

A new form of *Eremias*(Sauria: Lacertidae) from the Alvand Mountains, Hamedan Province, Western Iran

NASRULLAH RASTEGAR-POUYANI^{1*} AND ESKANDAR RASTEGAR-POUYANI²

1. Department of Biology, Faculty of Science, Razi University, 67149 Kermanshab, Iran

2. Department of Pharmacology and Molecular Biotechnology, University of Heidelberg, Heidelberg, Germany

A new and distinctive form belonging to the genus and subgenus *Eremias* Fitzinger, 1834 is reported from the highlands of Alvand Mountains, Hamedan Province, western Iran at about 2700 m elevation. It is easily distinguished from all the other species of the typical subgenus (*E. velox*, *E. persica*, *E. trauchi*, *E. nigrolateralis*, *E. lalezharica*, *E. afghanistanica*, *E. regeli*, *E. suphani*, and *E. nikolskii*) by having a variable number of postmentals (4-5 pairs), smaller size, and distinctive color pattern. Furthermore, it can be distinguished by having a combination of characters against any of the species in the typical subgenus. Further work, using both morphological and molecular techniques, is now being carried out on this new form in order to determine its exact taxonomic and phylogenetic status. Systematics of the genus *Eremias* is shortly discussed.

Key words: Lacertidae, *Eremias novo*, new form, Systematics, Distribution, Hamedan Province, Alvand Mountains, Western Iran

INTRODUCTION

The lacertid genus *Eremias* Fitzinger, 1834 encompasses about 37 species of mostly sand, steppe, and desert dweller lizards which are distributed from northern China, Mongolia, Korea, Central and southwest Asia to southeastern Europe (Rastegar-Pouyani and Nilson, 1997; Rastegar-Pouyani and Rastegar-Pouyani, 2001). The genus is Central Asian in its relationships and affinities (Szczerbak, 1974; Anderson, 1999). About 15 species of the genus *Eremias* occur on the Iranian Plateau, mostly in northern, central, and eastern regions (Rastegar-Pouyani and Nilson, 1997; Anderson, 1999; Rastegar-Pouyani and Rastegar-Pouyani, 2001). To date, no comprehensive study has been carried out on the *Eremias* fauna of the Iranian Plateau and the systematic status of most taxa is in great need of a revision. Szczerbak (1974), however, revised *Eremias* and divided it into two distinguished genera based on morphological characters: *Mesalina* Gray and *Eremias* Fitzinger (see under taxonomic account).

As the first record of *Eremias* from the area, in this paper we describe and introduce a new form of *Eremias*, here tentatively defined as *Eremias novo*, belonging to the typical subgenus from the upland and mountainous regions of the Alvand Mountains, Hamedan Province, western Iran at about 2700 m elevation (ca. 48° 25' E, 34° 33' N). This province is located in western Iran and a major part of it is covered by the Zagros Mountains (Fig. 1). The type locality of *Eremias novo* (new form) is located in an upland area (about 2700 m elevation) surrounded by the Zagros Mountains, about 21 km southwest of the city of Hamedan, Hamedan Province, western Iran (Fig. 2).

Eremias novo (new form) (FIG. 3)

DIAGNOSIS AND COMPARISON: A small to moderate-sized lacertid, collected by the senior author on 14 June 2004 (4 specimens) and again on 24 August 2005 (5 specimens), from the above-mentioned type locality (ca. 48° 25' E, 34° 33' N); maximum snout-vent length (SVL) = 52.6- 67.6 mm, tail length = 85-95mm, with 13-14 longitudinal and 27-28 transverse rows of

*Corresponding author : nasrullah.r@gmail.com



FIG. 1. – Location of Hamedan Province on the Iranian Plateau.

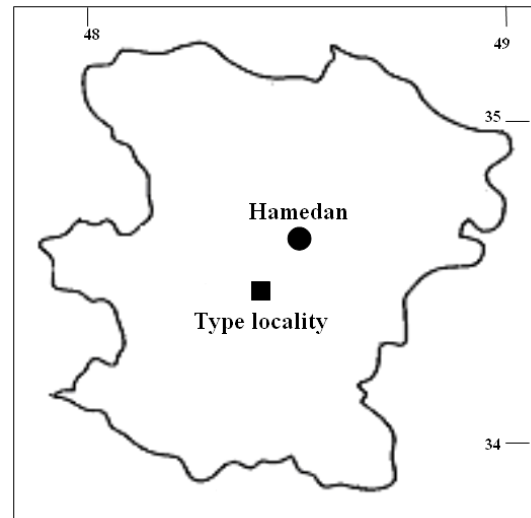


Fig. 2. – The type locality of the new form of *Eremias* (*Eremias novo*), about 21 km southwest of the city of Hamedan, Hamedan Province, western Iran.

ventral plates, slightly converging posteriorly; with 63-67 small, granular scales across middle of dorsum. A species belonging to the subgenus *Eremias*: subocular reaches mouth edge; one frontonasal; two supraoculars which are not completely separated from frontal and frontoparietals; distance between the femoral pores being narrow; color pattern "striped"; inhabitant of steppe and mountain-steppe landscapes (Szczerbak, 1974: 83).

