiomycosis, implicated in mass mortalities, population declines and the extinction of amphibian species worldwide.

Surveillance measures of chytridiomycosis to date have been based on the detection of *B. dendrobatidis* in its host, but Walker et al. (*unpublished data*) have developed a technique that allows detection of the pathogenous agent in relatively small volumes of water. This environmental diagnose technique consists on filtration of a volume of water from amphibian dwelling sites and application of the quantitative real-time PCR protocol described by Boyle *et al.* in 2004.

Following this methodology, we have sampled in different sites (ponds, streams, etc.) in a total of 13 interest areas (Natural Parks, CIAs, Biosphere reserve, etc.) of the Basque Country, in Northern Spain.

Here we show the results obtained from samples taken in spring and summer of 2007.



The biology and life history of *Triturus v. vittatus* (Urodela) at various habitats and breeding sites

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Habitats surrounding different breeding sites inhabited by *Triturus v. vittatus* in Northern Israel were studied. Altitudes of the localities ranged between 212–740 m ASL. Mature newts were observed around breeding sites, where they arrive before the pools fill with water. Males leave the ponds after breeding and females after oviposition of 20–70 eggs on plants and other substrata, depending on conditions in the ponds. The larvae hatch within about 15–30 days. Larval growth was found to extend for the longest period, between April and July, in ponds, which are located at the highest elevation, and the shorter period was found in ponds at altitudes in which water temperature is high and the hydroperiod is shorter. The period of larval growth varied among the various sites and differed throughout the years of the study, according to ecological conditions. All breeding sites were populated by newt larvae together with various anuran larvae; *Hyla savignyi*, *Bufo viridis*, *Rana bedriagae* and *Pelobates syriacus*. *Salamandra infraimmaculata* larvae and adult newts inhabited two rain pools simultaneously, but larval growth periods barely overlapped. Eggs and larvae developed in the winter ponds only when water temperature increased above 18°C, the temperature at which *S. infraimmaculata* larvae completed metamorphosis. In conclusion, among the different ponds, large variations were found in the newt larval growth period, as well as in the time required for the completion of metamorphosis. However, no differences in the ecological parameters and water quality of the ponds were discovered during the larval growth period.



LIFE HISTORY

Gonadal cycle in males and females of *Triturus vittatus vittatus* (Urodela) from the Southern limit of its distribution

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In this study we describe the gonads of mature terrestrial and aquatic *Triturus v. vittatus* males and females. The ovaries of *T. v. vittatus* are of the group synchronic type. Aquatic female gonads contain a defined batch of more developed oocytes together with oocytes at different stages of development. The stages are characterized as follows: Oogonia, Chromatin nucleolus stage, Perinuclear stage, Vitellogenic oocyte maturation. Some aquatic females were more developed than others, containing also mature oocytes during nuclear migration, but most of the females contained only oocytes at different stages of vitellogenesis.

Ovaries of terrestrial forms contained only pre-vitellogenic and atretic oocytes.

Male gonads consisted of seminiferous lobules containing cysts of cells at different stages of development. Spermatogonia, spermatocytes spermatides and spermatozoa were observed in the gonads of aquatic forms. More developed specimens contained lobuli packed with mature spermatozoa. Lobule of testes from terrestrial forms contained mainly the early stages: spermatogonia, spermatocytes and early spermatides.



Analysis of factors affecting the success rate of habitat management actions and repatriation in an endangered frog of northern Italy

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Repatriations are one of the most frequently management actions used for conservation of amphibians all over the World. Despite this, very few studies have analysed the effectiveness of those actions. The aim of this study was i) to measure the success rate of the repatriations of *Rana latastei* involved in a conservation project carried out during 1999-2001 in Lombardy (Northern Italy), and ii) analyse how the environmental and structural factors affected the success rate of repatriations. Twenty ponds were surveyed from February to April 2006, for an overall of 47 field surveys. Each pond was carefully checked for frog and/or egg presence. For each pond, we measured several variables concerning habitat management actions (not managed, restored, or excavated), structural features, micro and macro-habitat characteristics, human disturbance and predators (presence/absence). The presence of the species was ascertained only for 40% of the sites, and the presence of frogs was significantly higher in restored ponds by respect to both new and not managed ponds. Our data seemed exclude that the structure of ponds as well the microhabitat variables might influence the success of repatriations. Only two macro-habitat variables affected the outcome of repatriations, and frog presence positive associated with woodland abundance, which reflected the habitat preference of species for mature forest, as well with rice fields. In conclusion repatriations were more successful only in restored ponds, while outcomes of tadpoles releases did not differ in new and not managed ponds.

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Incipient speciation in Iberian and north African wall lizards (*Podarcis*): a multilocus approach

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The systematics of Iberian and North African wall lizards (*Podarcis*) has been a long-standing matter of debate due to complex variation in morphological patterns. These lizards have been recently suggested to be a species complex by mtDNA phylogenetic analyses. In this study, we increased mtDNA sequencing up to 2425bp in order to obtain more accurate estimates of phylogenetic relationships and compared this to nuclear variation, analysed by protein electrophoresis (10 polymorphic loci) and sequencing of two introns. Despite the broad agreement of allozyme data with mtDNA in defining evolutionary units, variation in nuclear introns is characterised by incomplete lineage sorting of ancestral polymorphism, probably coupled with present gene flow, suggesting that the various forms of *Podarcis* are only incipient species and reproductive isolation may have not been completely achieved. In order to test this hypothesis we selected as case-study a contact zone between two parapatric forms to evaluate the magnitude of gene flow. The study of mtDNA and a battery of 15 nuclear loci, analysed through recent model-based individual clustering methods, revealed that although there are unequivocal evidences of hybridization, this is a clearly bimodal hybrid zone, suggesting the existence of barriers against gene flow and an incipient stage of reproductive isolation.



Testing phylogeographic hypotheses in Iberian and north African *Podarcis*: the influence of latitude in shaping historical demography and substructure

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The aim of this study was to test simple biogeographic predictions related to the differential influence of the Ice Ages according to the latitude: (i) northerly distributed species should have experienced a greater loss of suitable habitat, resulting in higher lineage extinction, than species distributed in southern latitudes. This would be reflected in lower diversity and number of differentiated lineages in northern areas. (ii) a signature of demographic expansion following the climate amelioration should be obvious in northern species, contrasting to evidence of long-term effective population size stability in the south. We used as models for this study three species of wall lizards (*Podarcis bocagei*, *P. carbonelli* and *P. vaucheri*) which replace each other along a latitudinal gradient. Our results based on mitochondrial DNA variation show that *P. bocagei* presents remarkably low levels of diversity and subdivision, a shallow coalescent history and a strong signature of demographic growth. *P. vaucheri*, on the other hand, presents large levels of genetic diversity, strong geographic subdivision, no evidence of demographic growth and an ancient coalescence time, probably dating back to the initial stages of the Pleistocene. The intermediately distributed *P. carbonelli* presents average values of all studied variables. Taken together, these results entirely fit to our main predictions and demonstrate that the effects of the Ice Ages were indeed different according to the latitude.

Additionally we analysed a battery of nuclear markers in *P. bocagei* and *P. carbonelli* in order to study in more detail these species' evolutionary history and validate phylogeographic hypotheses suggested by the study of mtDNA.



MONITORING

17 years of monitoring the Majorcan midwife toad, *Alytes muletensis*. A growing tendency of the global population

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From the beginning of the First Recovery Plan of the Majorcan midwife toad, *Alytes muletensis*, (1991-1994) to nowadays it is been carried out an annual monitoring of all the existing populations of the Majorcan midwife toad to know the tendency of the population in all its occupational area.

The indicator to evaluate the global population tendency that has been chosen is the number of tadpoles counted through the annual census. The census consisted on visiting all the populations and counting all the tadpoles found visually from out of the pools and from inside them, helped occasionally with a water torch and a diving suit.

The present study compares the size of the tadpole populations among them through the years. The data shows a growing tendency of the global population and the demographic evolution through the tadpole counting during the seventeen years (1991-2007) of field work. Thus, in 1991 the tadpole population counting in all localities started. It was summarized a global population of 14.915 tadpoles in 12 populations, while in 2004 a historical record was obtained with 30.052 tadpoles in 33 populations.



Sauria SINEs as phylogenetic markers in lizards and snakes and an interesting horizontal transfer event of a SINE to a poxvirus genome

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Poxviruses (Poxviridae) are a family of double-stranded DNA viruses with no RNA stage. Members of the genus Orthopoxvirus (OPV) are highly invasive and virulent. It was recently shown that the taterapox virus (TATV) from a West African rodent is the sister of camelpox virus and therefore belongs to the clade closest to the variola virus (VARV), the etiological agent of smallpox. Although these OPVs are among the most dreaded pathogens on Earth, our current knowledge of their genomes, their origin and their possible hosts is still very limited. Here we report the horizontal transfer of a retroposon—known only from reptilian genomes—to the TATV genome. After isolating and analyzing different subfamilies of short interspersed elements (SINEs) from lizards and snakes, we identified a highly poisonous snake from West Africa as the closest species from which the SINE sequence discovered in the TATV genome (TATV-SINE) was transferred to the virus. We discovered direct repeats derived from the virus flanking the TATV-SINE and the absence of any snake-derived DNA flanking the SINE. These data provide strong evidence that the TATV-SINE was actually transferred within the snake to the viral genome by retrotransposition and not by any horizontal transfer at the DNA level. We propose that the snake is another intermediate host for TATV, suggesting that VARV-related epidemiologically relevant viruses may have derived from our cold-blooded ancestors and that poxviruses are possible vectors for horizontal transfer of retroposons from reptiles to mammals.



CONSERVATION

Conservation of Italian Agile frog (*Rana latastei* Boulenger, 1879) in Slovenia in the frame of the 92/43EEC Habitats Directive

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Italian agile frog (*Rana latastei* Boulenger, 1879) is one of the most endangered amphibian species in Europe and is also listed on Annex II of Habitat Directive. Amphibian baseline study for the proposal of Special Areas of Conservation (pSAC) for Natura 2000 network in Slovenia included also the survey of Italian Agile frog populations in Slovenia (Poboljšaj & Lešnik, 2003). The aim of the study was to determine the distribution area of the species in Slovenia and to make a proposal for conservation measures. Nevertheless, at the moment there is no legal protection of its habitats in Slovenia, except for protected Panovec forest.

In the year 2003 first intensive surveys were made in the reproduction time, when all the streams were systematically surveyed and egg masses counted in the whole potential distribution area of the species. The completely new sites were discovered in the valley of Branica river, which cover additional 57 km². In the year 2004 and 2005 the study on the same sites was repeated and further new potential areas were investigated and new sites discovered in Goriška Brda.

In 2003 four pSAC's for *R. latastei* were proposed, which are holding 90% of species populations in Slovenia. The largest area of Western Vipava valley (50 km²), which has 86% of all Slovenian population, was not included in Natura 2000 network declared in 2004. In the 2007, as a result of biogeographical seminar, the Vipava valley is in the process of becoming an additional Natura 2000 site in Slovenia.



Amphibian COI-barcoding and its application to taxonomy of European newts (genera *Mesotriton*, *Ommatotriton*, *Lissotriton*, *Triturus*) (Salamandridae)

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The COI-barcoding is a practical approach initially developed for biodiversity assessment and correct taxonomic identification. We used COI partial sequencing (from 200 to 750 bp) to barcode 245 samples of European newts (genera *Mesotriton*, *Ommatotriton*, *Lissotriton*, and *Triturus*) of altogether 33 taxa. As a result a reliable species / subspecies identification system was developed; revealed mismatches in identifications are most probably caused by mtDNA introgression as the sampling included mixed populations coming from contact zones between vicariant taxa where mtDNA introgression was shown or expected (*Triturus cristatus* – *Triturus dobrogicus*, *T. marmoratus* – *T. pygmaeus*, *Lissotriton vulgaris* – *L. montandoni*). COI data can be used for resolving interspecific taxonomic relationships and phylogeographic studies. Alpine newt (*Mesotriton alpestris*) can be a good example – we studied 43 specimens belonging to all currently recognized subspecies and obtained a well-resolved phylogenetic tree. Our hypothesis suggests the presence of two major clades with *M. alpestris* – western subspecies group (*M. a. apuanus*, *M. a. inexpectatus*, *M. a. cyreni* and *M. a. alpestris* (partim)) and eastern subspecies groups (the rest). The nominative subspecies *M. a. alpestris* is clearly polyphyletic. We failed to find any molecular difference between one-lake subspecies (*M. a. montenegrinus*, *M. a. serdarus*, *M. a. piperianus*, *M. a. reiseri*) from surrounding populations, while *M. a. inexpectatus* from Southern Italy formed a sister-clade with *M. a. apuanus*. The analysis of different populations of banded newt (*Ommatotriton vittatus*) revealed deep molecular divergence between *O. v. vittatus*, *O. v. cilicensis* and *O. v. ophryticus*. We propose the COI-barcoding as a useful approach for pilot phylogeographic and taxonomic studies; it can be also successfully used in evaluation of mtDNA introgression in contact zones and species identification of newt eggs and larvae.



