ephemeral vegetation the tortoise population was low – usually below 1.0 individual per hectare. The largest density of tortoise population was registered on desert biotopes between contour lines 300 – 800 m a.s.l. The piedmont plains and foothills (adyrs) of the Uzbekistan mountain system are located on this altitudes. The density of tortoise population closely depended on ground, soil and vegetation conditions. The number of species varied from 0.1 to 3.0 ind/ha on stony-loam piedmont plains near mountains. For foothills formed by loose loam and loess deposits this indices were considerably above – 4.6 ind/ha (Babathag range), 11.5 ind/ha (Malguzar range), 44.9 ind/ha (Nuratha range), 11.5 ind/ha (Karchinsky steppe). However, on an average in these sites of censuses the density of tortoise population varied between 5.0-20.0 ind/ha. In order to preserve the natural populations, control must be tightened over legal captures and measures must be taken against pouching of the tortoise. Breeding and growing the tortoise in captivity on legal breeding farms can become one of the ways of reducing the volumes of commercial capturing for international pet trade.

Sexual dimorphism in body size and tail length in the European grass snake (*Natrix natrix*)

Borczyk B
Laboratory of Vertebrate Zoology, Institute of Zoology, University of Wroclaw, Wroclaw, 50-335, Poland
borczyk@biol.uni.wroc.pl

Sexual dimorphism in body size is a common phenomenon among animals as a result of sexual selection and niche partitioning. Many species of snakes exhibit sexual dimorphism in tail length, with males usually having relatively longer tails than females. Despite of the importance of tail length for mating success, there are very few studies concerned with the tail allometry in snakes. Previous studies of the European Grass Snake (*Natrix natrix*) have shown, that the females are larger than males and that the males have relatively longer tails. However, sexual size dimorphism index is not constant and differs between populations. The only published study of tail proportions in this species showed an isometric growth pattern for both sexes. Here I present evidence that it is not true of all populations. I studied a European Grass Snake population from the "Stawy Milickie" Nature Reserve in SW Poland. I measured the snout-vent (SVL) and tail (TL) lengths, and marked each measured individual. The mean female SVL is significantly greater than the male SVL, but males have relatively longer tails. However, the relative TL decreases with increasing SVL in the males, (negative allometry), whereas this ratio remains constant in the females (isometry). This suggests that the importance of having a longer tail decreases for a male with the increasing body length, thus allowing for a better allocation of energy resources. The TL does not decrease in females possibly because it serves as a fat storage.

Amphibian skin glands as source of chemical signals

Brizzi R, Corti C, Delfino G[1], Jantra S[2] and Tanteri G
1Dip.di Biologia Animale e Genetica Università di Firenze, Via Romana 17, 50125, Firenze
[2]Dip. di Fisiologia, Università di Siena, Via Aldo Moro, 53100, Siena
brizzi@dbag.unifi.it

Secretions of many exocrine glands of the *Amphibia* function as signal molecules for survival strategies or social communication. The antipredatory arsenal of these vertebrates mainly consists of poisons produced by skin glands, serous in nature, randomly distributed on the body, or localised in "critical" skin regions, as the parotoid glands of toads and frogs and the caudal glands of some salamanders. The products of these glands consist of different bioactive substances aging as repellent, alarm substance or "venom" with peculiar toxicity and pharmacological actions. Chemical signals released from other cutaneous glands, usually mucous in nature, are involved in social interactions. These odours, named "pheromones", may be used among conspecifics to recognize sex, social status and reproductive condition. Competitive interactions often include marking and defence of a territory, and chemical signals are critical to furnish advertisements of territorial boundaries. In addition, production of pheromones by the males increase the probability that the female will become sufficiently receptive, so that fertilization can occur. Glands producing courtship pheromones are common in males of *Urodela* and *Anura*, although with different anatomical and morphological characteristics. Emblematic examples of breeding glands in the urodeles are some cutaneous and cloacal gland clusters occurring in the plethodontids, namely mental and vent glands, respectively. Other cloacal glands (dorsal glands) releasing chemical signals during the mating are known in the salamandrids. Although chemical cues are less common in anurans than in urodeles, males of some anurans (e.g. ranids) also produce mate actractants, which sources are referable to specialised exocrine glands. In some cases cutaneous glands may produce "glue" for clasping pairs, as the secretion released on the thumb nuptial pads of many frogs and toads. Finally, secretions from integumentary components have been reported in some parental care adaptations, as in the case of incubation and/or transport of eggs and embryos on the back skin of a nurse adult.

