



## *Eremias intermedia* or *Eremias nigrocellata*? Is morphology sufficient?

Farahnaz Molavi<sup>1\*</sup>, Toba M. Kalat<sup>1</sup>,  
Morteza Yazdanpanah<sup>2</sup>, Bahram H.  
Kiabi<sup>2</sup> and Haji Gh. Kami<sup>3</sup>

<sup>1</sup>\*Department of Biology, Faculty of Science,  
Islamic Azad University of Mashhad, Mashhad,  
Iran, e-mail: fm\_yazdan@yahoo.com

<sup>2</sup>Biology Department, Faculty of Science,  
Shahid Beheshti University, Tehran, Iran

<sup>3</sup>Department of Biology, Faculty of Sciences,  
Golestan University, Gorgan, Iran

Received: 1 September 2017 / Revised: 7 October 2017 / Accepted:  
15 October 2017 / Published online: 20 October 2017. Ministry of  
Sciences, Research and Technology, Arak University, Iran.

### Abstract

Markazi Province with its extended deserts and Anderson reported *Eremias intermedia* Strauch 1876, from Iran-Afghanistan border and *Eremias nigrocellata* Nikolsky 1896 from north and east of Iran. He also represented some features for recognition of these similar species. This study that lasted about one year was aimed at identifying herpetofauna of Kharturan protected area. 15 specimens of *Eremias* were obtained their measurements in agreement with the characters of neither *Eremias intermedia* nor *Eremias nigrocellata* that described by Anderson from Iran.

**Keywords:** Iran Lizards fauna, *Lacertidae*, Taxonomy, Morphology.

### Introduction

Widespread *Eremias* genus (Fitzinger 1834), with about 33 recognized species, include 16 species from Iran (Rastegar-Pouyan *et al.* 2008, Rastegar-Pouyani *et al.* 2010, Mozaffari *et al.* 2011). *Eremias intermedia* Strauch, 1876 is

distributed in southern central Asia and northern Afghanistan and Anderson reported it from Tajan (Tezden) river valley at the point where borders of Iran, Turkmenistan and Afghanistan comes together (Anderson 1999). Khar Turan national park is situated in Semnan province, southeast of Shahrood and parts of eastern Khorasan province. This area is comprised three extensive plain and consist of favorable habitat of both *E. intermedia* and *E. noigrocellata*, as previously described habitats namely sandy area covered with semi-shrubby vegetation and loosely soils respectively (Terentjev and Chernov 1949).

### Material and methods

#### Study Area

Northernmost region of Khartouran protected area and 10 Km south to cross between Kalshour area of Khartouran and Shahrood-Sabzevar road. This is a plain with desert shrub such as *Ephedra* sp., *Alhagi* sp. and *Seidlitzia rosmarinus*. Six specimens were collected from this first station. Nine specimens were collected from second station; an area situated about five Km South to Ahmad Abad, with dominant vegetation of bean-caper (*Zygophyllum eurypterum*) (Fig. 1 and 2).

Available keys (Minton 1966, Anderson 1979, Leviton 1992, Anderson 1999) were used in order to Identification based on morphologic and meristic characters, but specimens were not in agreement with any of species and exhibit an intermediate situation between *E. intermedia* and *E. noigrocellata*.

Measurements of metric characters were made using digital Vernier caliper (at 0.02mm accuracy) and meristic characters were

explored using dissecting microscope (7x-40x). Prevalent characters of family were studied (Table 1, Fig. 3 and Fig. 4).

**Table1.** Examined morphologic and meristic characters of *Eremias intermedia*.

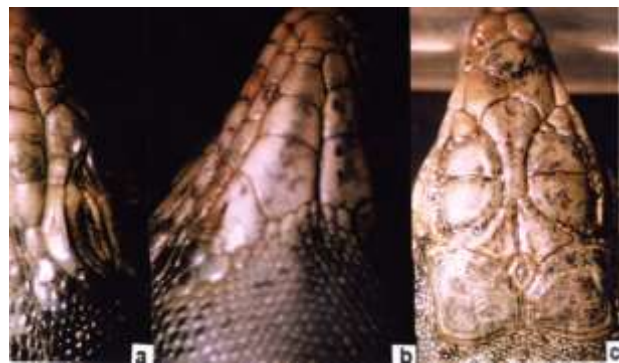
Abbreviation	Character
SVL. CL	SVL / CL
SVL	Length of snout to vent
HW	Wide of head
HL	Length of head
CL	Length of caudal
NS	nasal scales
AB	Number of scales around body
BE	Number of scales between eyes
BLEL	scales between labial and eye-right
BLER	scales between labial and eye-left
LLR	lower labial scales -right
LLL	supralabials scales-left
SLR	supralabials scales-right
FT4L	Fring of fourth toe-left
FT4R	Fring of fourth toe-right
T4	Subdigital scales of Fourth toe
FP	Femoral pors
DL	Dorsal scales Longitudinal of back
MD	Scales in Middorsaum
DT	Dorsal scales in longest transverse rows
VT	
VL	Ventral scales in longest transverse rows

For all characters, Mean, Minimum, Maximum and standard deviation was calculated using SPSS Ver. 16 statistical package (SPSS Inc., Chigaco, IL, USA). Kolmogorov-Smirnov test was carried out to assess the normality of character data. Homogeneity of variances was tested with Levene test and since all characters had normal distribution and variance

homogeny, sexual dimorphism was analyzed using one way variance analysis.



**Figure 3.** *Eremias intermedia*; dorsal view of adult specimen showing the color pattern and ventral view showing the ventral scales arrangement.