PHYLOGEOGRAPHY

Bioacoustic and genetic variation in the strawberry poison frog, *Dendrobates pumilio*

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Dendrobates pumilio is an abundant and conspicuous frog in the Caribbean lowland forest of Central America (Nicaragua, Costa Rica, Panamá). The species shows an enormous variation in size and colour pattern. To find out whether different populations of this polymorphic taxa belong to the same species we carried out molecular and bioacoustic analyses including more than 20 populations from north-west Costa Rica to east Panama. We sequenced three mitochondrial genes (Cyt B, COI, 16S rRNA) and used different phylogenetic approaches for the analysis. Resulting phylogenetic trees did not support the assumption that *D. pumilio* forms a monophyletic group. Instead two different genetic lineages, one in North Costa Rica and the second in South Costa Rica/Panama were identified. In contrast, particularly polymorphic frogs in Panama showed only very limited genetic differentiation. Several parameters of the advertisement calls varied along a geographic cline, but call differentiation did not correlate with genetic distance. This is in accordance with earlier studies in different animal taxa that did not detect co-variation between signal divergence and genetic distance.



Frog concerts: a new initiative for more effective amphibian conservation

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Amphibian decline is usually caused by a combination of factors. Some of these, such as deliberate killing, are directly related to the fact that frogs, toads, newts and salamanders form a hardly-known, unpopular animal group. Consequently, education programmes are vital parts of conservation focussing on these animals. As a new initiative in this field Frog Concerts have been performed in Hungary since the International Environmental Day, 2006. They contained music ranging from Joseph Haydn's Frog quartet to Crazy Frog, folk music and (frog) chanson, poems and stories from La Fontaine to children rhymes and advertisements. Natural history, however, is a key element in Frog Concerts including the photos, sounds and short description of local and exotic species. Award winning actresses and musicians as well as local schoolchildren presented poetry and music together to make it even more diverse and attractive for local people. The audience can also participate by entering a croaking competition near the end of the programme. As side events, a little zoo, frog object, frog fashion and frog book exhibitions are also arranged. Five concerts were performed under different conditions ranging from a village of 140 inhabitants (plus many from neighbouring settlements) to the central national ceremony of the International Water Day. This programme also generated outstanding media attention reaching nearly two million people in a year. As a result, Frog Concerts effectively helps the conservation of local amphibians and nature in general by calling attention to amphibian decline and possible mitigation measures.



CONSERVATION

The data on status and official plan of conservation of *Bombina bombina* L. in Latvia

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Bombina bombina L. is a rare Latvian amphibian living on the northern border of the area. *Bombina bombina* enrolled into the Red Book of Latvia. Studies on the ecology of this species, as well as distribution and monitoring, are strongly needed it as urgent measures to preserve *Bombina bombina* in Latvian fauna.

In 2006 only four existing or confirmed populations of *Bombina bombina* were known in Latvia: "Bauskas" (Bauskas district), "Ilgas", "Ainavas" and population "Demenes" found in 2006 (all three in Daugavpils district). Common number of observed vocalizing males was 86 in Latvia in 2006.

The major threats are: small number of animals in populations, natural destruction of biotopes, cold climate, urbanization, predators etc.

The official Plan of a protection of *Bombina bombina* in Latvia was created by authors in 2006 under supervision of Latvian Nature protection board and was officially agreed by Ministry of nature of Latvia at 10.01.2007. The official address of the Plan is <http://www.dap.gov.lv/?objid=288>.

The main measures of conservation of *Bombina bombina* in Latvia are: creation of new protected territories; optimizations of dark biotopes; creation of new ponds; genetical and ecological researches; neutralization of predators; breeding of the *Bombina bombina* in the zooculture; reintroduction and introduction; monitoring, education of people; others measures.

Some measures were realized in 2006 by Daugavpils University and Latgales Zoo (Project LIFE04NAT/LV/000199; optimization of biotopes; breeding in zooculture; education of people etc.).

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The data on status and prospective official plan of conservation of *Emys orbicularis* in Latvia

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Emys orbicularis L. is a very rare and protected species in Latvia, living on the northern border of his area. There is data on observation of *Emys orbicularis* in Latvia since 1820 (Silins, Lamsters 1934). It is known about new finds of species in Latvia (more of 50 observations), mostly single adults, very seldom groups or juveniles. At the same time, it is known nothing about any stable population of *Emys orbicularis* in Latvia. Therefore research of distribution and ecology of *Emys orbicularis* in Latvia is needed for the preservation of species.

The existing measures of a protection of *Emys orbicularis* in Latvia are: 1) Legislation in Latvia: the *Emys orbicularis* is put officially into the first category of the List of rare and protected animals, the penalty for the destruction of a *Emys orbicularis* is ~800\$ in 2007; 2) Preservation in-situ: one local value reserve of pond turtles exist in Latvia (Apgulde, Dobeles district); 3) Preservation ex-situ: in the zooculture exist more than 25 *Emys orbicularis* (Latgales Zoo, LES, Daugavpils district), 9 juveniles are received ex-situ in 2006.

In present time the first official Plan of protection of *Emys orbicularis* in Latvia is in process of creation. Planned head measures: new protected territories (Kraslava district etc.); optimizations of biotopes; genetical and ecological researches; creation of the zooculture, creation of the first group of *Emys orbicularis* in the fenced pond for next years; education of people.

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MORPHOLOGY & SYSTEMATICS

Mucous specialised glands in the nuptial pads of the Eastern fire-bellied toad, *Bombina orientalis*

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The cutaneous pads in the forearm of *Bombina orientalis* contain clusters of large mucous glands with peculiar secretory units. Observed under the LM, these consist of tall mucocytes, resembling truncated pyramids in shape, and are radially arranged, with their exiguous apices encircling a virtual lumen. Mucocyte nuclei form a single basal row, whereas the supranuclear cytoplasm holds remarkable amounts of relatively dense granules. TEM analysis reveals consistent ultrastructural traits in these mucous units that contrast with the ordinary mucous glands occurring in the skin at the boundary with the cutaneous nuptial pads. Tall mucocytes possess somewhat dilated, packed rER cisterns in the subnuclear cytoplasm, resting on a continuous, relatively thick myoepithelial sheath. Contiguous cells are separated by obvious interstices and contain secretory granules with identical electron density. Mucocytes in ordinary glands rest on a discontinuous, thin myoepithelium, and exhibit different length as well as irregular arrangement, encircling a lumen of variable width. They contain flat rER cisterns that occupy the slender cytoplasm of contiguous cells, closely adhering to each other with secretory granules, characterized by different electron density.

Mucous glands in the pad skin of *B. orientalis* share common ultrastructural traits with other specialized glands occurring in several amphibian species and involved in production and release of pheromonal substances during courtship. Present findings confirm that these secretory units express dimensional as well as functional specializations of the mucous skin gland line widespread among amphibians.



Geographic variability and taxonomy of the *Montivipera raddei* species group (Reptilia, Viperidae) in Iran – a morphological approach

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In order to determine geographic variability and taxonomic status of the *Montivipera raddei* (s.l.) species group from Iran, six morphometric and eighteen meristic data were analysed by univariate, bivariate and multivariate statistics. 31 specimens (16 male and 14 female) from nine localities were collected between 2003-2006, from six provinces in North West of Iran, including central and western Alborz and northern Zagros mountains.

To study clinal gradients Spearman Correlation test was carried out and revealed 12 characters which correlate significantly ($p \leq 0.05$) with longitude. Principle Component Analysis and Cluster Analysis were performed on both sexes separately. Results of male and female specimens are incongruent. In males, two geographically separated groups exist (central Alborz Mountains are separated from all other localities). Analysis of male specimens confirms *M. latifii* as a separate taxon within *raddei* species group but do not support the validity of *M. albicornuta*, *M. raddei raddei* and *M. raddei kurdistanica*, because some characters follow a clinal gradient through longitude. However, at that time of the study the taxonomic conclusions are provisional.



Hematological profile for selected species of *Bothrops* and *Crotalus* (Ophidia: Viperidae), kept in captivity at the Butantan Institute, São Paulo, Brazil

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The aim of the present study was to determine the hematological profile for a group of *Bothrops* and *Crotalus* kept in captivity at the Butantan Institute, São Paulo, Brazil. From March to May of 2001, blood was collected from 173 clinically healthy snakes, including 15 *B. alternatus* (10 Females; 5 Males); 28 *B. jararaca* (16 F; 12 M); 15 *B. jararacussu* (10 F; 5 M); 10 *B. moojeni* (7 F; 3 M); 9 *B. neuwiedi* (5 F; 4 M); 21 *C. durissus collilineatus* (10 F; 11 M) e 49 *C. d. terrificus* (29 F; 20 M). Immediately after collection, blood smears were prepared and stained with modified May-Grünwald-Giemsa stain. Red blood cells (RB), white blood cells (WB) thrombocytes and differential leukocytes counts, packed cell volume (PCV), hemoglobin concentration and hematimetric indexes (MCV, MCH and MCHC) were determined according to routine protocols and formulae. Blood values were statistically (a £ 0.05) evaluated using Kolmogorov-Smirnov, Kruskal-Wallis, Dunn's and Mann Whitney tests, under the program GraphPad Prism, version 4.3 (Graph Pad Software, USA). The most relevant results obtained for genus *Bothrops* showed a significantly higher number of basophiles in *B. jararaca* when compared to other species studied, and a significantly lower number of RB and hemoglobin concentration for *B. moojeni*. Within the genus *Crotalus*, *C. d. terrificus* revealed a significantly higher number of RB when compared to *C. d. collilineatus*. The present results offer an important hematological normal value baseline for *Crotalus* and *Bothrops* snakes kept in captivity in Brazil.

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Serum biochemical profile for selected species of *Bothrops* and *Crotalus* (Ophidia:Viperidae), kept in captivity at the Butantan Institute, São Paulo, Brazil

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The purpose of this study was to provide biochemical data for Viperidae snakes (genus *Crotalus* and *Bothrops*) kept in captivity at the Butantan Institute, São Paulo, Brazil. From March to May of 2001, blood was collected from 173 clinically healthy snakes, including 15 *B. alternatus* (10 Females; 5 Males); 28 *B. jararaca* (16 F; 12 M); 15 *B. jararacussu* (10 F; 5 M); 10 *B. moojeni* (7 F; 3 M); 9 *B. neuwiedi* (5 F 4 M); 21 *C. durissus collilineatus* (10 F; 11 M) e 49 *C. d. terrificus* (29 F; 20 M). Immediately after collection, 1.0ml of blood was placed in a tube without anticoagulant to obtain serum for biochemical analysis. The biochemical tests for calcium, total protein; albumin, alkaline phosphatase, phosphorous and urea were performed by specific colorimetric tests. To determine alanine aminotransferase, aspartate aminotransferase and creatine-kinase enzymes, glucose, creatinine, cholesterol and uric acid, heparinized total blood were used and measured by Reflotron â (Roche). Data were statistically (a \leq 0.05) evaluated using Kolmogorov-Smirnov, Kruskal-Wallis, Dunn's and Mann Whitney tests, under the software GraphPad Prism, version 4.3 (Graph Pad Software, USA). Results indicated significant variation among species and gender; however, the most relevant biochemical results were the significantly higher levels of alanine aminotransferase for males of *B. alternatus*, *C.d. terrificus* and *C.d. collilineatus*, and higher levels of calcium and cholesterol for females when compared to males. The results presented in the present study corroborate that snakes may present a marked variation on serum biochemical profile without pathological significance.

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LIFE HISTORY

Reproductive cycle of female in *Boulengerula taitanus* (Loveridge, 1935), an oviparous Gymnophionan amphibian

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Gymnophiona are elongated and burrowing amphibians living in tropical countries. Their reproductive biology is still poorly known and only a few species have been studied. *Boulengerula taitanus* lives in the cloud forests of the Taita Hills, Kenya. The area undergoes to two rainy seasons, a long one, from March to May, and a shorter one in November and December, during which eggs and juveniles have been observed. In this work, the reproductive cycle of females is described for the first time.

The ovaries have been studied using histology and immunohistochemistry techniques, and the evolution of follicles has been described throughout the year. The ovaries are paired structures situated in then posterior part of body, parallel to the intestine. From germinal nests scattered on the ovaries, oocytes and follicles develop. Oocytes are surrounded with a first layer of follicle cells, the granulosa, and a second layer of connective cells, the connective theca. During its evolution each oocyte increases in size, and yolk reserves accumulate in cytoplasm. Granulosa cells also increase in size, and, from a flattened shape, they become cubic. After ovulation, the follicles bring on corpora lutea. Several atretic follicles are observed in all the ovaries.

Follicles develop and differentiate regularly from January until November. All the follicle categories, excepted corpora lutea, are observed in the ovaries throughout the year. We conclude that there is an annual sexual cycle in female *Boulengerula taitanus*, an oviparous species.



