A brief history and current status of herpetology in Iran

1,4NASRULLAH RASTEGAR-POUYANI, 1HIWA FAIZI, 2HAMZEH ORAEI, 1AZAR KHOSRAVANI, 1BEHZAD FATHINIA, 1NASTARAN HEIDARI, 1RASOUL KARAMIANI, AND 3ESKANDAR RASTEGAR-POUYANI

1Department of Biology, Faculty of Science, Razi University, 67149 Kermanshah, IRAN 2Faculty of Biology, University College of Science, University of Tehran, Tehran, IRAN 3Department of Biology, Faculty of Science, Teacher Training University, Sabzevar, IRAN

Abstract.—In this paper, we present a brief history of herpetology in Iran, discuss its current status, and review some important works carried out by Iranian and non-Iranian herpetologists. Current problems, information, and challenges associated with herpetology in Iran are presented. Finally, current herpetological studies in Iran are introduced and potential biodiversity hotspots of herpetofauna in Iran are identified. These potential hotspots are strongly recommended by experts in the country to be considered for studies at the graduate level.

Key words. History, Iran, herpetology, status, studies, biodiversity hotspots, education


The herpetofauna of Iran is rich and diverse. In terms of species richness and taxonomic diversity of reptiles, this area harbors one of the most remarkable reptile faunas within the western Palearctic region, owing to both high habitat diversity and historical biogeographical factors.

Most amphibians and reptiles of Iran were originally described by non-Iranian herpetologists in the “classical” literature of scientific natural history, but recently, herpetological studies by Iranian herpetologists have expanded rapidly.

Unfortunately, despite the high diversity of the Iranian Plateau herpetofauna, the number of research studies carried out in this field has been limited. For the last century, only a few reliable books have been published by Iranian herpetologists: Amphibians of Iran (Balouch and Kami 1995), Snakes of Iran (Latifi 1991, 2000), and Field Guide to the Lizards of Iran (Rastegar-Pouyani et al. 2006, 2007) are the main herpetological texts (in Farsi and/or Persian) in Iran.

New molecular data and computational phylogenetic methods are transforming the field of herpetology in a number of ways, and many of these same transformations have occurred in other groups of organisms. These approaches are overturning or questioning many traditional ideas about reptile and amphibian phylogeny based on morphology. In recent years, Iranian herpetologists have been using these advanced methods to reveal the species relationships of amphibians and reptiles of Iran. Given current trends, we hope that the phylogeny of most reptile and amphibian groups will be resolved in the following years, at least at the level of currently recognized genera.

Recognizing the conservation status of endemic species of amphibians and reptiles is of great importance. The Iranian herpetofauna consists of about 15 species of Anura (frogs and toads), seven species of Caudata (salamanders), nine species and six subspecies of Testudines (Chelonia; turtles, terrapins, and tortoises), one species of Crocodilian, one species of amphibiaenian, more than 135 species of Lacertilia (lizards), and about 85 species of Serpentes (snakes). Of this great herpetofaunal diversity, conservation status has been clearly delineated for only two species of newts (Neurergus microspilotus and N. kaiseri) from western Iran. Owing to causes including lack of public knowledge about the significance of wildlife, habitat destruction, overuse of natural resources, road expansions, lack of public environmental knowledge and education, legal and illegal use of firearms, and environmental pollution, Iranian herpetofaunal biodiversity is under serious threat.

Thus, it is necessary for Iranian herpetologists to take special and effective steps in the study of the indigenous herpetofaunal species of Iran to determine their conservation status. The Iranian Plateau herpetofauna has suffered from numerous devastating factors: the high rate of human population growth in Iran, coupled with the relatively low standard of living, create social conditions that act to erode the remaining expanses of undisturbed vegetation, including those located within protected areas. Deforestation rates in Iran are very high, and the amount of forest in Iran is expected to decrease to a little more than a third of its original total.

With regard to the limited distribution of endemic species of the Iranian herpetofauna, determining the conser-
Figure 1. The spider viper *Pseudocerastes urarachnoides* in natural habitat, western Iran. Photo by Behzad Fathinia.