On the other hand, it differs from all the other species of its relevant subgenus based on having several distinguishing characters; the color pattern is distinctive and it is distinguishable from all the other species in this character i.e., dorsum uniformly dark-brown without spots and ocelli, interrupted by five light longitudinal stripes; the vertebral stripe bifurcating on the nape, two paravertebrals on each side; a broad dorso-lateral stripe containing one or two regularly arranged light spots (very different from all the other species of *Eremias* in this character); Furthermore, it differs from each species of the typical subgenus in the following character combinations (Szczerbak, 1974; Bischoff & Böhme, 1980; Böhme and Szczerbak, 1991; Rastegar-Pouyani & Nilson, 1997; Rastegar-Pouyani and Rastegar-Pouyani, 2001):

From *Eremias nigrolateralis* Rastegar-Pouyani & Nilson, 1997 in having a much smaller size, lack of separation of the third pair of submaxillary shields by granular scales (0% versus 100%), lower count of gulars (23-24 versus 41-42), variable number of submaxillary shields (33% versus 0%), reach of femoral pores to the knee (100% versus 0%), and distinct differences in color pattern.

From *Eremias persica* Blanford, 1874 in having a smaller size, lower count of gulars (23-24 versus 28-38), the absence of distinctly keeled upper caudal scales (100% versus 75%), variable number of submaxillary shields (33% versus 4%) and distinct differences in color pattern.

From *E. velox* (Pallas, 1771) in having a smaller size, in the absence of distinctly keeled upper caudal scales (100% versus 0%), variable number of submaxillary shields (33% versus 5%) and in color pattern.

From *E. stranchi* Kessler, 1878 in having a smaller size, the absence of distinctly keeled upper caudal scales (100% versus almost 0%), variable number of submaxillary shields (33% versus 9%) and in color pattern.



FIG. 3. – The new form of *Eremias* (*Eremias novo*) in natural habitat.



FIG. 4. – Habitat of *Eremias novo*, on the Alvand Mountains, about 2700 m elevation, 21 km southwest of the city of Hamedan (ca. 48° 25' E, 34° 33' N), Hamedan Province, western Iran.

From *E. lalezharica* Moravec, 1994 in having variable number of submaxillary shields (33% versus 0%), higher count of dorsals (63-68 versus 54-59), no contact of gulars with the second pair of submaxillary shields, lack of a small scale between prefrontals, and distinct differences in color pattern.

From *E. afghanistanica* Böhme & Szczerbak, 1991 in a much higher count of dorsal scales (63-68 versus 44-46), lower count of gulars (23-24 versus 25-28), variable number of submaxillary shields (33% versus 0%), and in color pattern.

From *E. nikolskii* Bedriaga, 1905 in a higher count of dorsals (63-68 versus 45-59), variable number of submaxillary shields (33% versus 8%), and in color pattern.

From *E. regeli* Bedriaga, 1905 in a higher count of dorsals (63-68 versus 43-61), higher number of scales in the 9th-10th caudal annulus (27-28 versus 17-25), the absence of distinctly keeled upper caudal scales (100% versus 0%), variable number of submaxillary shields (33% versus 3%), and in color pattern.

From *E. montanus* Rastegar-Pouyani & Rastegar-Pouyani, 2001 in general color pattern and distinct differences in behavior and habitat.

DESCRIPTION OF THE NEW FORM OF *Eremias* (= *Eremias novo*)