On the occurrence of the Zagros lacertid, *Lacerta zagrosica* Rastegar-Pouyani & Nilson, 1998 (Sauria: Lacertidae) in Central Zagros Mountains, Iran

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The lacertid lizards of the genus *Lacerta* Linnaeus, 1758 occur in Iran with at least 13 documented species. Of these, the recently described and endemic species, *Lacerta zagrosica* Rastegar-Pouyani & Nilson 1998, was originally recorded in a very restricted locality in the rocky areas of the central Zagros Mountains, Isfahan Province, west-central Iran at about 2500 m elevation. During a long-term study and field work in the Zagros Mountains, some new and remote localities were found for this species in the high mountainous regions of the central Zagros Mountains at the elevation of more than 3000 m. The area is covered by snow for at least eight months within a year. So, the hibernation period is extraordinarily long for this species in the studied area. These new and mountainous localities are located in Isfahan and Kohgiluyeh-va-Buyer Ahmad Provinces, west-central Iran. Based on this study, a certain degree of geographic variation exists between the original, topotypic population of *Lacerta zagrosica* and the newly recorded, above-mentioned, populations.

Systematics and relationships of *Lacerta zagrosica* are shortly discussed and its distribution map is given.



Phylogeography and genetic diversity within *Psammophis schokari* (Serpentes) in north Africa based on mitochondrial DNA sequences

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The snake *Psammophis schokari* has a widespread distribution across North Africa, and in Morocco/Western Sahara is represented by three different morphotypes: striped, unicolor and the Western-Sahara morph. ND4 mitochondrial DNA sequences from 28 specimens, comprising 20 *P. schokari*, two *P. aegyptius*, one *P. elegans*, two *P. sibilans*, one *P. condanarus* and two outgroups were analysed. Within *P. schokari* we identified four genetic lineages (Morocco/Western Sahara, Mauritania, Algeria and Israel) with a genetic divergence ranging from 4-5%, less than that typically found between different species. Surprisingly, Moroccan/Western Sahara and Algerian lineages are the most divergent ones. This geographic substructuring may be explained due to severe climate changes experienced by the Sahara desert between the Miocene and Pleistocene associated with expansion/contraction phases of this desert. *Psammophis aegyptius* is the sister-taxon of *Psammophis schokari* with a high level of genetic divergence between them (10.7%) supporting the recognition of *P. aegyptius* as a distinct species. The three Moroccan/Western Sahara colour morphotypes form one genetic lineage indicating that colour pattern does not reflect a different phylogenetic history, and is probably an ecological adaptation to the local environment.



***Xenopus laevis*, a new exotic amphibian in Portugal**

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Several populations of the African clawed frog, *Xenopus laevis*, were recently found inhabiting a single stream (Lage) at Oeiras, about 15 km W of Lisbon, Portugal. Although the place and time of introduction are not clearly identified, there are reasons to believe that this may be a >30 yr-old introduction proceeding from nearby laboratories.

Xenopus laevis is native from South Africa, and introductions of this species and its adverse effects are already documented in other Mediterranean climate-type regions, particularly in California.

Starting in 2007, the Oeiras municipality is promoting research on the distribution and abundance of this species in Lage stream, in order to design an effective eradication program. Until now, populations of the species have already been found in three stream sections, and we present preliminary data on its distribution and abundance. Fortunately, the Lage stream catchment is isolated from surrounding streams. Furthermore, all the populations were found downstream, in a heavily urbanized area that clearly constrains the ability of individuals to cross overland to other water bodies. Therefore, an eradication program may be feasible.



A carnivorous tadpole from Madagascar: *Gephyromantis corvus*

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The endemic Malagasy frog radiation of the Mantellidea contains numerous groups of strongly derived morphology and ecology. Among these is the genus *Gephyromantis* that contains on the one hand direct-developing species, and on the other hand the subgenus *Phylacomantis* with currently two species (*Gephyromantis corvus* and *G. pseudoasper*) which have strongly derived tadpoles that have been hypothesized to be carnivorous. To confirm this hypothesis we performed the first time detailed studies on their behaviour.

Substrate choice was tested in containers with gravel, sand and dead leaves as substrate in equal shares and periodically controlling the position of tadpoles. Tadpoles were found to show clear preferences for a substrate composed of dead leaves.

To ascertain the putatively carnivorous habits, *G. corvus* tadpoles were placed in containers together with other tadpoles and frog eggs.

We could ascertain that the *G. corvus* tadpoles actively hunt and attack other tadpoles as well as aquatic invertebrates; that they are able to kill and consume other tadpoles; and that also the eggs are part of their prey spectrum. In contrast, no indication for strong cannibalistic tendencies among *G. corvus* tadpoles was found.



Species and ontogenetic differences in vulnerability of amphibians to predation by introduced fish rotan *Perccottus glenii*

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The introduced fish rotan *Perccottus glenii* (Odontobutidae) negatively impacts on amphibian species richness in small lakes and ponds of European part of Russian Federation. Rotan-amphibian interactions were studied at the eldest Russian freshwater biological station Glubokoe Lake founded in 1891 (located 50 km West of Moscow). The lake and surrounding area form the Lake Glubokoe Reserve. Since 1994, annual ecosystem monitoring of aquatic habitats has been carried out. The number of sites monitored has increased from 24 in 1994 to 38 in 2008. Faunal and general limnological data were obtained and field observations were completed with laboratory aquarium experiments. The rotan diet includes a wide range of animal species. However this fish is limited in its ability to find immobile prey. So, rotan ignores newt, frog and toad eggs. Moreover normally laid amphibians eggs have negative or neutral taste for rotan and are rejected by the fish after seizing. On the other hand amphibian larvae represent a significant part of rotan diet. The fish readily consumes newt and frog larvae but rejects noxious *Bufo bufo* tadpoles. Adult amphibians are less vulnerable to rotan excepting small-sized *Triturus vulgaris*. Analysis of multiyear metapopulation information shows that the most vulnerable species are *Triturus* newts, especially *T. cristatus*. *Rana* frogs demonstrate intermediate level of vulnerability whereas toad *Bufo bufo* successfully breeds in sites colonised by rotan.

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ECOLOGY & PHYSIOLOGY

The role of historical and ecological factors in the structure of a tadpole community (Amphibia, Anura)

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In order to verify the importance of ecological and historical factors on the structure of an anuran community, the resource use (diet and microhabitat) of tadpoles from 14 species of a temporary pond in southeast Brazil, determined along five years (1989-1994), was compared to the species relatedness. It was hypothesized that if the resource use of phylogenetically closer species is more similar, then the community will be structured by historical factors. Species phylogeny was obtained by parsimony analysis based on 167 morphological characters, and also in two recently published hypotheses. Except for *Leptodactylus fuscus*, preponderantly mycophagous, the diet of leptodactylid and *Chaunus schneideri* tadpoles was based on diatoms. The diet of *Discoglossus pictus* (“Archaeobatrachia”) is also based on diatoms, suggesting that historical constraints may explain the conservative diet of the species of this clade. Hylid tadpoles consumed a great variety of items, and their diet did not reflect phylogenetic relationships. The microhabitat use shows this same pattern: leptodactylid were benthonic and hylid have diversified habits, mostly in relation to the position along the water column. The historical analysis of resource use evidences that studied community is composed by groups of species with different evolutionary histories: leptodactylid show the plesiomorphic pattern for Neobatrachia concerning resource use, suggesting a conservative evolutionary history, whereas the great diversification in resource use by hylid probably reflects the great morphological diversification of this family. This study shows that two different anuran lineages (hylid and leptodactylid+*Chaunus schneideri*) followed different evolutionary routes in the same type of habitat.



Do agriculture practices affect negatively waterfrog populations?

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During spring 2006, we have sampled, in the Piedmont plain, 304 adult waterfrogs (males and females); 185 animals from 5 rice field populations and 119 from 4 pristine sites.

We measured waterfrog SVL (Snout Vent Length) and weight; successively we determined their age by means of skeletochronology. From these data we calculated the Condition Index ($CI = \text{weight}/\text{SVL}^3$) and a Growth Index (GI) in accordance with the formula proposed in Lleonart et al., (2000).

Blood samples were collected by intracardiac puncture from 85 males and some haematic parameters were measured: haematocrit value, red blood cell and white blood cell total count, haemoglobin concentration. Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC).

The results show that animals from rice fields (both females and males) are younger, have lower growth rates and have lower values of Condition Index than animal from other temporary pristine sites. These results suggest that rice fields are not as favourable as pristine ponds to waterfrog growth and survival.

Moreover the haematic analyses show that males from rice fields tend to have lower MCV, lower MCHC values and higher white blood cells concentrations than males from pristine areas. These results suggest that males from rice fields may have a slightly impaired erythropoiesis and a high incidence of infectious and inflammatory diseases.

All these data seem to highlight that agriculture may impact negatively waterfrog populations.



Factors affecting territorial response in Common wall lizards

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Common wall lizards (*Podarcis muralis*) exhibit a syntopic colour polymorphism in both sexes, with three main morphs differing for the throat and belly colourations (white, yellow and red). In this study, we investigated whether territorial behaviour of males could be predicted by colour morph. Thirty three sexually mature males – 11 for each morph – were collected, kept in outdoor individual plastic cages, and fed for at least three weeks before starting the experiment. Then, each male was paired in its own cage with three males – one for each morph – in three consecutive trials at one day interval. By this procedure, we simulated the natural situation where one resident male finds a conspecific intruder in its own home range. All trials were video recorded to count the number of the aggressive (e.g. bites and running away) and submissive displays used by each contestant. Aggressive response of resident male in the first trial was predicted only by size asymmetries (stepdown ANCOVA: $b=1.51 \pm 0.51$, $t=2.97$, $P=0.006$), but when all trials were considered, only the prior experience (i.e., the outcome in the previous encounter) had a significant effect (stepdown mixed model ANOVA: $b=0.38 \pm 0.10$, $t=3.63$, $P=0.0014$). The effects of colour morphs of the two contestants were always negligible. These results suggest that short-term prior experience may override size asymmetries in territorial contests in this species, and colour polymorphism does not seem to reflect different territorial strategies as it occurs in other polymorphic lizards.



Phylogeography of Bedriaga's rock lizard , *Archaeolacerta bedriagae* (Lacertidae) based on mitochondrial DNA sequences data

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Archaeolacerta bedriagae is a rock lizard endemic to Corsica and Sardinia. Four subspecies have been described based on weak morphological traits: the nominal one spread in Corsica and the remaining three in Sardinia (*sardoa*, *paessleri* and *ferrerae*, respectively in the Gennargentu Massif, Limbara mountains and coastal Gallura). Recent analyses of both allozyme and morphological variability did not support this subspecific arrangement (Salvi et al., unpubl.). Phylogeographic structure and relationships of 13 populations, representing the whole range of *A. bedriagae*, were analysed using mitochondrial sequences of *nad4* and *tRNA His* genes. Genomic DNA was extracted from tail tips of 64 specimens and a fragment of 850 bp was amplified by PCR using ND4 and Leu primers. Sequences (from GenBank) of four species belonging to the genera *Podarcis* and *Lacerta* were employed as outgroups. Phylogenetic analyses were performed under the assumptions of both maximum parsimony (MP) and distance (NJ). We also analysed the genealogical relationships among the 19 haplotypes found by a statistical parsimony network. Both phylogenetic and haplotype network analyses showed the same geographical structure of genetic variability. The northern Corsica population appeared deeply differentiated from the remaining ones, whereas the southern Corsica population represented the sister group of the Sardinian populations. In Sardinia we identified three major groups distributed from North to South, being the Southernmost fairly differentiated from the others. The most parsimonious biogeographical hypothesis indicates an ancient colonization from southern Corsica to Sardinia, where considerable fragmentation into population groups subsequently occurred.



Colonisation and abundance of amphibians in recently created temporary ponds in a Mediterranean region

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Wetland loss, fragmentation and isolation of populations, among other factors, have been responsible for losses of amphibians at local and regional scales. 33% of Mediterranean amphibians are currently in various levels of decline. Many of these species depend on temporary ponds for breeding, egg-laying or the juvenile stage of development. Restoration of destroyed ponds and creation of new water bodies was suggested as a good measure to prevent local population decline and to sustain species at regional scale favouring the maintenance of a metapopulation structure. To evaluate the effectiveness of these actions in a Mediterranean landscape nine ponds (3 recently created ponds; 6 reference) in Girona (NE Iberian Peninsula) were monitored during the 2007 breeding season to assess colonization of recently created wetlands by amphibians, compare the amphibian fauna to that reference wetlands and document the effectiveness of new habitats. New ponds were surveyed with a continuous drift fence equipped with pitfalls and funnel traps which completely encircle the ponds. This methodology not only allows us to evaluate amphibian colonization if not also estimate amphibian diversity, abundance, population structure and potential contribution of temporary pond-breeding amphibians to secondary production and to the transfer of matter and energy between aquatic and terrestrial habitats in seasonal Mediterranean ponds. Six amphibian species colonized recently created pond (*Salamandra salamandra*, *Triturus marmoratus*, *Alytes obstetricans*, *Discoglossus pictus*, *Pelodytes punctatus* and *Bufo calamita*), whereas a total of 11 species were detected in reference ponds. The most abundant species in new ponds were *B. calamita* and *D. pictus*, typical opportunists and temporary pond-breeders, showing a great capacity of colonization of these habitats and with abundant and well structured populations. The results of this study indicate that new temporary wetlands are valuable habitat for at least a subset of the amphibian fauna of this region their first year. Future studies can give information about colonization of other amphibian species during the maturation ponds process when incorporating floating, submerged or emergent plants species required for some amphibian species, and how amphibian community succession is doing during wetlands maturation.