Figure 2. The Kermanshah cave gecko, *Asaccus kermanshahensis*, in natural habitat. Photo by Nasrullah Rastegar-Pouyani.
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The conservation status of wide-ranging species like *Macrovipera lebetina*, *Pseudocerastes persicus*, and *Trapelus agilis* is easier than narrowly endemic taxa, such as *P. urarachnoides* (Fig. 1), *Bufo luristanica*, *B. kavirensis*, *Montivipera latifi*, *Asaccus kermanshahensis* (Fig. 2), *A. nasrullahi*, *A. kurdestanensis*, and *Tropiocolotes latifi*.

A recent effort toward understanding the conservation status of amphibians and reptiles in Iran was an IUCN-SSC workshop in Antalya, Turkey to establish Red Book status for all species of the Caucasus, Turkey, and Iran. This workshop was attended by Iranian researchers, as well as representatives from America and Europe involved with the fauna of this region. Although this was only a preliminary step, the workshop was useful in producing tentative distribution maps for all species and identifying areas of research needed to answer conservation problems. One definitive outcome was the development of sufficient information leading to a CITES listing for the narrowly endemic endangered salamander, *Neurergus kaiseri* (Fig. 3).

Based on long term surveys by researchers in different habitats and areas across Iran, regions with high numbers of taxonomically problematic groups have been identified. These problematic taxa need special attention by researchers and young scientists of the country. Some interesting reports include the rumored presence of *Mesalina guttulata* in the plains of Khuzestan, southwestern Iran, the possible presence of *Phrynocephalus raddei raddei* in Kopet Dagh valleys on the border of Iran and Turkmenistan, the presence of *Cyrtodactylus kotschyi* in northwestern Iran, and a high degree of individual variation in morphology in *Tropiocolotes persicus* ssp. southwest of Minab in southern Iran. Further, the taxonomic status of the relict genus *Asaccus* using molecular and morphological approaches should be addressed within the framework of a Ph.D. thesis. Also, the genus *Ophiomorus* needs further studies and investigations employing morphological and molecular tools.

While there is an ongoing need to further ascertain the range and distribution of all species, there are a number of geographic areas where additional exploration and detailed collecting are particularly needed. The western Zagros Mountains in Iran, Iraq, and southeastern Turkey have been shown to be areas of high endemism and diversity, where new taxa are being described. The authors consider that more herpetological surveys will produce even more species. The Jaz Murian Depression in southeastern Iran, west of Iranshahr, although little-explored, has yielded three narrowly distributed endemic species, *Mediodactylus sagittifer*, *Ophiomorus streeti*, and an undescribed species of *Scincus* (Anderson 1999a). Few of the many internal mountain ranges of the Central Plateau of Iran have been explored zoologically. Some of these may prove to be ecological islands of population divergence. The Dasht-e Lut has been virtually impermeable in the past, but the advent of improved field transportation now enables faunal surveys. This region is not expected to have great diversity or population densities, owing to its extremely arid and severe conditions, but studies will reveal interesting adaptations that provide for the survival of fauna in these harsh environments. The Makran Range forms the border of the southeastern edge of the Iranian Plateau and has yet to be adequately surveyed for fauna in Iran, Afghanistan, or Pakistan,
where tribal unrest and military intervention has made the possibility of surveys problematic in the two last countries. Over the last half century, a number of species (such as *Lytorhynchus maynardi*, *Éristicophis macmahonii*, and *Rhinogecio misommei*) previously known from Pakistani Baluchistan have been found in eastern Baluchistan, indicating that the ranges of more Pakistani and Afghani fauna may extend west into Iranian Baluchistan. The collections of the Afghan Boundary Commission more than a century ago produced many species endemic to that region, and only sporadic collection has occurred along this border since. Kuh-e Taftan, also rarely visited, yielded the lizard species *Eremias lazeharica*, described less than 20 years ago; it has not been visited by herpetologists since. Only random collecting has been done on the islands of the Persian Gulf, apart from Qeshm Island. Recent information suggests that the fauna of these islands have much to reveal about trans-gulf connections.

In order to better promote herpetology in Iran, a national herpetological society that publishes, at least annually, developments in Iranian herpetology is desirable. A network to facilitate exchange of ideas and published literature and a repository of electronic copies of past and present world literature pertaining to the taxa of amphibians and reptiles of Iran would be helpful. At least two existing websites, Pars Herpetologists Institution (http://www.pars-herp.org/) founded by Omid Mozaeffari, and Steven Anderson’s personal website (http://swsiazology.tripod), were begun with the intention of serving some of these needs. Both are still in development, but they require more time and effort than has proven possible thus far.