Nine specimens, preserved in 75% ethyl alcohol in good condition; body relatively moderate to small (SVL= 52.6-67.6 mm) and moderately depressed; a species of the subgenus *Eremias* (Szczerbak, 1974:83); four to five pairs of submaxillary shields, first three pairs in contact, the fourth and fifth pairs widely separated; first pair of submaxillary shields as large as the fifth and in contact with mental anteriorly, with first and second infralabials laterally; the fifth submaxillary pair each in contact with the fourth pair anteriorly, being surrounded by 8 granular scales laterally and posteriorly. 7-8 supralabials, 4-5 of which anterior to subocular; subocular borders the mouth; two large nasals in contact with rostral anteriorly, with first and second supralabials laterally, and with frontonasal and first loreal posteriorly, the former being single, broader than long and laterally in contact with first loreal and posteriorly with prefrontals; two prefrontals each smaller than frontonasal and almost as long as broad and laterally in contact with second loreal and posteriorly with frontal and granules of supraocular region; only frontonasal with distinct concavity; frontal almost as long as prefrontal and frontonasal together, broadened and posteriorly and laterally

partly in contact with supraoculars (and partly separated from the latter by 2-3 large scales, not by granules) and posteriorly with frontoparietals; two frontoparietals almost as large as a single supraocular, laterally being in contact with the second supraocular, and posteriorly with the interparietal and parietals, the former being small and relatively lozenge-shaped, surrounded by frontoparietals and parietals; two very large and plate-like parietals, almost as long as broad, being in contact behind interparietal; a vestigial occipital; two loreals, the first one small, surrounded by first the two supralabials, nasal, frontonasal, and the second loreal which is distinctly large with an evident keel; 6-7 supraciliaries, separated from supraocular by a series of 42-46 granules; postocular elongate, surrounded by granules anteriorly; temporal region mostly covered by granular scales becoming large towards the orbit, more than 100 on each side; tympanic scale distinct and elongated obliquely, almost the same size on both sides; tympanum vertically elongated, slightly larger than the orbit; no distinct supratemporal; subocular huge, broader than long with a distinct ridge being extensively in contact with the lower edge of the orbit; lower eyelids with a semi-translucent membrane made up of about 20-23 enlarged scales; collar well pronounced, not serrated, made up of 10-12 scales, the two medial ones the largest; gular fold weakly developed, 23-24 gulars from symphysis of chin shields to median gular, becoming enlarged posteriorly; 13-15 longitudinal and 27-30 transverse rows of almost squarish ventral plates from collar to hind limbs; anterior series of ventrals to some extent irregular, median ventral longer than broad; dorsal scales juxtaposed, smooth, granular, becoming slightly larger posteriorly, 63-68 scales across the middle of dorsum, and about 160-164 scales in a single row from occiput to a point just above the vent; proximal caudals larger than posterior dorsals but the change being gradual; caudals becoming large, elongate, and slightly keeled distally, arranged in distinct whorls, 27-28 scales in the 10th whorl behind the vent; upper forearm covered dorsally by enlarged, juxtaposed, and almost lozenge-shaped scales; lower forearm covered with granules; upper hind limbs covered externally by granules, externally by large shields; tibia covered dorsally by slightly pointed granules, ventrally by large plates which are slightly keeled, two plates in a transverse row; no fringes on the toes, 18-20 uni- and bi-carinate lamellae under the fourth toe, proximal part of the lower fourth toe containing two complete rows of lamellae, distal part with a single row (in this character it is quite different from all other species of its relevant subgenus); 18-20 femoral pores in each side, the two series separated anteriorly by a narrow space consisting of three scales; preanal region encompassing 20-24 large shields, the four median ones being the largest; 5-6 plates in a longitudinal row from the space between femoral pores to anterior edge of the vent.

COLORATION AND COLOR PATTERN

Dorsum uniformly dark-brown without spots and ocelli, interrupted by five light, narrow longitudinal stripes: one vertebral bifurcating on the nape, two paravertebrals on each side; a broad dorso-lateral stripe containing one or two regularly arranged light spots (very different from all other species of *Eremias* in this character); a ventro-lateral series of dark-brown spots, to some extent forming a stripe; upper surface of head uniformly olivish-brown; temporal and labial regions suffused by dark-brown; submaxillary region light-grey-cream; ventral region dirty white, suffused by bluish-brown; upper surface of limbs dark-brown containing numerous light spots; proximal upper surface of tail brown, distal part light brownish-grey; lower surfaces of limbs and tail yellowish-white.

HABITAT

During field work in the western regions of the Iranian Plateau, we surveyed the Alvand Mountains, as a part of the Zagros Mountains, in southern regions of Hamedan Province, about 21 km southwest of Hamedan city (ca. 48° 25' E, 34° 33' N). In this area, we came across an isolated population of the genus *Eremias*, regarded here as a new form. The habitat, which is surrounded by the Zagros Mountains, is characterized by stony hills and mountainous steppes; the vegetation is steppe and mountainous association, mainly *Astragalus*, *Euphorbia*, *Gondelium* as well as

various other species of the families Gramineae and Compositae (Fig. 4). Since it is a mountainous region with high elevation (about 2700 m), the winter is harsh and cold, entirely and deeply snow-covered (the snow persists till late June), the summer being mild and rather short. All the specimens were foraging around the *Astragalus* and other shrubs probably looking for prey. They were quite shy and wary and very difficult to capture. When alarmed, they took refuge under the shrubs or nearby stones. One of the most effective anti-predatory adaptations evolved in these lizards is the ability to lose the tail (autotomy) when being pursued and touched by the predators (or collectors).