Influence of fire in the reptile community of a Mediterranean Protected Area near Barcelona

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Fire is an important factor that causes habitat alteration in Mediterranean landscapes. Post-fire regeneration studies suggest that some reptile species become more abundant after fire due to severe modifications of the habitat (e.g. improvement of thermal microhabitats, vegetation structure). We have investigated this issue in Sant Llorenç del Munt i l'Obac Natural Park (Barcelona province, NE Spain), a protected area with oak forests and pine plantations. In this park there is a fire mosaic that includes areas with old and new prescribed fires, areas with high fire-frequency, and unburned areas. The biggest fire (4500 ha) occurred in August 2003. We made standardized surveys in 103 independent sites that include unburned (control) and burned points. Each site was visited twice in May and June 2007 during one hour, and reptiles were actively searched and recorded. Furthermore, every site was characterized by vegetation structure and composition. We found almost 500 reptile records that included *Podarcis hispanica*, *Psammodromus algirus* and *Timon lepidus*, and sporadically *Psammodromus hispanicus*, *Tarentola mauritanica* and *Anguis fragilis*. Our results showed that the most common species, *P. hispanica* and *P. algirus*, were more abundant in burned than in unburned forest stands. The wide distribution of both species suggests a rapid settlement and increasing densities due to the habitat modification, caused by fire, from forest to shrub and open areas. Among snakes, we detected six species in the study area. Snakes were more common in unburned than in burned areas, this finding suggesting slower recolonization for snakes than for lizards.



CONSERVATION

Microsatellites from *Rana dalmatina*

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Rana dalmatina in Spain has a limited distribution in the north of the country and is very threatened, mainly by the loss of habitat. The surviving populations are separated by large barriers as a result of urbanization, agricultural fields, roads, etc. A study using polymorphic microsatellites will allow assessments of *R. dalmatina* phylogeography, genetic diversity, problems of inbreeding depression in the subpopulations, gene flow and the testing of whether metapopulations exist. The primary aim for these studies is to improve the conservation prospects of the remaining populations. First, we will construct a genomic library enriched in microsatellite loci. We will then characterise multiple loci and develop sets of primers for amplification of these loci by the polymerase chain reaction. *R. dalmatina* DNA will be purified and selected in the 300-700bp size range. Linkers will be added, then PCR amplification will be followed by hybridisation-selection of microsatellites, cloning, and screening for individual microsatellite loci. Polymorphism in these loci will then be measured in samples taken from the subpopulations, and analysed to assess levels of genetic diversity and differentiation.



Amphibians of a Venezuelan Table Mountain

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The Venezuelan sandstone table mountains (tepui) are remnants of an extensive sandstone plateau, the Roraima Plateau, which during Tertiary covered a part of the Guianan region. Situated along the eastern side of the Paragua River, Estado Bolívar, the Guaiquinima-Tepui is one of the largest Venezuelan sandstone table mountains (approximately 1600 km² including talus slopes; platform 330 km²). The tepui has a maximum altitude of 1520 m. Notable features include an abundant vegetation cover with a high percentage of tall forest, a fairly level topography and a deficiency of rock outcrops (Dunsterville, 1980). Further descriptions of the tepui and the surrounding area are provided in Donnelly & Myers (1991) and Mägdefrau et al. (1991). Donnelly & Myers (1991) carried out an expedition to the Guaiquinima describing a new species of lizard (*Plica lumaria*) and two new species of snakes (*Liophis torrenicola* and *Philodryas cordata*), but during their expedition no frogs belonging to the genus *Eleutherodactylus* were found. During our expedition to the Guaiquinima in the same year (Mägdefrau et al., 1991; Schlüter & Mägdefrau, 1991) different frog genera were collected at four localities on the summit of the table mountain, among them unknown species of *Eleutherodactylus*. Most of the *Eleutherodactylus* lack information about their distribution, ecology, and population status. Their taxonomic status is not always clear because only few samples from the Guiana Shield are known (Barrio-Amorós & Molina, 2006). Amphibians (especially *Eleutherodactylus*) and reptiles collected during the Guaiquinima expedition are presented.



National responsibilities and conservation priorities in species conservation

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Without doubt, Red Lists are the most prominent tool for priority setting in applied conservation. However, the responsibility for a species is high in a country where this species is endemic, but such a species might not necessarily be a threatened species, following Red List criteria. Hence, the threat status is not always reflecting actual conservation needs and can be very different from conservation priorities. As a response to limitations of Red List systems for conservation prioritization, the concept of national responsibility as a complementary tool to the Red List systems was developed during the last two decades. In most existing methods, threat status and international importance have been hardly separated and a scaling of results has not been implemented in a practical way for larger scales. EuMon has developed a new method, basing on the distribution pattern and distribution range, has tested the method and assessed it giving a list of criteria. Most importantly, the method clearly distinguished between the national responsibilities of countries and the conservation priority given by the combination of national responsibilities and threat status. The latter is introduced in the method by using the nature directives' annexes, the IUCN red list and national red lists.



Spatial analysis of amphibian mortality on local roads

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Roads are modifying strongly the environment. Road-kills are the greatest, directly human-caused source of wildlife mortality in USA and Europe. In particular, amphibians are the group more affected by road-kills on highways. However, there are few data about local road effects, which could be the main mortality place, as main roads are strong barriers for amphibians. I quantified the proportion of living and road-killed amphibians by species, sex and age on local roads in the province of Salamanca (Spain) and analysed the spatial distribution of road-kills in order to identify hotspots of road-kills. Locations of road-killed and living amphibian were recorded with a GPS during 2000-2002, in 17 raining nights by car. The Nearest Neighbour Index (NNI) was used to determine if road-kills and living records on roads were clustered or not. High road-kill rates by road section and the mean probability of collision (λ) were determined. A total of 312 (38.10 %) amphibians were road-killed and 507 (61.90 %) were living. Fourteen amphibian species were collected during the surveys (10 anurans and four urodeles). The species most road-killed were the anurans *Bufo calamita*, *Pelobates cultripes* and *B. bufo*. Female group as well as adult group were the most recorded groups and also most road-killed. The NNI showed clustering on specimens' distribution. The λ was 0.23 road-kills per kilometre. Fifty-two sections with two or more collisions were considered as points with a high rate of collisions.



LIFE HISTORY

Age of males and females in amplexing pairs, and number and size of eggs in the grass frog *Rana temporaria*

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We studied the age, size (S-V length and weight) of males and females of *Rana temporaria* collected in amplexus (N=47) during breeding seasons 2003 and 2004 in south west of Poland. The age of females ranged from 2 to 7 years. The majority of females were 4- (17 individuals), 5- (14 individuals), and 3-years old (8 individuals). The age of males ranged from 2 to 8 years. The most numerous were males 4- (18 individuals) and 5-years old (12 individuals). Males were bigger than females in 19 pairs, the size was equal in 15 pairs, and males were smaller in 13 pairs. In 18 pairs the male was older than female, in 16 – both partners were at the same age, and in 11 – the female was older (N=45). The correlation between age and size was stronger for females ($R=0.6$, $p=0.00001$) than for males ($R=0.4$, $p=0.007$).

The number of eggs per female ranged from 559 to 3637, and differ among females ($F=1670$, $p<0.005$); most females laid 1500 – 2000 eggs. There was the positive correlation between the number of eggs and size (length and weight) of a female, whereas there was no correlation between the age and number of eggs. Egg diameters ranged from 0.9 to 2.8 mm and differ among females ($F=1670$, $p<0.005$). There were no correlations between mean egg diameter and their number ($R=0.1$; $p=0.504$; $N=47$), length ($R=-0.01$; $p=0.957$; $N=47$), weight before oviposition ($R=0.3$; $p=0.051$; $N=44$), weight after oviposition ($R=0.03$; $p=0.864$; $N=47$), and age ($R=0.3$; $p=0.077$; $N=45$) of a female.



Amphibians of southern Bahia, Brazil: A hotspot for Anuran diversity

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Brazil, with more than 800 species, harbors the largest number of amphibians of any country on Earth. For the south of Bahia State 92 anuran species have been reported recently.

Some of the largest remnants of Atlantic rainforest are located in southern Bahia, being often interconnected through Cocoa plantations. Cocoa trees are planted in the shade of tall hardwoods belonging to the original native Atlantic rainforest flora. These Cocoa plantations are called “Cabruças” and play a mayor role in the conservation of many animal species. A visual and acoustic encounter survey was carried out weekly from December 2006 to May 2007 in a small “Cabruca” (25 ha). Amphibians were sought during night and day. A total of 32 anuran species were recorded for the area, belonging to the families Hylidae (16 species), Leptodactylidae (10 species), Bufonidae (3 species), Microhylidae (2 species) and Pipidae (1 species). Some species were recorder during more than 90% of the surveys (*Leptodactylus ocellatus*, *L. spixii*, *Chaunus crucifer*, *Hypsiboas albomarginatus*, *Phyllomedusa nordestina* and *Physalaemus erikae*), while others were only recorded during one (*Chiasmocleis cf. schubarti*, *Chaunus granulatus*, *Scinax cf. catharinae*) or two nights (*Stereocyclops incrassatus*, *Hypsiboas pombali*). The anthropogenic activity in the “Cabruças” doesn’t seem to affect negatively most of the amphibians inhabiting the Atlantic rainforest of Southern Bahia State. A complementary survey in a pristine Atlantic rainforest remnant should help to identify for which species “Cabruças” could be considered a corridor linking the last remnants of Atlantic Rainforest in southern Bahia State.



Variation of ecological parameters of 6 populations of *Podarcis cretensis* in western Crete

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P. cretensis is a recently redescribed species of the genus, endemic to the island of Crete and satellite islands. Its distribution on the island is very particular: On Crete it is found only on the ¼ western part of the island and not on the major satellite islands whereas in eastern Crete it is present only on satellite islands.

The scope of this work was to study ecological parameters of 6 populations from western Crete, under the light of the recent phylogenetic findings.

The 6 populations belong to 3 of the formerly described subspecies. They are distributed in various biotopes: from sandy to rocky, from the north and south part of the island and from sea level to 1000m a.s.l.

The ecological parameters we studied are: thermoregulatory strategy (selected, body and operative temperatures), presence of ecto- and endoparasites, population density and aspects of predation pressure. Results are compared to the phylogenetic relationships of the populations as inferred from Cytochrome *b* sequences.



Threatened species of Calabrian Herpetofauna: distribution and conservation

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Calabria is the southernmost region of the Italian Peninsula; it is an interesting study area due to its geographical position. In this region 12 species of amphibians and 16 of reptiles were found. We analyzed local and worldwide distribution data of each of these species and identified four species that can be considered as “threatened” for the Calabria region: *Triturus alpestris inexpectatus*, *Testudo hermanni*, *Emys orbicularis* and *Natrix tessellata*. Of these, two (*T. alpestris inexpectatus* and *N. tessellata*) are uncommon due to zoogeographical factors, while *E. orbicularis* and *T. hermanni* are threatened as a consequence of habitat alteration and fragmentation. Except *T. hermanni*, the three other considered species are present only in the northern part of Calabria. Comparing their distribution in the study area with the localization of the protected areas of the region, it is possible to observe that only some populations of *T. hermanni*, *E. orbicularis* and *N. tessellata* benefit from national or local natural reserves. Instead, the populations of *T. alpestris inexpectatus* live in ponds that are not yet included into protected areas. Therefore it would be desirable and necessary not only the institution of a regional natural park in the Catena Costiera massif (the only area, where Alpine newt populations are present), but also other protection projects for those areas, lowland and coastal above all, where populations of the three other threatened species are localized.

CONSERVATION

Great divergence among haplotypes from the Cuba Island as a challenge for conservation strategies of rock iguanas of the genus *Cyclura*

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In order to assess genetic variation in Cuban rock iguanas (*Cyclura nubila nubila*), we sequenced a fragment of mitochondrial DNA (894 bp long region including a part of the ND4 subunit of the NADH gene and the tRNA genes histidine, serin and leucin (partial)) in 22 iguanas from European ZOOs and private breeders. Sampled animals represent founders and important representatives of studbook population. The data were replenished by published sequences of other species/subspecies of the genus and outgroups. We used neighbour joining, maximum parsimony, and Bayesian methods to reconstruct the phylogenetic tree.