**Figure 4.** Scales of head region of *Eremias intermedia*.

## Results and Discussion

There are only few distinctive morphological characters that are not appropriate because they have high CV. Results are summarized in table 2 (below). Morphological character analysis revealed the existence of sexual dimorphism in head length. Mean of this character for males is 21.79 and larger than 19.43 for females.

*E. intermedia* and *E. nigrocellata*, have an enigmatic taxonomic situation. Boulenger (1885) considered *E. nigrocellata* and *E. intermedia* as synonymous. Nikolsky (1896),

assigned *E. nigrocellata* as a subspecies of *E. intermedia* (Anderson, 1999). Anderson (1999) described them as separate valid species.

Terentjev and Chernov (1949) recorded *E. intermedia* from northeastern Iran. Anderson (1999) attributed populations of north and east of Iran to two distinct species. He regarded north and east Iran populations to *E. nigrocellata* and those that had been taken at the borders of Iran-Afghanistan-Turkmenistan to *E. intermedia*. He used these characteristics to distinguish between two species:

1-Snout-vent length/tail length (SV/T) in *E. intermedia* equals 0.53-0.60 and in *E. nigrocellata* equals 0.70-0.85.

2-Supraoculars completely separated from frontal by row of granules in *E. intermedia* but in *E. nigrocellata* supraoculars are in contact with frontal.

3-In *E. intermedia* there are 16-18 (mean 16.8) ventral scales in longest transverse row compare with 17-20 (mean 19.2) in *E. nigrocellata*.

4- Subdigital scales of Fourth toe in *E. intermedia* there is one row and in *E. nigrocellata* is two rows.

5- Tympanic shield is indistinct in *E. intermedia* but though is small or distinct in *E. nigrocellata*.

Anderson (1999) reexamined Guibé (1957) specimens from Mahneh (Khorasan) and Boulenger (1885) specimens from Gorgan, and identified them as *E. nigrocellata*. He also examine two specimens of *E. intermedia* type series, that in both fourth supraoculars were completely broken up into small scales and SV/T ratio was 0.82 in adult and 0.63 in

immature specimen. In latter specimen supraoculars were completely separated from frontal and frontoparietals by a row of small scales, while in the adult, supraoculars are in contact with the frontal.

In this study 15 specimens (9 female and 6 male) obtained from Abas Abad and Kach Chah located in Khar Turan National Park that characterize by these traits:

1- SVL/CL in females equal 0.63-0.68 and 0.62-0.67 in males.

2- Number of ventral scales in longest transverse row in females is 16-18 (mean=17.65) and in males 18-16 (mean 17.33), (as before mentioned there is a range of character states from completely distinct to completely indistinct).

3- In none of the specimens showed no Fourth supraocular (according to result of Anderson, 1999 for *E. intermedia*).

4- Only in two specimens few granules separate frontal scales from frontoparietal ones and in others frontals are in contact with supraoculars.

5- Subdigital blade-like lamellae in the fourth toe are hard to examine.

So, according to this result it seems that *E. intermedia* and *E. nigrocellata* haven't a sharp border in their diagnostic morphologic characters and their characters exhibit a clinal pattern of variation. This fact, make their taxonomic situation obscure again. As Anderson (1999) mentioned, based on limited specimens can't persuade that *E. intermedia* is distinct from *E. nigrocellata*. More morphological and molecular studies may offer additional insights.

## References

Anderson S.C. 1979. Preliminary key to the turtles, Lizard and Amphisbaenas of IRAN Fieldiana Zoology 65(4): 27-44.

## Acknowledgment

We are grateful to Mr. Mohammadian for his generous help and Mohammad Yazdanpanahi for his efforts in collecting the specimens.

- Anderson S.C. 1999. The lizards of Iran, Vol. 15. Contributions to Herpetology. Ithaca, NY: Society for the Study of Amphibians and Reptiles.
- Boulenger G.A. 1885. Catalogue of the Lizard in the British museum. Vol.1, 2.
- Guibé J. 1954. Catalogue des types des lézards du Museum national d'Histoire naturelle. Bayeux: Colas.
- Leviton A.E., Anderson SC, Adler K. and Minton S.A. 1992. Handbook to Middle East amphibian and reptiles. Contribution to Herpetology. Oxford, OH: Society for study of Amphibians and Reptiles.
- Minton Sh.A. 1966. A contribution to the herpetology of West Pakistan. Bulletin of the American Museum of Natural History, 134(2): 29-184.
- Mozaffari O., Ahmadzadeh F. and Parham J. (2011). *Eremias papenfussi* sp. Nov., a new lacertid lizard (Sauria: Lacertidae) from Tehran, Iran. Zootaxa 31(14): 57-62.
- Rastegar-Pouyani E., Rastegar-Pouyani N., Kazemi Noureini, Joger S., Wink U.M. 2010. Molecular phylogeny and evolution of the *Eremias persica* complex of the Iranian Plateau (Reptilia: Lacertidea) based on sequences of the mtDNA, Zoological Journal of the Linnean Society 158: 641-660.
- Rastegar-Pouyani N.R., Kami H.G., Rajabzadeh, Shafeie M., Anderson S.C. 2008. Annotated Checklist of Amphibians and Reptiles of Iran. Iranian Journal of Animal Biosystematics 4 (1): 7-30.
- Terentjev P.V. and Chernov S.A. 1949. Guide to Reptile and Amphibians, Soviet Science Prees, Moscow and Leningrad, 340 pp.