It may be worth noting that the attendance of Iranian herpetologists at national and international meetings has increased as research and publication have progressed. The first herpetological meeting in Iran was held at Kerman in February 2009 and several faculty and students attended the SEH meeting in Turkey in 2009.

At present, there is a lack of local suppliers of the books and equipment necessary for professional herpetologists and herpetoculturalists to maintain animals in captivity. There is also a developing interest by private or amateur herpetologists towards herpetology in Iran. Although not funded by the taxpayers, in recent years these individuals have made major contributions toward supplementing the studies of academic herpetologists.

Iran has a rather long history of herpetological studies, from the 1700s until the present. The original scientific herpetological studies were mostly carried out by non-Iranian researchers (e.g., Olivier, Blanford, Zarudny, De Filippi, and Nesterov) but modern studies have been carried out mainly by young native herpetologists. Here we present a brief history of contemporary herpetologists who have made important contributions in the study of the Iranian Plateau herpetofauna.

Taxonomic and faunistic studies on the herpetofauna of Iran were carried out by Steven C. Anderson (e.g., 1963, 1966a,b,c, 1974, 1999a, b; Fig. 4) who spent about nine months in Iran during 1958 and paid a shorter visit to the country in 1975. In 1999, Anderson published the results of his 40-year studies in a book entitled *The Lizards of Iran* (Anderson 1999a). Currently, this book is considered a key reference for all herpetologists in Iran, both experts and amateurs, in spite of the fact that the taxonomy of many taxa has been superseded as a result of subsequent studies. Of the other contemporary herpetologists, we mention Göran Nilson and Claes Andrén (Fig. 5), the Swedish herpetologists who visited Iran a number of times (1973, 1976, 2000, 2002) and made important contributions in the study of the Iranian Plateau Amphibians and Reptiles, describing *Bufo kavirensis* and *Ophiomorus nuchalis*, among others.

The late Mahmoud Latifi (Fig. 6), a researcher of the Razi Institute considered one of the pioneers in serum production in the world, published a book entitled *The Snakes of Iran* in 1984 (see also Latifi 1991, 2000), with illustrations and an identification key for all recognized species. As with Anderson’s book, many of the generic names of these snakes have since changed.

Mohammed Baloutch, during a series of herpetological expeditions in Iran, trained a generation of herpetologists and described two new species of lizards (Baloutch 1976, 1986). Together with Haji Gholi Kami (another contemporary herpetologist), Baloutch published the only textbook on Iranian amphibians entitled *Amphibians of Iran* (Baloutch and Kami 1995) (in Persian). The history of herpetological studies in Iran prior to the current century has been presented by Anderson (1999a, b).

Since 1988, ongoing studies by N. Rastegar-Pouyani and his younger brother E. Rastegar-Pouyani (Fig. 7) have led to descriptions of numerous new taxa of reptiles (e.g., N. Rastegar-Pouyani 1996, 1997, 1998, 1999; Rastegar-Pouyani and Nilson 1997, 1998; Rastegar-Pouyani and Rastegar-Pouyani 2001; Rastegar-Pouyani, Nilson, and Faizi 2006) and are among the most comprehensive studies in Iranian herpetology. Fortunately, today there are some young and active herpetologists (co-authors of this paper among them) devoting their studies to the Iranian Plateau herpetofauna and conducting field research in various parts of the country.

Various universities and institutions in Iran are offering programs in order to enhance the knowledge of herpetology among Iranian students, both undergraduate and graduate. These include Shahid Bahonar University and International Center for Science, High Technology and Environmental Science Zoological Museum (IC-STZM) in Kerman Province, which is directed by Soheila Shafei (a Ph.D. student in herpetology) and Mehdi Rajabizadeh (M.Sc. in herpetology) respectively. Gorgan University, directed by Haji Gholi Kami, also offers a major collection of the amphibians and reptiles of Iran in...
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Figure 4. Steven C. Anderson (left) and Nasrullah Rastegar-Pouyani (right) at the 3rd World Congress of Herpetology, Prague, Czech Republic, August 1997. Photo by Natalia Ananjeva.