The results clearly support previously reported paraphyletic relationship of *C. nubila* with respect to *C. cyclura* from Bahamas. Surprisingly, within *C. n. nubila* we found previously undescribed haplotypes that are phylogenetically closer to those of subspecies *C. nubila caymanensis* from Little Cayman Island, or *C. nubila lewisi* from Grand Cayman Island. Thus, *C. n. nubila* is paraphyletic also with respect to these subspecies/species and validity of these taxa is questioned. Nevertheless, as rapidly evolving isolates they are still worth of conservation effort.

We hypothesize that basal divergence of the *C. nubila* - *C. cyclura* clade happened somewhere in Cuba and the above mentioned species/subspecies from neighbouring islands are a result of a recent over water dispersal. In conclusion, our data suggest that special attention should be devoted to conservation of Cuban iguanas.



Tetraploid hybrid of rock lizards of genus *Darevskia*I. STEPANYAN; M. ARAKELYAN & F. DANIELYAN

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The first tetraploid hybrid in the group of Caucasian rock lizards of genus *Darevskia* was discovered in 2004 in a population near the village Kuchak (central part of Armenia). The majority of hybrid individuals, which are formed in a sympatric zone of parthenogenetic and bisexual species of Caucasian rock lizards, are triploid sterile females ($3n = 57$). However, karyological study among hybrids *D. valentini* x *D. unisexualis* revealed the tetraploid set of chromosomes for one specimen. This hybrid had two fully developed testes (2.4 x 3.2 mm), well organized hemipeneses and obvious visible femoral pores. The Giemsa-stained smears of testes have shown diakinetik stages of meiosis and middle, late spermatides (60%). The karyotype ($4n=76$, $NF=76$) was represented by 71 acrocentric chromosomes and 5 microchromosomes. So, this was a tetraploid male with sex chromosomes of wZZZ type.



Sea turtle nesting populations of the Dominican Republic

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Sea turtles nesting in the Caribbean have experienced massive reductions since pre-Colombian times. Many nesting rookeries have been reduced to vestiges of their past size and as such are difficult to effectively monitor. Here we present the first systematic status surveys of marine turtle nesting in Dominican Republic for more than 25 years. We describe the results of detailed surveys at Jaragua National Park (SW DR) and Saona Island (East National Park, SE DR), and data from extensive surveys and interviews throughout the northern and eastern coasts of the country during 2006. Two turtle species were confirmed nesting in considerable numbers: leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*). In addition, anecdotal accounts suggest sporadic nesting of green turtles (*Chelonia mydas*). At Jaragua Reserve, leatherbacks nested in April and May (12 clutches) and hawksbill turtles nested between July and November (23 clutches). Although there are no past quantitative records, leatherback nesters were present in considerably lower numbers than anecdotal accounts from 2005. Illegal egg take is close to 100% of nests at the Park. Artificial incubation in plastic boxes has been undertaken by local rangers since 1972. At Saona Island, hawksbill turtles are found nesting throughout the year (62 clutches) although there are also occasional nests by green and leatherback turtles. At this site, illegal egg take is about 50%. Elsewhere we detected low levels of hawksbill nesting (1-4 clutches/season; 10 sites) and leatherback nesting (1 site). Based on these preliminary data, higher resolution monitoring efforts are planned.



Parasitism, island size and populations density, as interfering factors in tail regeneration in Aegean wall lizard (*Podarcis erhardii*)

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Tail autotomy is one of the most efficient antipredator mechanisms in lizards. Tail condition is crucial to the overall fitness of a lizard and has important impacts on many seminal life history functions (energy storage, locomotion, social status). Regrowth of an autotomised tail is a complex and energy-consuming mechanism that deprives resources from other substantial processes such as reproduction or immune response. It has been established that regeneration rate and effectiveness may be influenced by many different factors. In the present study we tried to assess the impact of haemoparasites (*Hepatozoon* sp.) and intraspecific competition on regeneration performance. We conducted this study on the Aegean wall lizard deriving from Naxos complex biotopes (main island and surrounding islets) where population densities vary significantly and parasite loads may be different (*Haemophysalis* sp. ticks introduced on some islands by goats). In order to simulate these diverse densities lizards were housed in individual and group (8 animals per each) terraria. The length of the tail was measured weekly, *Hepatozoon* parasitemia was quantified by examining thin blood smears under the microscope whereas corticosterone levels, the main stress hormone, were recorded in all cases. We failed to detect any difference regarding parasite load in the regeneration rate among studied populations. In contrast, regeneration rate was lower in the case of lizards that were housed in group terraria. This suggests that though infection status has a minor impact on tail regrowth, population density affects thoroughly the feature under study.

The present work is supported by PYTHAGORAS II from EPEAEK II, Hellenic Ministry of Education and EE.



MORPHOLOGY & SYSTEMATICS

Morphological variability of *Podarcis muralis* (Sauria: Lacertidae) in Bulgaria

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The common wall lizard *Podarcis muralis* is a small-sized lacertid largely distributed throughout middle and southern Europe including nearly almost all the territory of Bulgaria. In despite of here wide distribution in this country there is no information about the intraspecific morphological variation of this species. Former recognised subspecies from this region do not give an explanation of the observed morphological polymorphism. In order to draw a preliminary picture of the morphological variability, 27 morphological characters (13 meristic and 14 morphometric, later transformed into 13 indices) were analysed in 416 preserved specimens. Univariate (ANOVA) and multivariate (PCA and DFA) analyses were used to describe the geographic variability. Specimens were grouped according to their geographical locations, later reduced to 4 main groups. Results from both uni- and multivariate statistics suggest strong morphological differentiation among them, well expressed in males. Only specimens from group 1 are attributed to the nominal subspecies. They are distributed in central, northern and north-western Bulgaria. Those from group 2 inhabit southern Bulgaria. Group 3 inhabit north-eastern and group 4 south-eastern part of the country. Morphotype 1 meets in a contact zone with morphotypes 2 in south-western and south-central and with morphotype 3 in north-eastern Bulgaria. After the present results we may conclude that four morphotypes occur in the country. To clarify the relationships among them future genetic analysis should be carried out.



Phonotactic approach in *Allobates femoralis* (Dendrobatidae) – spatial and temporal analysis of movement

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Videotape recordings of 41 phonotactic approaches by male *A. femoralis*, evoked through synthetic advertisement calls, were analysed in terms of spatial and temporal patterns. Positive response is taken as evidence for both perception and recognition of acoustic stimuli and hence enables an approach towards the understanding of the animal's auditory capabilities. Jump angles (angular deviation of the jump direction from the target axis) of consecutive jumps were measured to quantify the accuracy of approach. Furthermore the effect of interbout intervals on phonotactic approach was examined by comparing movement parameters (approach time, number of jumps, jump distances and jump angles) of two test series using a standard call (SC) with interbout intervals and a continuous call (CC) without. The mean jump angle of all hops was $\approx 16.5^\circ$ (SC) and $\approx 18.35^\circ$ (CC), respectively. Phonotactic approach occurred almost exclusively during bouts (94.69%) than interbout intervals (5.27%). Interbout intervals have no influence on the accuracy of approach, as significant differences between the two test series could be found only for approach time. The results concerning approach times (no increase of speed with decreasing distance to the sound source) confirm the assumptions of prior studies that indicate an "all-or-none" phonotactic response for *A. femoralis* at intensities above 65dB.



LIFE HISTORY

Study of the European pond turtle (*Emys orbicularis*) at “Draga pri Igu” ponds and implications to the wider Ljubljansko barje wetlands

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In Slovenia, the pond turtle enjoys full protection within the frame of the Natura 2000 network. Due to its secluded way of life, not much is known about its habitat use. This makes production of efficient management plans for this species problematic. Not so long ago, the occurrence of the European pond turtle was recorded only in Ljubljansko barje, Bela krajina, Krška kotlina and Krka river. However, our understanding of its range became significantly better over the recent years, and many new localities were discovered.

The goal of the project is to determine the size and structure of the European pond turtle (*Emys orbicularis*) population at the Draga pri Igu ponds through a study of the turtles at the ponds, as well as through study of the wider area of Ljubljansko barje wetlands. The ponds are located at the edge of the wetlands, and listed as a natural heritage site. The Ljubljansko barje area is also included in the Natura 2000 network. We will estimate the size of the population using capture-mark-recapture field methods and statistical modelling in MARK software. Two animals are going to be equipped with radio transmitters, and their habitat use and activity patterns documented by radiotelemetry.



Morphological variation of 6 populations of *Podarcis cretensis* in western Crete

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Podarcis cretensis is a recently redescribed species of the genus, endemic to the island of Crete and satellite islands. Its distribution on the island is very particular: On Crete it is found only on the ¼ western part of the island and not on the major satellite islands whereas in eastern Crete it is present only on satellite islands.

As in other *Podarcis* species, it exhibits high diversity and great morphological plasticity, which have led to the description of 7 subspecies of the taxon (formerly *P. erhardii*) in Crete.

Here we study the morphological relationships of 6 populations from western Crete under the light of the new phylogenetic relationships. The 6 populations belong to 3 of the formerly described subspecies. They are distributed in various biotopes: from sandy to rocky, from the north and south part of the island and from sea level to 1000m a.s.l.

We compared 18 morphological characters (11 metric and 7 pholidotic) of these populations in accordance with indications from the relevant literature.

Multivariate analyses techniques were conducted to detect the characters that most differentiate sexes and populations. We compare the results to the formerly recognized subspecies. Moreover we compare the results with the current phylogenetic data as to see if the groupings of populations according to molecular analyses are corroborated by morphological data.



Intraspecific variation of preferred body temperatures in the lizard *Podarcis vaucheri* from Morocco

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The intraspecific variation of preferred body temperatures (Tp) was analysed in the lacertid *Podarcis vaucheri* which in Morocco is restricted to the Mediterranean and mountain areas. Adult males and females lizards were collected during spring 2006 in Ketama, Rif Massif (34°54'N, 4°34'W; 1549 m). Lizards were kept in individual terraria for less than two weeks (to prevent acclimation) with food and water provided *ad libitum* and under a natural regime of light and temperature. Each lizard was measured (SVL) and individually exposed to a photothermal gradient at ten time intervals. Tp varied with lizard condition (non-pregnant females \geq males \geq pregnant females) and time of the day. Individual females tended to increase their Tp after egg-laying. Tp seems to reflect a dependence on the reproductive condition as supported by previous studies on other lacertids.



Responses to conspecific calls in *Dendropsophus cruzi* (Anura:Hylidae) from Central Brazil

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Sexual selection in anurans results of male's competition and female's choice. In the chorus, a male's neighbour represents his principal obstacle because he could intercept females or cause acoustical interferences. The aim of this study was to verify if changes in the male's behaviour take place when they hear conspecific calls. Fieldwork was carried out in the Bioparque Jaó, Goiânia, Goiás, Brazil. Observations were conducted between September/2006 and March/2007. All sound level measurements are expressed as dB SPL, with reference to 2x10⁻⁵Pa. We recorded calls of 22 males with a Marantz PMD 222 and a Sennheiser ME66 at 30-50 cm. After each playback experiment session, we captured the male, measured its body length (snouth-vent length) to the nearest 0.5mm with a caliper ruler and its mass to the nearest 0.05g with Pesola balance. The stimulus used in playbacks consisted of 5 sequences of 30 calls, that were only advertisement, only territorial or advertisement+territorial calls) separated by silence period of 15s. Twenty-two individuals were exposed to the playbacks, being 10 with only advertisement calls, 6 with territorial calls and 6 with a mix of both calls. Playbacks were made at modal amplitudes of 64, 68, 72, 76 e 80dB, 50 cm from the speaker. The results show that the males usually do not respond directly to another male (advertisement call: $t=-0.8887$, $p=0.4001$; territorial call: $t=-3.2528$, $p=0.0829$; mixed call: $t=-2.1246$, $p=0.1236$), but they follow the chorus, presumably because it is more advantageous to attract females then to start fights. Support: CNPq



DISTRIBUTION

Predicting potential geographic distribution of Hermann's Tortoise in the Natural Park of the Albera (Eastern Pyrenees, Catalonia) via ecological niche models

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The last native population of the Hermann's Tortoise (*Testudo hermanni hermanni*) in the Iberian Peninsula survives in the Natural Reserve of the Albera Mountains (Eastern Pyrenees, Catalonia). Achieving reliable population potential distribution maps is essential for management conservation purposes. The aim of the project is, therefore, to determine the potential geographic distribution of the Hermann's Tortoise in the Natural Park of the Albera via niche models, which will allow to manage and conserve this tiny population. Ecological niche models were developed using two different modelling techniques: the Genetic Algorithm for Rule-set Production (GARP), and the Maximum Entropy method (Maxent). The database was composed of 635 occurrence data from the spring period (when the species is more active) and several environmental covers influencing its distribution (e.g. vegetation, altitude, slope and exposure). Results showed that the areas of population potential distribution concentrated in the bottom of the valley and different significances of the environmental parameters using a discriminant analysis.

