



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

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### 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 the 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* have obtained their measurements in agreement with the characters of neither *Eremias intermedia* nor *Eremias nigrocellata* that was described by Anderson from Iran.

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

### Introduction

Widespread *Eremias* genus (Fitzinger 1834), with about 33 recognized species, includes 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 come 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 of three extensive plains and consists of the favorable habitat of both *E. intermedia* and *E. noigrocellata*, as previously described habitats namely sandy areas covered with semi-shrubby vegetation and loose soils respectively (Terentjev and Chernov 1949).

### Material and methods

#### Study Area

The northernmost region of Khartouran protected area and 10 Km south to cross between Kalshour area of Khartouran and Shahrood-Sabzevar road. This is plain with desert shrubs such as *Ephedra* sp., *Alhagi* sp. and *Seidlitzia rosmarinus*. Six specimens were collected from this first station. Nine specimens were collected from the 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 the species and exhibit an intermediate situation between *E. intermedia* and *E. noigrocellata*.

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

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

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

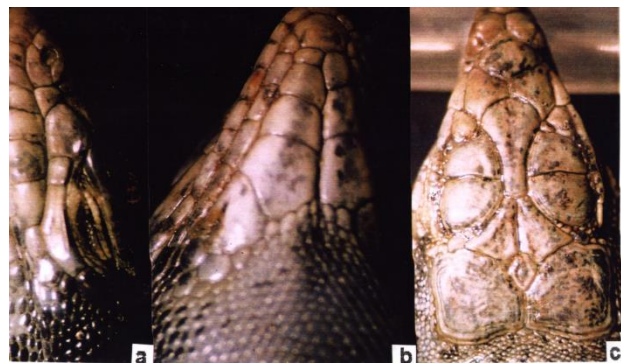
Abbreviation	Character
SVL. CL	SVL / CL
SVL	Length of snout to vent
HW	Wide of head
HL	Length of head
CL	Length of caudal
NS	nasal scales
AB	Number of scales around body
BE	Number of scales between eyes
BLEL	scales between labial and eye-right
BLER	scales between labial and eye-left
LLR	lower labial 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 the Fourth toe
FP	Femoral pores
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 the 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 the adult specimen showing the color pattern and ventral view showing the ventral scales arrangement.



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

## Results and Discussion

There are only a few distinctive morphological characters that are not appropriate because they have a high CV. Results are summarized in table 2 (below). Morphological character analysis revealed the existence of sexual dimorphism in head length. The 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 are completely separated from frontal by a 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 the longest transverse row compared with 17-20 (mean 19.2) in *E. nigrocellata*.

4- Subdigital scales of the 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 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 the

immature specimen. In the latter specimen supraoculars were completely separated from frontal and frontoparietal 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- The number of ventral scales in the 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 the result of Anderson, 1999 for *E. intermedia*).

4- Only in two specimens do 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.

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