The Amphibia of Gabon: still a time for great discoveries

Burger M[1], Olivier SG, Pauwels[2] WR, Branch B[3], Lötters S[4] and Rödel MO[5]
[1]Zoology Department, University of the Western Cape, Private Bag X17, Bellville 7535, South Africa
[2]Department of Recent Vertebrates, Institut Royal des Sciences Naturelles de Belgique, Rue Vautier 29, 1000

Brussels, Belgium; Smithsonian Institution, National Zoological Park, Monitoring and Assessment of Biodiversity Program, Gamba, Gabon
[3]Department of Herpetology, Port Elizabeth Museum, P.O. Box 13147, Humewood 6013, South Africa
[4]Zoological Institute, Department of Ecology, Mainz University, Saarstrasse 21, 55099, Mainz, Germany
[5]Department of Animal Ecology and Tropical Biology, Biocenter of the University, Am Hubland, 97074 Würzburg, Germany
sungazer@iafrica.com

The amphibian faunal assessment for Central African countries, as per Frétey and Blanc (2000), set the tally for Gabon at 72 species. This figure was improved by at least 25% in the following four years, resulting from a spate of herpetofaunal assessments conducted during this period. Most noteworthy of these were five surveys within the Gamba Complex of Protected Areas in south-western Gabon, an initiative driven by the Smithsonian Institution's Monitoring and Assessment of Biodiversity Program (SI/MAB), in collaboration with Shell Foundation and Shell Gabon. Another substantial effort was driven by WWF-Gabon, and included surveying some of the most prominent biodiversity localities within Gabon. Most of the 25% increase in richness consists of known species that were new to Gabon, including genera new to Gabon, i.e. *Leptodactylodon*, *Trichobatrachus*, *Werneria*, *Hemisus*, *Hoplobatrachus* and *Kassina*. But several species new to science and endemic to Gabon have also been discovered, three of which were recently named: *Leptodactylodon stevarti* Rödel & Pauwels 2003; *Werneria iboundji* Rödel, Schmitz, Pauwels & Böhme 2004; *Leptopelis crystallinoron* Lötters, Rödel & Burger 2005. A system of 13 national parks was established in Gabon in 2002, comprising 11% of the country's area. As part of these surveys, herpetological work has been conducted in four of these, the richest being Moukalaba-Doudou National Park with 70 amphibian species recorded thus far. A long-term objective of these surveys was to train in-country biologists so that alpha-level taxonomy could proceed with a national drive. The tasks of local biologists in future should be to focus investigations at localities above 500 m in altitude, because these are regions of endemism, and to survey the remaining national parks. Although the greater part of Gabon is currently still under rainforest, most of this is already under logging concessions. The results of these surveys should be applied to protect additional portions of this rich and special biodiversity zone.

Embryonic development and eggshell thickness: recovering three viviparity origins in genus *Sceloporus*

Meza Lázaro RN, Calderón Espinosa ML and Méndez de la Cruz FR
Instituto de Biología, UNAM, A,P, 70-153, C.P. 04510 , UNAM, México D.F.
faustor@ibiologia.unam.mx

Oviparity is the basal condition of genus Sceloporus, nevertheless, viviparity has raised three independent times within the genus: 1) in a clade formed by torquatus, grammicus y megalepidurus groups, 2) in the formosus group and 3) in the scalaris group, which contains oviparous and viviparous species. We reconstructed the transition from oviparity to viviparity in the genus mapping two characters over its phylogeny: intrauterine embryonic development stage and eggshell thickness. Under normal conditions all the oviparous Sceloporus lay the eggs in the embryonic development stage 30. However, they display a variety of responses to hydric stress. Some species retain eggs and maintain embryonic development in the oviduct beyond the stage 30; even females of oviparous S. scalaris can reach stage 40 (full development). Consequently, facultative viviparity could be an intermediate step between oviparity and obligated viviparity. Mapping this character through the genus point out that the scalaris group ancestor could maintain embryonic development during retention periods. On the other hand, megalepidurus-grammicus-torquatus clade is not associated to species that can continue embryonic development in utero. Whereas Spinosus, sister group of formosus, could maintain embryonic development, but their ancestor. Eggshell thickness varies among species; it is positively correlated to egg mass, which is determined by the female size. We suggest that viviparity was originated in small species, because their eggs have thin eggshells that enhance mother-embryo water and gas interchange. It is supported by female size of the viviparous groups ancestors.

Parentage analysis and parental care of *Chirixalus eiffingeri* (Anura: Rhacophoridae) from Taiwan

Chen YH, Yu A HT and Kam YC
Institute of Zoology, National Taiwan University, R847, Taipei, 106, Taiwan, R.O.C.
ann@whale.twbbs.org

Genetic parentage analyses have uncovered many details of reproductive natural history in different animals, notably insects, birds and fishes. The results have also given us revolutionary insights into evolutionary models of animal reproductive and parental care behaviors. *Chirixalus eiffingeri* is a rhacophorid tree frog that breeds in arboreal pools and has unique parental care behaviors. The males stay to attend the clutches during the embryonic period and females provision their offspring, the tadpoles in the pools, by laying unfertilized eggs. It is a good animal model to study the patterns of genetic parenthood and evolutionary ecology of parental care behaviors in the arboreal reproductive mode. We developed 11 polymorphic microsatellites as genetic makers for parentage analysis to resolve the ecology of parental care. The numbers of alleles per locus ranged from 2 to 17. The observed and expected heterozygosity averaged 0.433 and 0.656, respectively. Total exclusionary probability of these loci is 0.984 when no