Moreover, it would be interesting to take into account the overall biological cycle of the species and determine the potential distribution of the Hermann's Tortoise at different seasons.



Herpetofauna field notebook database for study and share phenological and corological data

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One of the main problems in herpetofauna conservation in Spain is the lack of a regular record of geographical occurrence and life history data. It is a fundamental element to focus conservation management of species measures and its habitats. This problem reaches special relevance when most of the species have certain protection status, and, therefore, administrations must have them in account to conservation planning. In addition, there is a large request of information to evaluate processes of species decline or climate change. It is specially required to develop tools to assist field data collection for their later integration and analysis. In this context, we are developing a herpetofauna field notebook database that will offer the following possibilities: 1) register field observations in an easy and standardized form, emphasizing its phenological and corological character; 2) analyze the information compiled by each user; 3) participate in the Spanish phenological and corological database with other users.

This application has the purpose to describe the annual cycle of species activity throughout Spanish territory, as well as to provide information for corological and phenological analyses at regional level. The herpetofauna field notebook database will be a free downloadable application at AHE website (www.herpetologica.org) to all interested users. The interface will look user-friendly, including multiple resources of data management and analysis. In addition, users would be able to share their data with the Spanish phenological and corological database.

This project is supported by the “Fundació Territori Paisatge”.



Size-assortative mating in explosive breeder anurans

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The pattern of sexual selection in the breeding population of the Common Frog (*Rana temporaria*) and the Common Toad (*Bufo bufo*) was examined in a field experiment at a breeding pond in Central Bohemia, Czech Republic, in order to reveal presence or absence of size-assortative mating (SAM) and to determine the effect of male density and operational sex ratio (OSR) on this phenomenon. The mate availability hypothesis was also tested. Furthermore, we discussed methods used for detection of SAM (particularly correlation and its interpretation) as well as methods suitable for testing the effect of varying male densities and OSR on intensity of SAM.

The presence of SAM has usually been demonstrated by correlation with a significant result ($p < 0.05$). Since the significance level of such tests depends not only on the value of correlation coefficient but on the sample size as well, it is not correct to take significance levels for a measure of correlation. Furthermore, the significance of the correlation should be statistically tested. Moreover, correlation between male and female sizes in pairs does not necessarily mean the optimal difference between these sizes, i.e. the difference resulting in the optimal number of fertilized eggs. Hence, an alternative methodology consisting of comparing variances of differences between male and female sizes in pairs (under different male densities and OSR values) is proposed.



Molecular diversity and population genetic structure of the Danube crested newt (*Triturus dobrogicus* Kiritzescu, 1903) in the Pannonian lowland

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The Danube crested newt *Triturus dobrogicus* is a lowland species distributed along the Danube, Tisza and Sava rivers. The distribution comprises two parts, centered at Hungary and Romania, with a fringe distribution in each of the neighbouring countries. We studied the molecular diversity and population genetic structure of the Pannonian populations using eight microsatellite loci, and partial sequences of the nicotinamide adenine dinucleotide dehydrogenase subunit 2 (*nad2*) mitochondrial DNA gene. Fifteen locations and 110 individuals were sampled throughout the species range in Hungary.

Levels of allelic diversity and heterozygosity for the eight microsatellite loci were high (mean alleles/locus and H_e were 2-7.17 and 0.33-0.78, respectively) in the Pannonian populations. Lack of significant genetic structuring in geographical terms (overall $F_{ST}=0.139$) indicated intensive gene flow between populations ($N_m=0.9$). We detected *T. cristatus* diagnostic alleles on two loci in the population from North Hungary (Aggtelek-karst), located at the border with Slovakia, that we interpret as stemming from hybridization between *T. cristatus* and *T. dobrogicus*. Similarly, *T. carnifex* diagnostic alleles were found in Western Hungary, implying introgression between *T. dobrogicus* and *T. carnifex*.

The phylogenetic analysis of the mitochondrial *nad2* gene revealed two main clades, indicating two different postglacial colonization routes, associated with the Danube and Tisza rivers, respectively.



The phylogeography of the crested newt *Triturus karelinii* from the eastern Mediterranean Basin

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The *Triturus cristatus* superspecies – the crested newts – is a group of closely related, mostly parapatric salamander taxa, inhabiting the Western Palearctic. Intraspecific variation is low in the European part of the crested newt distribution, on which previous research has focussed. *T. karelinii* occurs in the Eastern Mediterranean Basin: a region which, although it promises to hold interesting biogeographical patterns due to its turbulent geological history, is relatively understudied from a phylogeographical point of view. By using a dense geographical sampling strategy, sequence data from a variable mitochondrial marker (the ND4 gene), and a Bayesian phylogenetic analysis, this study uncovers the genetic structuring within *T. karelinii*. Three phylogroups are present and monophyly of the taxon is rejected. The allopatric population from Caucasia comprises a homogenous phylogroup, not closely related to the others. The *T. karelinii* cluster from Northern Turkey and the one from Western Turkey and the Balkans are both subjected to strong substructuring. A sister relationship between both these phylogroups is found and representatives from each occur syntopic along the Sakarya river in the north-west of Turkey. Furthermore, a ring-like structure is present in the phylogroup from Western Turkey and the Balkans: two distinct haplotypes, connected by intermediate ones occurring along the Sea of Marmara, meet in Thrace (European Turkey).



Newts as transporters of freshwater mussels

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Although amphibians frequently coexist with bivalve molluscs, there are few published reports of mussels being transported by attachment to the digits of amphibians. During the course of amphibian surveys in central and southern Luxembourg, newts in two separate ponds were found to have mussels (*Sphaerium nucleus*) clamped onto their toes. All four local newt species (*Triturus alpestris*, *T. cristatus*, *T. helveticus* and *T. vulgaris*) were affected, and over 25% of the newts caught in one pond had mussels attached to their toes. Toes became detached or damaged after several days of attachment, and damaged digits were much more frequent in newts captured from a pond with mussels than they were from a pond where mussels were absent or not found on newts' toes. Mussels attached to toes on the hind limbs may also hinder egg laying behaviour in female newts. High incidences of mussel attachment to toes may therefore have implications for newt ecology and behaviour.



Is vitellogenin conserved in sea turtles? Preliminary western blot analysis

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Vitellogenin (VTG) is considered a marker of exposure to estrogen-mimicking pollutants in oviparous species. This protein can also be used as physiological parameter for determining the reproductive status of females. At present little is known about the structure and sequence of sea turtles VTG and no standardised system exists for its quantification.

The present work reports on the use of an anti-VTG antibody in *Chelonia mydas* for the identification of VTG presence and level in plasma of *Dermochelys coriacea*, *Lepidochelys olivacea* and *Caretta caretta* females.

The antibody was produced at CIBNOR following standardised techniques. Plasma was collected from nesting females or females obtained as bycatch. Western blot analysis was used successfully to identify the VTG protein in the sera of all the species examined. This preliminary result suggests that VTG might be highly conserved in sea turtle species. Indeed, the antibody produced for *C. mydas* cross-reacts with good responsiveness with VTG of all other species considered. This cross-reactivity indicates the possible existence of a conserved core in sea turtles VTG, which would be expected considering the key role of the protein in reproduction. This hypothesis can be confirmed with sequencing of VTG of several species to define the aminoacid structure and its length. This will be, together with species specific VTG purification and antibody production, future steps of our research.



Melanism, abundism and pseudomelanism in populations of the European Whip snake, *Hierophis viridiflavus*: a preliminary analysis of proximal causes

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Melanism is a genetic mutation that could be selectively adaptive when target animals live in extreme ecological conditions, or may have a significant benefit in life history traits. Indeed, melanic snakes could compensate risk factors due to a much higher visibility to predators having, for instance, a higher thermoregulatory capacity. Melanism refers to a phenotype in which the pigmentation of an organism is entirely, or nearly entirely, expressed. Abundism is an increase in dark pigmentation in patterned skins which causes an increase in the number or size of pigmented spots, stripes or other patch types, and when is like melanism, such as when the stripes of a striped animal increase in width sufficiently to overlap, is called pseudo-melanism.

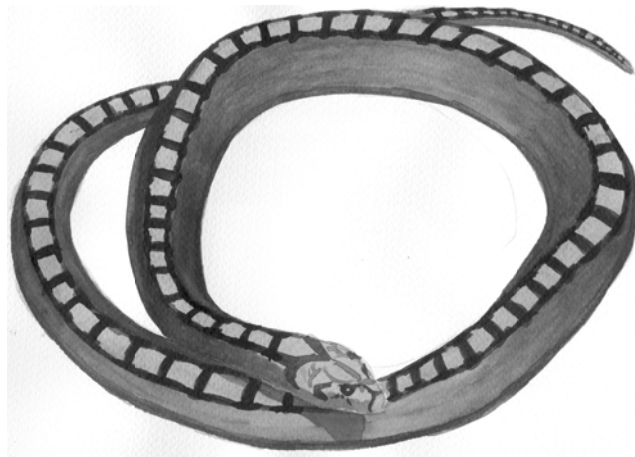
H. viridiflavus is black in northeastern and southern Italy, often in the Alpine area, while non “melanic” Whip snakes do exist in other parts of the species distribution range (exception in Corsica).

The melanism and pseudo-melanism in NE-Italy could be tentatively explained as a prehistoric secondary adaptive pattern to colder climates, as likely happened in S-Italy.

From 8.5 to 7.5 Myr, *H. viridiflavus* was split in two major sub-groups, the NE-central Italy and the S-Italy groups, that were isolated for some million years. Cold climates could have locally extinguished fairly all not black populations for number reasons (i.e.: low thermoregulatory ability, decreased fecundity). More recently (5-3.5 Myr), black snakes from S-Italy and from NE-Italy have then recolonised westward and northward the Italian peninsula, not yet Corsica and Sardinia.







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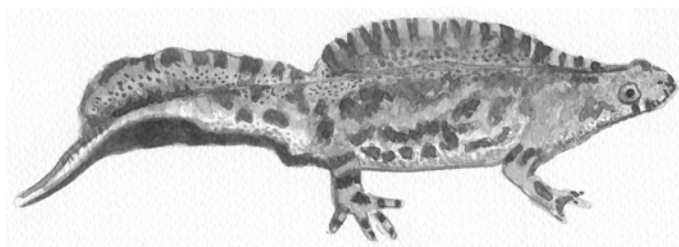
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7. Author Index



| | | |
|----------|---------------|---------------|
| V. | Abad | 169 |
| E. | Abella | 42 |
| A. | Aguilar | 55 |
| R. | Ajtić | 43 |
| G. | Alarcos | 165, 166 |
| J. | Alas | 167 |
| P. X. | Albornà | 56 |
| I. | Aleksić | 198 |
| J. | Allen | 68 |
| V. | Almada | 288 |
| N. | Almaguer | 206 |
| N. C. | Almeida | 168 |
| H. | Alonso | 126 |
| M. | Amaghazaz | 113 |
| P. | Amaral | 288 |
| S. | Amaral | 225 |
| F. | Amat | 130 |
| A. | Amézquita | 74, 157 |
| Z. S. | Amr | 108 |
| J. D. | Anadón | 169 |
| N. | Ananjeva | 44, 107 |
| M. | Andrada | 265 |
| C. | Andrèn | 89, 229 |
| F. | Andreone | 64 |
| P. | Antunes | 69 |
| M. | Arakelyan | 170, 306 |
| P. | Arena | 222 |
| A. | Arencibia | 171, 193 |
| E. N. | Arnold | 36, 54, 150 |
| J. W. | Arntzen | 146, 318, 319 |
| S. | Astolfi-Filho | 212 |
| A. | Astruc | 182 |
| F. | Aubret | 45 |
| R. | Augustyńska | 110, 172 |
| N. M. | Ayvazian | 173 |
| N. | Baadi | 113 |
| T. N. | Badaeva | 174 |
| K. | Bajer | 175, 254 |
| A. | Bajgar | 176 |
| J. | Baker | 76 |
| L. C. | Ball | 46 |
| R. | Ballestar | 169 |
| A. A. | Bannikova | 239 |
| D. | Barbosa | 47 |
| L. | Bassu | 62 |
| M. | Bastit | 48 |
| R. P. | Bastos | 314 |
| B. | Bauch | 136, 299 |
| A. M. | Bauer | 49 |
| L. | Bauer | 177 |
| G. | Bauer | 178 |
| G. | Bautista | 193 |
| T. J. C. | Beebee | 50, 297 |
| J. | Benhassine | 179 |
| Y. | Benyamin | 257 |
| M. | Berec | 176, 180 |
| M. | Bernardes | 288 |
| F. | Bernini | 270 |
| R. | Berti | 183 |
| A. | Bertolero | 182 |