Whether it is a relict and rare taxon, confined only to the type locality or it is distributed over a wider area in the Alvand Mountains is yet to be established (see below).

TAXONOMIC ACCOUNT

As mentioned before, so far, the most complete work done on the complicated genus of *Eremias* (*sensu lato*) is of Szczerbak (1974), who studied almost all species and species complexes of this genus throughout the range. Based on morphological characters and geographic distribution, Szczerbak (1974) subdivided the inclusive genus *Eremias* (*sensu lato*) into two distinct genera; the genus *Mesalina* as a North African and lowland southwest Asian clade, and the genus *Eremias* (*sensu stricto*) which is mainly occurring in Central and northeast Asia.

Furthermore, Szczerbak (1974) subdivided *Eremias* (*sensu stricto*) into five distinct subgenera:

Eremias (Szczerbak, 1974: 83), *Rhabderemias* (Szczerbak, 1974: 201), *Ommateremias* (Szczerbak, 1974: 146), *Pareremias* (Szczerbak, 1974: 22-23), and *Scapteria* (Szczerbak, 1974:247).

Except for the subgenus *Pareremias*, which is a Central and east Asian clade, all of the major species groups of the genus are presented on the Iranian Plateau (Anderson, 1999). Arnold (1986), who studied the hemipenes of lacertids, supported the Szczerbak's subgeneric names. In a more recent study Arnold placed *Eremias* as the sister taxon of a clade including *Acanthodactylus*, *Mesalina*, and *Ophisops-Cabrita* (Arnold, 1989:238-240). But Mayer and Benyr (1994) have proposed a different scenario. According to these authors, *Eremias* is the sister taxon of *Mesalina* and both of them belong to a larger clade also containing *Omanosaura* and *Ophisops*. They believe that *Eremias* is not closely related to *Acanthodactylus*.

Recently, a new species of *Eremias* (= *E. montanus*) has been reported from the Zagros Mountains, Kermanshah Province at about 2200 elevation (Rastegar-Pouyani and Rastegar-Pouyani, 2001). This is a small-sized species, apparently, restricted in distribution to the type locality. At the same time, it seems that there are some deep similarities between *Eremias novo*, the new form described here, and *E. montanus*. Further comparative work, using both morphological and molecular techniques, are now being carried out by us in order to determine exact taxonomic and phylogenetic status of this new form of *Eremias* and to show the affinity of the two taxa (i.e., *Eremias montanus* and *E. novo*) and whether they are conspecific or not. The results of our comprehensive study on these two taxa will be published in the near future and until such time, we have tentatively named the new *Eremias* from Hamedan as *Eremias novo*.

The Czech Biological Expedition to Iran in 1996 collected 8 specimens of an undetermined species of *Eremias* related to *E. persica* from the Zagros Mountains in Esfahan Province at about 2000-2200 m elevation (Frynta et al., 1997: 9-10). Whether it is a new taxon or just a variety of *E. persica* is yet to be known.

ACKNOWLEDGMENTS

We wish to thank Iranian Department of the Environment, Kermanshah for all their help and support during field work in western Iran. Also our special thanks go to the Razi University, office of Research Affairs (Kermanshah), for their unsparing help and support. We also wish to thank Professor Göran Nilson, Gothenburg Natural History Museum, Gothenburg, Sweden for loan of

Eremias specimens. Our special thanks also go to Mr. Ahmad Bakhtiari, who first introduced the area to us.

MATERIAL EXAMINED

Eremias novo (new form) (n=9): RUZM 96T-104T (from about 21 km southwest of the city of Hamedan, Hamedan Province, western Iran.

Eremias montanus (n = 3): P 198-200 (Field number), from around the Siah-Darreh Village (about 2000 m elevation), 65 km northeast city of Kermanshah, Kermanshah Province, western Iran.

Eremias nigrolateralis (n = 2): GNHM. Re. ex. 5147-5148, from 150 km northeast of Shiraz, Fars Province, south-central Iran.

Eremias persica (n = 4): GNHM. Re. ex. 5159-5162, from 150 km northeast of Shiraz, Fars Province, south-central Iran.