Figure 5. Claes Andrén (left), N. Rastegar-Pouyani (middle) and Göran Nilson (right) at the 3rd Asian Herpetological Meeting, Almaty, Kazakhstan, September 1998. Photo by Sahat Shamakov.
Figure 6. The late Mahmoud Latifi. Unknown photographer.

Figure 7. Type locality of *Eremias montanus*, 19 June 2004 (the senior author, left, and Eskandar Rastegar-Pouyani, right). Photo by Maysam Rastegar-Pouyani.
its zoological museum, providing a very good resource for herpetological studies. This museum collection is known as the Gorgan University Zoological Museum (GUZM). In collaboration, the Razi University Zoological Museum (RUZM) also provides a valuable collection of amphibians and reptiles belonging to most families and genera that have been collected over Iran. This collection is directed and managed by the senior author. Further, graduate programs in herpetology are also offered by Department of Biology, Razi University, which has produced various peer-reviewed herpetological papers, M.Sc, theses, and Ph.D. dissertations. At Razi University, the masters program in herpetology was established by the senior author in 2000 and a new Ph.D. program in herpetology in 2010, the students of which are trained in various aspects of herpetology in the Iranian Plateau, mainly focusing on problematic taxa of amphibians and reptiles. These broad studies employ morphological, molecular, and ecological approaches. The main authority in molecular herpetology in Iran is one of us (E. Rastegar-Pouyani) from the Teacher-Training University of Sabzevar, Khorasan Province, who graduated from Heidelberg University in Germany after studying the molecular phylogenetics of reptiles, with the *Eremias persica* complex as the main subject of his doctoral dissertation.

There are also conservation programs and projects offered by the Department of the Environment (DOE) that try to expand and increase the knowledge of herpetology in Iran. These programs and projects are mainly conducted and carried out by a variety of the above-mentioned herpetologists, as well as by the co-authors of this paper. The MMTT (Iranian National Natural History Museum), which once was a center of research with a very nice exhibition in Tehran, is now incorporated into the general collections and exhibitions of the Department of the Environment. Some workers (e.g., N. Rastegar-Pouyani, and S. C. Anderson) have been interacting with the MMTT at various periods, and the senior author and Haji Gholi Kami from Gorgan University worked as herpetologists in the MMTT from 1989 to 1992.

An updated checklist of the reptiles and amphibians of Iran (Rastegar-Pouyani et al. 2008) enumerated the number of amphibians, lizards, snakes, and turtles of the country. This paper was published in the recently established Iranian Journal of Animal Biosystematics (IJAB).

In summary, Iran has a long-lasting history in herpetology and, as a complicated and rich region from the herpetological point of view, warrants more comprehensive studies on its herpetofauna using various disciplines. In this way, it is hoped that more new taxa and new discoveries will be uncovered and that more herpetologists will become devoted and active in the study of Iranian amphibians and reptiles thus helping protect these wonderful animals for future generations.

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References


Nasrullah Rastegar-Pouyani

Earned his B.S. in Zoology from Razi University Kermanshah, Iran in 1986 and his M.S. in Zoology from Tehran University, Tehran, Iran in 1991, where he studied herpetology with the agamids as the central object. He started his Ph.D. in Gothenburg University, Sweden in 1994 under the advisement of Professor Göran Nilson and graduated in 1999, working on taxonomy and biogeography of Iranian Plateau agamids with *Trapelus* as the main object. His research interests include taxonomy and biogeography of the Iranian Plateau, the Middle East and Central Asian herpetofauna.
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Hiva Faizi earned his B.Sc. in plant biology from Shahid Beheshti University (SBU) and his M.Sc. in Animal Biosystematics from Razi University. He is currently employed as a specialist in ecological studies and environment at Mahab Ghdss Consulting Engineering Company. His special interests are morphology, systematics, taxonomy, and biogeography of the Iranian Plateau with special reference to reptiles and amphibians. During his M.Sc. he studied the genus *Trachylepis* in Iran from different perspectives, including morphology, osteology, parasitology, and systematics of *Trachylepis aurata transcaucasica*. Hiva has described a new species of Asaccus lizard, *Asaccus kurdistanensis* with his supervisor Prof. Nasrulla Rastegar-Pouyani and his collaborator Prof. Göran Nilson. Hiva has also studied the near eastern fire salamander, *Salamandra infraimmaculata seminovi*, from Kurdistan province, western Iran. Hiva is collecting data and samples of *Neurergus microspilotus* and *Neurergus kaiseri* to start a Ph.D. project on population genetics and genetic diversity of the two previously mentioned species.