| | | |
|----------|-------------|---|
| J. | Bertoluci | 181 |
| A. | Besnard | 182 |
| M. | Biaggini | 183 |
| J. | Bielby | 73 |
| M. | Bielli | 222 |
| D. | Bitchava | 308 |
| P. | Bloor | 230 |
| A. | Bocher | 105 |
| T. | Bodnár | 180 |
| S. | Bogaerts | 51, 138 |
| W. | Böhme | 40, 186 |
| M. A. | Bologna | 294 |
| P. | Bombi | 294 |
| A. | Bonacci | 304 |
| B. | Borczyk | 184 |
| A. | Borisenko | 208 |
| J. | Bosch | 73, 267 |
| W. | Bosman | 52 |
| C. | Both | 185 |
| L. | Boumans | 152 |
| J. E. | Bourke | 186 |
| S. | Bovero | 73 |
| S. M. J. | Branco | 302 |
| D. | Brankovits | 187 |
| R. A. | Brassaloti | 181 |
| X. | Bravo | 295 |
| L. | Briggs | 124, 188 |
| J.C. | Brito | 93, 133, 192, 216, 217, 233, 250, 287, 281 |
| R. | Brito | 57 |
| R. | Brizzi | 281 |
| D. G. | Broadley | 160 |
| A. C. | Broderick | 307 |
| N. | Brokaw | 85 |
| C. | Brun | 257, 258 |
| M. | Bryzewska | 112 |
| J. | Buckley | 76 |
| D. | Buckley | 145 |
| J. | Budó | 315 |
| N. A. | Bulakhova | 130 |
| U. | Bulbul | 53, 61, 190 |
| K. | Busse | 186 |
| J. | Bustamante | 79 |
| D. | Butanescu | 75 |
| A. | Caccone | 59 |
| G. | Cadeddu | 189 |
| E. | Çakir | 53, 61, 190 |
| P. | Calabuig | 191, 255 |
| M. | Camacho | 191 |
| C. | Cámara | 112 |
| D. | Canestrelli | 81 |
| D. C. | Cannatella | 159 |
| J. M. | Cano | 63 |
| X. | Capalleras | 315 |
| L. | Cardona | 55 |
| S. | Carranza | 54, 150 |
| C. | Carreras | 55, 255 |
| M. A. | Carretero | 47, 56, 93, 103, 128, 130, 217, 233, 245, 287, 294, 313 |
| S. | Carvalho | 192 |

| | | | | | |
|----------|---------------------|------------------------|--------|-------------------|------------------------|
| C. F. | Carvalho | 212 | A. | Egaña-Callejo | 209 |
| A. B. | Casal | 193 | A. | Egea-Serrano | 210, 211 |
| S. | Castellano | 189 | E. | Elron | 77 |
| J. L. | Catão-Dias | 178, 283, 284 | E. | Engel | 320 |
| P. | Catry | 126 | D. | Estévez | 191 |
| K. P. | Cavalcante | 302 | J. -M. | Exbrayat | 48, 236, 257, 258, 285 |
| F. | Ceacero | 219 | D. | Fadda | 262 |
| S. Z. | Cechin | 185 | C. | Fantin | 168, 212 |
| A. | Ceia-Hasse | 57 | C. | Faria | 288 |
| A. | Čeirāns | 194 | I. P. | Farias | 168, 212 |
| J. | Chávez | 206 | M. | Fasola | 270, 293 |
| M. | Cheylan | 182, 214 | H. | Fearnley | 68, 213 |
| Y. | Chiari | 58, 59, 64 | P. | Feliz | 307 |
| M. | Chirikova | 203, 263 | A. -L. | Ferchaud | 214 |
| P. | Cid | 71 | W. | Fernandes | 178 |
| M. | Cipot | 60, 275 | G. | Fernández | 55 |
| N. | Clemann | 107 | M. | Fernández | 307 |
| Z. | Çolak-Yılmaz | 53, 61, 190 | M. J. | Fernández Benítez | 165, 166, 215, 266 |
| V. J. | Colino | 195 | N. | Ferrand | 37, 145, 271, 272 |
| S. | Contreras | 171 | G. | Ferrão da Costa | 216 |
| A. | Cordero-Rivera | 151 | M. | Ferreira | 57, 69 |
| C. | Corti | 62, 183 | F. | Ferri-Yáñez | 153 |
| M. | Costa | 66 | G. F. | Ficetola | 70, 105, 197, 200 |
| T. | Couturier | 182 | M. C. | Fisher | 73 |
| R. | Creemers | 65, 196 | M. F. | Flechoso | 166 |
| E. G. | Crespo | 69, 192 | M. | Florencio | 79 |
| J. | Crnobrnja-Isailović | 43, 197, 198 | E. V. | Fokina | 242 |
| P. -A. | Crochet | 63, 138 | M. M. | Fonseca | 217 |
| A. | Crookes | 160 | C. | Fonseca | 252 |
| A. | Crottini | 64 | E. | Font | 47, 71 |
| G. | Cruz | 265 | S. | Fornasiero | 163 |
| A. A. | Cunningham | 73, 207 | J. | Foufopoulos | 308 |
| D. | Cvetković | 197, 198 | A. | Fouquet | 218 |
| F. | Danielyan | 306 | M. | Franch | 209, 295 |
| I. S. | Darevsky | 80, 239 | C. | Fresi | 62 |
| A. | De Miguel | 171 | U. | Fritz | 120 |
| W. | de Vries | 155 | D. | Frynta | 305 |
| G. | Degani | 77, 115, 223, 268, 269 | P. | Galeotti | 123, 293 |
| G. | Delfino | 281 | E. A. | Galoyan | 72 |
| C. | Delgado | 66 | M. | Gamberoni | 321 |
| T. | Dellinger | 66 | T. | Gamble | 49 |
| M. | Denoël | 199, 200 | P. | García | 166 |
| E. | Desfilis | 47 | E. | García-Muñoz | 114, 219, 220 |
| A. | Devaux | 105 | M. | García-París | 145, 151, 230 |
| M. A. | Dias | 126 | S. C. | Gardner | 321 |
| I. R. | Dias | 302 | T. W. | Garner | 73, 207 |
| C. | Díaz-Paniagua | 79, 201 | L. | Garofalo | 221 |
| J. | Diéguez-Uribeondo | 215 | A. | Gasith | 77 |
| M. | Dimaki | 89, 229 | H. | Gasser | 74 |
| A. Y. | Dmitriev | 202 | D. | Gelli | 222, 321 |
| E. V. | Dmitrieva | 202 | N. | Gemmell | 218 |
| V. H. M. | do Prado | 291 | T. | Gent | 76, 142 |
| S. I. | Dolotovskaya | 203, 263 | A. | Gentilli | 270, 293 |
| M. | Domínguez | 204, 205, 206 | J. Y. | Georges | 321 |
| R. M. | Dorazio | 67 | F. X. | Geraldes | 307 |
| T. | Dorge | 87 | I. V. | Ghira | 75 |
| H. | Drews | 188 | C. | Giacoma | 189, 262, 292 |
| A. L. J. | Duffus | 207 | R. | Gibson | 73 |
| T. | Duiseibayeva | 208 | F. | Gil | 288 |
| E. A. | Dunayev | 208 | A. | Gilles | 218 |



| | | |
|--------|--------------------|--|
| A. | Giménez | 169 |
| F. | Glaw | 109, 131, 152, 159 |
| C. | Gleed-Owen | 68, 76, 213 |
| J. | Glos | 141, 289 |
| B. J. | Godley | 147, 307 |
| T. | Goldberg | 77, 223 |
| G. | Gollmann | 224 |
| T. | Gomes dos Santos | 185 |
| B. J. | Gómez | 230 |
| I. | Gomez-Mestre | 78 |
| C. | Gómez-Rodriguez | 79, 201 |
| V. | Gonçalves | 225 |
| O. M. | González-Díaz | 111 |
| M. | Govedič | 60 |
| E. | Goverse | 226 |
| P. | Gozalbes | 147 |
| J. P. | Granadeiro | 126 |
| F. G. | Grazziotin | 134 |
| V. V. | Grechko | 80, 239 |
| E. | Greenbaum | 49 |
| K. F. | Grego | 178, 283, 284 |
| R. A. | Griffiths | 320 |
| K. | Groh | 320 |
| O. | Guclu | 227 |
| F. | Guerrero | 114, 219, 220 |
| D. | Guicking | 91 |
| S. | Guittonneau | 105 |
| V. | Gvozdik | 81, 108 |
| S. | Hagemann | 277 |
| J. | Hakim-Saade | 88 |
| J. | Hale | 107 |
| J. | Hallermann | 82 |
| B. | Halpern | 83 |
| D. J. | Harris | 93, 131, 150, 217, 271, 272, 287, 294 |
| M. | Hasegawa | 84 |
| P. D. | Hebert | 208, 276 |
| K. | Henle | 136, 299 |
| P. Y. | Henry | 136 |
| J. | Herder | 228 |
| A. | Herrera-Montes | 85 |
| M. R. | Hidalgo | 171, 193, 264 |
| A. | Hidalgo-Fontiveros | 219 |
| A. | Hillers | 86, 116 |
| W. | Hödl | 74, 157 |
| S. | Hofmann | 87, 224 |
| S. | Hraoui-Bloquet | 88 |
| T. | Hrbek | 212 |
| M. | Hudson | 68, 213 |
| A. K. | Hundsdoerfer | 120 |
| J. | Ihnatowicz | 110 |
| I. | Ineich | 160 |
| Y. | Ioannidis | 89, 229 |
| A. | Iraola | 230 |
| V. G. | Ishchenko | 231 |
| N. | Ivanova | 208 |
| T. | Jackman | 49 |
| K. | Jackson | 269 |
| N. -E. | Jalil | 113 |
| I. | Janssen | 90 |

| | | |
|-------|-----------------|-------------------|
| T. B. | Jdeidi | 232 |
| H. E. | Jensen | 264 |
| R. | Jiménez | 114 |
| F. | Jiménez-Gómez | 114 |
| U. | Joger | 91, 109 |
| P. | Joly | 199 |
| O. | Jovanovic | 92 |
| E. M. | Junior | 302 |
| J. W. | Júnior | 181 |
| R. | Kaiser | 98 |
| A. | Kaliontzopoulou | 93, 233, 245, 312 |
| S. | Kalyabina-Hauf | 91 |
| S. | Kapelj | 248 |
| P. | Kapli | 234 |
| K. | Katona | 83 |
| B. H. | Kiabi | 282 |
| P. | Kierzkowski | 235, 260 |
| R. B. | King | 94 |
| F. | Kiremit | 227 |
| O. | Kisserli | 236 |
| T. | Knopp | 63 |
| S. | Koenig | 149 |
| C. K. | Kolesnikovas | 283, 284 |
| T. | Konrad | 116 |
| O. | Kopecký | 237, 317 |
| V. I. | Korchagin | 99, 174 |
| P. | Kornilios | 238 |
| K. | Kostoulia | 229 |
| S. A. | Kosushkin | 239 |
| T. | Kotenko | 95 |
| P. | Kotlik | 81, 259 |
| A. | Kotusz | 110 |
| S. | Koutsoupakis | 303, 312 |
| D. A. | Kramarov | 239 |
| L. | Kratochvil | 108 |
| A. | Krug | 240 |
| M. | Kuljerić | 96, 241 |
| V. N. | Kuranova | 130, 242 |
| P. | Kutilková | 180 |
| B. | Kutrup | 53, 61, 190 |
| S. L. | Kuzmin | 119 |
| A. | Kwet | 243 |
| P. | Kyriazi | 244 |
| M. | Lahoud-Hokayem | 88 |
| F. | Langeani | 291 |
| S. | Larbes | 233, 287 |
| A. | Latorre | 71 |
| A. | Leal | 251 |
| M. | Lecoq | 126 |
| D. | Leitão | 288 |
| J. P. | Lena | 199 |
| G. | Lenti | 262 |
| Y. M. | León | 307 |
| A. | Lešnik | 60, 275 |
| H. B. | Lillywhite | 97 |
| A. | Lima | 157 |
| A. I. | Lima | 245 |
| K. E. | Linsenmair | 253 |
| A.L. | Liria | 246, 247 |
| D. | Lisičić | 248 |