Eremias persica (n = 28) : GNHM. Re. ex. 5163-5190, from 45 km east of Arak on the road to Qum, Markazi Province, north-central Iran.

Eremias persica (n = 4): GNHM. Re. ex. 5191-5194, from 65 km west of Tehran, between Eshtehard-Saveh, Tehran Province, northern Iran.

Eremias persica (n = 2): GNHM. Re. ex. 5195-5196, from 45 km east of Golpaygan, Esfahan Province, central Iran.

Eremias persica (n = 4) : GNHM. Re. ex. 5197-5200, from 50 km north of Delijan on the road to Qum, Markazi Province, north-central Iran.

Eremias persica (n = 1) : GNHM. Re. ex. 5201, from 50 km north of Abadeh, Fars Province, south-central Iran.

Eremias persica (n = 1): GNHM. Re. ex. 5202, from 50 km east of Hamedan on the road to Qazvin, Hamedan Province, western Iran.

Eremias persica (n = 3): GNHM. Re. ex. 5203-5205, from 5 km west of Takestan on the road to Zanjan, Zanjan Province, northwestern Iran.

Eremias velox (n = 4): GNHM. Re. ex. 5122(1-4), from around the Carin River, 250 km E-SE Almaty (Alma Ata), Kazakhstan.

Eremias velox (n = 2): GNHM. Re. ex. 5120 (1-2), from Mulali Kurozek, eastern Kazakhstan.

Eremias velox (n = 2): GNHM. Re. ex. 5121(1-2), from the Taldi Korgau District, northeast Kazakhstan.

Eremias velox (n = 2): GNHM. GK. 18881 (1-2), from Archenjan Village (1), and 30 km north of Mary (2), Turkmenistan.

Eremias trauchi (n = 3): GNHM. Re. ex. 4411 (1-3), from Golestan National Park, Mazandaran Province, northeastern Iran.

ABBREVIATIONS : GNHM. Re. ex. = Gothenburg Natural History Museum, Reptilia exotica.
RUZM= Razi University Zoological Museum.

LITERATURE CITED

ANDERSON, S. C. (1999). The Lizards of Iran. Society for the study of Amphibians and Reptiles. Oxford, Ohio. 442pp.

ARNOLD, E. N. (1986). The hemipenis of lacertid lizards (Sauria : Lacertidae): structure, variation and systematic implications. *Journal of Natural History*. 20: 1221-1257.

ARNOLD, E. N. (1989). Towards a phylogeny and biogeography of the Lacertidae: relationships within an Old-World family of lizards derived from morphology. *Bulletin of British Museum of Natural History, Zool. Ser.* 55(2): 209-257.

BISCHOFF, W. & W. BÖHME (1980). Der systematische Status der türkischen Wüstenrenner des Subgenus *Eremias* (Sauria : Lacertidae). Bonn Zoologische Beiträge, 26: 297-306.

BÖHME, W. & N. SZCZERBAK (1991). Ein neuer Wüstenrenner aus dem Hochland Afghanistans, *Eremias (Eremias) afghanistanica* sp. n. (Reptilia : Sauria : Lacertidae). Bonn Zoologische Beiträge, 42: 137-141.

FRYNTA, D., J. MORAVEC, J. CIHAKOVA, J. SADLO, Z. HODKOVA, M. KAFTEN, P. KODYM, D. KRAL, V. PITULE, & L. SEJNA (1997). Results of the Czech Biological Expedition to Iran. Part 1. Notes on the distribution of amphibians and reptiles. Acta Societas Zoologica Bohemicae, 61: 3-17.

MAYER, W. & G. BENYR (1994). Albumin-Evolution und Phylogense in der Familie Lacertidae (Reptilia: Sauria). Annals of Naturhistory Museum Wien, 96B: 621-648.

MORAVEC, J. (1994). A new lizard from Iran, *Eremias (Eremias) lalezharica* sp. n. (Reptilia: Lacertilia: Lacertidae). Bonn Zoologische Beiträge, 45: 61-66.

RASTEGAR-POUYANI, N. & G. NILSON (1997). A New Species of *Eremias* (Sauria: Lacertidae) from Fars Province, South-Central Iran. *Russian Journal of Herpetology*, 4(2): 94-101.

RASTEGAR-POUYANI, N. & E. RASTEHR-POUYANI (2001). A New Species of *Eremias* (Sauria: Lacertidae) from the Highlands of Kermanshah Province, Western Iran. *Asiatic Herpetological Research*, 9: 107-112.

SZCZERBAK, N. N. (1974). Yashchurki Palearktiki (Palearctic species of *Eremias*). Kiev. 295pp.