Azar Khosravani earned her B.S. in Biological Sciences from the University of Zabol. She received her M.S. in Animal Biosystematics from the University of Razi, Kermanshah, where she researched the geographic variation of *Mesalina watsonana* (Sauria: Lacertidae) in Iran. Currently she is a Ph.D. student in the Department of Biology at the University of Razi, Kermanshah. Her current research interests include molecular systematics and phylogeography of Lacertid lizards in Iran.

Hamzeh Oraie is a Ph.D. student in the Department of Zoology at the University of Tehran. He received his B.S. in Biological Sciences from the University of Razi, Kermanshah. He obtained his M.S. in Animal Biosystematics from the University of Razi, Kermanshah, where he researched the geographic variation of *Cyrtopodion scabrum* (Sauria: Gekkonidae) in Iran. His current research interests include molecular systematics and phylogeography of Ophisops elegans (Sauria: Lacertidae) in Iran.

Behzad Fathinia earned his B.A. and M.S. from Isfahan and Lorestan universities, respectively. His M.S. research focused on “The Biosystematic Study of Lizards of Ilam Province.” For the time being, he is a Ph.D. student at Razi University, Kermanshah, western Iran under supervision of Nasrullah Rastegar-Pouyani, Mozafar Sharifi, and Eshkandar Rastegar-Pouyani. His dissertation research involves ecology, phylogeography, molecular systematics, and population genetics of the Iranian viper *Pseudechaceras urarachnoides* in western Iran. He is also interested in other reptiles, specially snakes.
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Rasoul Karmiani earned his B.S. in Animal Biology from the Lorestan University of Lorestan province, Iran in 2004 and his M.Sc. in Animal Biosystematics from Razi University, Kermanshah, Iran in 2009. During his graduate education he studied the systematics of the Family Eublepharidae in Iran with special reference to *Eublepharis angramainyu* Anderson and Leviton 1966. He also investigated skull comparison of the genera *Eublepharis* and *Asaccus* under the advisement of Prof. Nasrullah Rastegar-Pouyani. His research interests include taxonomy, ecology, biology, conservation, and phylogeography.

Eskandar Rastegar-Pouyani earned his B.Sc. in Animal Science from Tehran University, Iran in 1995 and his M.Sc. in Animal Biosystematics from Teacher Training University of Tehran, Iran in 1997, where he studied the herpetofauna of the Semnan Province, northeastern Iran. In 2007 he received his Ph.D. from the University of Heidelberg, Germany under the advisement of Michael Wink and Ulrich Joger. His doctoral dissertation investigated the molecular phylogeny and phylogeography of the genus *Eremias* (Sauria, Lacertidae).

Nastaran Heidari is a Ph.D student at the Department of Biology, Faculty of Science, Razi University, Kermanshah. She received her B.Sc. in biology from Zabol University in eastern Iran and her M.Sc. in environmental sciences from Ahwaz Research and Science University. She started her studies as an Environmental Engineer but then began her professional life towards reptiles during her M.Sc. in 2008. During this time as a masters student she studied the lizard fauna of the Gando Protected Area (Southeastern Iran), with outstanding results. In 2010 she was accepted as a Ph.D. student at Razi University, Kermanshah under the advisement of Prof. N. Rastegar-Pouyani. Her dissertation research project and main focus will be the phylogeny and molecular systematics of the genus *Acanthodactylus* (Sauria: Lacertidae) in the Iranian Plateau (an important and noticeable taxon of lacertid lizard in Iran).

Rasoul Karmiani earned his B.S. in Animal Biology from the Lorestan University of Lorestan province, Iran in 2004 and his M.S. in Animal Biosystematics from Razi University, Kermanshah, Iran in 2009. During his graduate education he studied the systematics of the Family Eublepharidae in Iran with special reference to *Eublepharis angramainyu* Anderson and Leviton 1966. He also investigated skull comparison of the genera *Eublepharis* and *Asaccus* under the advisement of Prof. Nasrullah Rastegar-Pouyani. His research interests include taxonomy, ecology, biology, conservation, and phylogeography.