| | | |
|----------|--------------------|---------------------------------|
| M. | Lizana | 165, 166, 195, 215, 266 |
| G. A. | Llorente | 56, 93, 128, 295, 316 |
| A. | Löhmus | 124 |
| L. F. | López-Jurado | 42, 246, 247, 255 |
| A. L. | Loza | 191 |
| I. V. | Lukács | 278 |
| S. M. | Lyapkov | 249 |
| A. | Lyet | 214 |
| P. | Lymberakis | 38, 234, 238, 244, 303, 312 |
| G. | Macías | 155 |
| M. J. | Madeira | 230 |
| J. | Madrigal | 165, 166 |
| Á. | Major | 318 |
| A. | Maletzky | 98 |
| V. V. | Malimonov | 100 |
| D. N. | Malysheva | 99 |
| G. | Mantziou | 107 |
| X. | Manzano | 273 |
| Ü. | Manzke | 240 |
| A. | Marco | 42, 55, 101, 102, 155, 255, 266 |
| V. | Marconi | 189 |
| A. | Marques | 103 |
| O. A. V. | Marques | 106 |
| R. | Márquez-Ferrando | 104 |
| O. | Marquis | 105 |
| A. | Marrero | 171 |
| J. J. | Martín | 55 |
| S. | Martín | 195 |
| F. | Martínez-Freiria | 250 |
| A. | Martínez-Silvestre | 265 |
| I. | Martínez-Solano | 145 |
| M. | Martins | 106, 134, 261 |
| R. | Martins | 251 |
| I. A. | Martirosyan | 99 |
| E. | Marzona | 292 |
| R. | Mašlak | 260 |
| A. | Máté | 83 |
| J. A. | Mateo | 150, 265 |
| R. | Matias | 126 |
| M. | Matos | 252 |
| J. | Measey | 285 |
| M. | Mele | 163 |
| J. | Melville | 107 |
| D. | Menezes | 126 |
| V. | Mercurio | 64 |
| J. | Merilä | 63 |
| I. | Meuche | 253 |
| A. | Meyer | 58, 64 |
| C. | Miaud | 70, 105, 197 |
| A. | Mico | 221 |
| G. | Miehe | 87 |
| P. | Mikulíček | 98 |
| M. C. | Milinkovitch | 149 |
| M. -S. | Min | 119, 154 |
| T. | Mingozzi | 221 |
| A. | Miño | 296 |
| D. | Modrý | 108 |
| O. R. | Molnár | 175, 254 |
| P. | Monagas | 111 |
| L. A. | Monjeló | 168, 212 |
| J. L. | Mons | 55 |
| C. | Montgelard | 214 |
| A. | Montori | 295, 316 |
| C. | Monzon-Arguello | 255 |
| D. | Moraes | 256 |
| J. | Moravec | 81, 108 |
| L. V. | Moreno | 205 |
| A. | Mori | 84 |
| E. N. | Moudilou | 257, 258 |
| N. | Moulton | 76 |
| N. | Mouterfi | 257, 258 |
| R. | Muñoz-Olivas | 112 |
| R. W. | Murphy | 39 |
| R. | Musilová | 259 |
| M. | Mylonas | 234, 238, 244 |
| Z. T. | Nagy | 91, 109 |
| G. | Nardini | 222 |
| P. | Narins | 157 |
| G. | Nascetti | 81 |
| S. | Ndriantsoa | 289 |
| E. | Nevo | 77, 223 |
| R. A. | Nichols | 207 |
| S. | Nieto-Román | 154 |
| G. | Nilson | 89, 125, 229 |
| F. | Nomura | 291 |
| S. | Nouira | 179 |
| A. | Novelletto | 221 |
| V. | Nulchis | 62 |
| M. | Ogielska | 110, 139, 172, 235, 260, 301 |
| A. | Ogrodowczyk | 260 |
| N. | Okada | 274 |
| P. | Oliveira | 126 |
| M. E. | Oliveira | 261 |
| J. A. | Oliver | 273 |
| G. | Ollano | 262 |
| H. | Onay-Karaoğlu | 53, 61, 190 |
| F. | Oneto | 132 |
| N. L. | Orlov | 39 |
| V. F. | Orlova | 203, 263 |
| N. | Oromí | 167 |
| J. | Orós | 111, 171, 191, 193, 264, 265 |
| F. | Ortega | 220 |
| M. E. | Ortiz-Santaliestra | 112, 165, 166, 215, 266 |
| F. | Ouanaimi | 113 |
| M. | Pabijan | 224 |
| P. | Pafilis | 303, 308 |
| C. | Pálinskás | 83 |
| G. | Parra | 114, 219, 220 |



| | | |
|-------|----------------------|-------------------------|
| V. | Partata | 222 |
| M. | Pascual | 55 |
| O. | Paulo | 217 |
| M. | Pavillard | 167 |
| L. | Paz | 267 |
| O. | Pearlson | 115, 268, 269 |
| T. | Péchy | 83 |
| L. | Pedrajas | 219 |
| D. | Pelliteri-Rosa | 270 |
| J. | Penner | 116 |
| A. | Perera | 117 |
| G. | Pérez i de Lanuza | 71 |
| V. | Pérez-Mellado | 117, 118 |
| R. | Picchiotti | 163 |
| P. | Pierzchot | 301 |
| C. | Pinho | 93, 271, 272 |
| S. | Pinya | 118, 273 |
| S. | Piovano | 262 |
| O. | Piskurek | 274 |
| J. M. | Pleguezuelos | 104, 133 |
| K. | Poboljšaj | 60, 275 |
| P. | Poli | 163 |
| P. | Pons | 315 |
| C. E. | Pook | 160 |
| M. | Portella | 295 |
| A. | Portheault | 79, 201 |
| D. | Posada | 131 |
| N. | Poulakakis | 234, 238, 244 |
| N. A. | Poyarkov | 119, 203, 208, 263, 276 |
| P. | Praschag | 120 |
| H. | Pröhl | 240, 253, 277 |
| M. | Puky | 121, 122, 278 |
| F. | Pupin | 123, 270, 293 |
| A. | Pupina | 279, 280 |
| M. | Pupins | 279, 280 |
| V. | Puš | 317 |
| S. | Quagliata | 281 |
| I. | Quaresma | 66 |
| J. A. | Raga | 55, 147, 307 |
| J. C. | Rage | 143 |
| M. | Rajabizadeh | 282 |
| L. C. | Rameh-De-Albuquerque | 178, 283, 284 |
| J. A. | Ramírez | 171 |
| R. D. | Randrianaiaina | 141 |
| R. | Rannap | 124 |
| M. | Raquet | 285 |
| H. T. | Rasolonjatovo | 289 |
| N. | Rastegar-Pouyani | 125, 286 |
| C. | Rato | 287 |
| J. M. | Ray | 94 |
| E. | Razzetti | 270 |
| R. | Rebelo | 126, 225, 251, 288 |
| E. | Recuero | 81 |
| E. | Reeve | 289 |
| I. | Rehák | 305 |
| C. | Remy | 149 |
| A. N. | Reshetnikov | 127, 290 |

| | | |
|----------|----------------|--------------------|
| A. H. M. | Reza | 120 |
| R. | Ribeiro | 47, 128 |
| Á. | Richter-Boix | 295 |
| C. | Rico | 55, 255 |
| M. | Ringler | 129 |
| E. | Ríos | 264 |
| S. | Rocha | 131 |
| M. -O. | Rödel | 86, 116 |
| P. D. | Rodrigues | 69 |
| E. A. | Rodrigues | 302 |
| E. S. | Roitberg | 130 |
| A. | Romano | 54 |
| D. de C. | Rossa-Feres | 291 |
| A. | Rosso | 189, 292 |
| N. | Roura-Pascual | 315 |
| X. | Rubio | 230 |
| D. | Rubolini | 293 |
| H. | Rushmeier | 59 |
| A. P. | Ryskov | 99, 174 |
| R. | Sacchi | 123, 270, 293 |
| R. | Sadek | 88 |
| D. | Šalamon | 96 |
| M. | Šálek | 317 |
| D. | Salvi | 294 |
| S. | Salvidio | 132 |
| M. | San Félix | 55 |
| O. | San Sebastián | 295 |
| I. | Sándor | 187 |
| S. S. | Sant'anna | 283, 284 |
| X. | Santos | 104, 128, 133, 296 |
| C. | Santos | 288 |
| M. | Santos-Reis | 251 |
| D. | Sanuy | 167 |
| A. | Sanz | 206 |
| E. | Sanz-Rodríguez | 112 |
| V. | Sarasola | 297 |
| M. G. | Satta | 62 |
| H. O. | Sawakuchi | 181 |
| R. J. | Sawaya | 134 |
| S. | Scali | 270, 293 |
| D. | Scaravelli | 222, 321 |
| P. | Schäd | 122 |
| L. | Schley | 320 |
| A. | Schlüter | 298 |
| D. S. | Schmeller | 136, 299 |
| M. | Schmidt | 116 |
| B. | Schmidt | 135 |
| A. | Schmitz | 82 |
| P. C. | Scott | 256 |
| B. | Seidel | 137 |
| L. | Serrano | 79 |
| B. | Shacham | 287 |
| R. | Shine | 45 |
| T. | Šilić | 96 |
| N. | Sillero | 128, 133, 138, 300 |
| J. R. S. | Silva | 314 |
| C. | Simou | 303, 308 |
| R. | Sindaco | 138 |

| | | |
|-------|------------------|-------------|
| U. | Sinsch | 167 |
| J. W. | Sites Jr. | 212 |
| K. | Skierska | 301 |
| G. | Smit | 226 |
| A. M. | Smith | 276 |
| A. M. | Soares | 252 |
| M. | Socha | 139,301 |
| M. | Solé | 185,186,302 |
| E. N. | Solovyeva | 203 |
| G. | Sotgiu | 54 |
| V. | Spaneli | 303,312 |
| G. | Spano | 62 |
| E. | Sperone | 304 |
| K. M. | Stanford | 94 |
| Z. | Starostová | 305 |
| I. | Stepanyan | 306 |
| B. | Sterijovski | 140 |
| A. | Strauss | 141,289 |
| N. | Stümpel | 282 |
| A. | Stumpel | 142 |
| G. | Szövényi | 83 |
| J. M. | Szymura | 224 |
| Z. | Szyndlar | 143 |
| T. L. | Tadevosyan | 144 |
| P. | Taroso | 145 |
| J. | Teixeira | 81,145 |
| M. | Tejedo | 210,211 |
| A. | Tenza | 169 |
| G. E. | Themudo | 146,319 |
| O. N. | Tokarskaya | 99,174 |
| J. | Tomás | 55,147,307 |
| N. | Tomašević | 197,198 |
| L. | Tomović | 43,140 |
| L. | Tontini | 292 |
| M. | Torralva | 210,211 |
| A. | Torrent | 111 |
| M. I. | Torres-Lopez | 114 |
| B. | Toxopeus | 138,153 |
| S. | Tripepi | 304 |
| G. | Tsasi | 308 |
| V. F. | Tsurkanu | 162 |
| B. | Tuniyev | 148 |
| S. | Tuniyev | 148 |
| O. | Turkozan | 227 |
| N. D. | Tzankov | 309 |
| A. | Tzika | 149 |
| C. | Ulger | 227 |
| P. | Ulmer | 186 |
| H. | Urei | 125 |
| S. | Ursenbacher | 214 |
| E. | Ursprung | 310 |
| E. D. | Valakos | 303,308 |
| M. | Vamberger | 311 |
| J. | van Delft | 65,196 |
| T. | van der Meij | 226 |
| A. | van der Meijden | 159 |
| P. | van der Munckhof | 52 |
| R. | Vasconcelos | 150 |

| | | |
|----------|------------|----------------------------------|
| J. M. | Vázquez | 171 |
| M. | Veith | 86 |
| G. | Velo-Antón | 151 |
| M. | Vences | 58,64,92,109,131,141,152,159,289 |
| V. | Venus | 153 |
| A. A. | Vergun | 99 |
| C. | Verissimo | 303,312,313 |
| L. | Vicente | 69,126 |
| R. | Vidéki | 83 |
| D. R. | Vieites | 138,152,154,159 |
| T. R. A. | Vilaça | 314 |
| A. | Vilardell | 315 |
| V. M. F. | Vilela | 181 |
| D. | Villero | 316 |
| J. | Vojar | 237,317 |
| J. | Vörös | 318 |
| P. | Wagner | 156 |
| D. B. | Wake | 154 |
| S. | Walker | 73 |
| L. | Wan | 203 |
| Y. | Wang | 44 |
| B. | Wang | 59 |
| M. | Warburg | 158 |
| K. M. | Warkentin | 78 |
| M. | Wegmann | 116 |
| H. | Werning | 186 |
| B. | Wielstra | 319 |
| J. J. | Wiens | 78 |
| M. | Wink | 91,109 |
| K. C. | Wollenberg | 159 |
| L. R. | Wood | 320 |
| T. | Woodfine | 213 |
| D. | Wright | 76 |
| W. | Wüster | 160 |
| V. A. | Yakovlev | 130 |
| B. A. | Young | 161 |
| A. | Zaccaroni | 222,321 |
| N. A. | Zakharyan | 173 |
| K. R. | Zamudio | 134 |
| A. | Zanella | 222 |
| V. | Zanollo | 189 |
| A. P. | Zanotti | 283,284 |
| V. | Zavadil | 259 |
| O. I. | Zinenko | 130,162 |
| M. A. L. | Zuffi | 123,163,322 |
| A. | Zuiderwijk | 90 |







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