

New Records of the Turkmenian Fat- Tailed Gecko, *Eublepharis turcmenicus* Darevsky, 1978, From Khorasan Razavi Province, Iran (Squamata: Eublepharidae)

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This paper presents the south westernmost record of the Turkmenian Fat- Tailed Gecko, *Eublepharis turcmenicus* Darevsky, 1978, from Khorasan Razavi province, Iran. Five specimens (three adult females, one adult and one juvenile male) were studied from 15 km southwestern of Azadvar village, about 34 km north western of Joghotai County in Razavi Khorasan province. Morphometric and meristic characters of these specimens, coloration, and habitat of the species are presented in this paper.

Key words: *Eublepharis turcmenicus*, new records, Khorasan Razavi, Iran

INTRODUCTION

The lizards of family Eublepharidae Boulenger, 1883 or eyelid geckos are moderate to large geckos, ranging from 45 to 155 mm adult snout- vent length. Their distribution is disjunct in southwestern North America and northern Central America, and sub- Saharan Africa and southern Asia (Vitt & Caldwell, 2014). These geckos are a small family containing six genera and 36 species (Sindaco & Jemercenko, 2008; Uetz & Hosek, 2017). The family Eublepharidae is divided into two subfamilies- Aeluroscalabotinae Grismer, 1988 and Eublepharinae Boulenger, 1883 (Ananjeva *et al.*, 2006). Asiatic eublepharids belong to three genera: *Aeluroscalabotes* Boulenger, 1925; *Goniurosaurus* Barbour, 1968 and *Eublepharis* Gray, 1827 (Kaverkin & Orlov, 1996). The leopard geckos or fat- tailed geckos, *Eublepharis* Gray, 1827 is a genus with distinct distribution in N Mesopotamia and W Iran, Kopet dag between Turkmenistan and Iran, S and E Afghanistan, most of Pakistan, W and NE India (Sindaco & Jemercenko, 2008). There are six species in this genus (Uetz & Hosek, 2017), three of them are reported from Iran (Anderson, 1999; Rastegar-Pouyani *et al.*, 2008; Smid *et al.*, 2014; Safaei-Mahroo *et al.*, 2015). Turkmenian Fat- Tailed Gecko or Turkestan leopard geckos, *Eublepharis turcmenicus* Darevsky, 1978 is distributed in Kopet dagh and Turkmen- Khorasan Mountains. This species is listed in the Red Data Book of Turkmenistan (Szczerbak & Golubev, 2003). This species was recorded by Darevsky from northwest of Mashad and in the Kopet dag- Khorasan Mountains, without providing precise locations. During a field study on the herpetofauna of central and eastern Iran was found an adult male of this species in 5 km south of Bazangan village, 75 km east of Mashad, Khorasan province, North Eastern Iran (Auer *et al.*, 2008). It was presented only these two localities and no new records of *Eublepharis turcmenicus* exist from Iran (Smid *et al.*, 2014). During a field study on nocturnal vertebrates of Joghotai County, second author found five live specimens of leopard geckos were found in a new locality. These materials were collected in about 330 km west of the second record in Bazangan village.

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FIGURE 1. Distribution range of *E.turcmenicus* in the northeastern part of Iran. (1- Mountains northwest of Mashhad, without precise location Darevsky (1978); 2- Bazangan village, east of Mashhad Auer et al. (2008); 3-About 15 km southwest of Azadvar village, 34 km North West of Joghotaï (presented in this study).

MATERIALS AND METHODS

The study area is located in Razavi Khorasan province, north east of Iran. Specimens were collected from 15 km southwestern of Azadvar village (36° 44' N; 56° 43' E) at elevation of 960 m a.s.l. This village is located in 34 km North West of Joghotaï County. Rainfall was 153.5mm from September 23, 2013 to September 22, 2014 and 224.2mm from 2014 to 2015 in Joghotaï County. Mean temperature of Sabzevar city (southeast of Joghotaï) was 15.6°C from September 23, 2013 to September 22, 2014 and 17.0°C from 2014 to 2015 Habibi Nokhandan *et al.* (2016).

In some fieldwork throughout the Joghotai County during 2014, five new materials of the Turkmenian Fat- Tailed Gecko, *Eublepharis turcmenicus*, were collected (Fig. 1). The first specimen was collected in September 5, 2014; the others were collected in June 20 (2 specimens) and June 21 (2 specimens), 2015. These specimens were studied in captivity and laboratory, and then released in the previous natural habitat. All specimens were examined using common gekkonid or eublepharid morphological characters (Table 1). Morphological studies were carried out using a stereomicroscope and digital calipers measuring to the nearest 0.01 mm. Specimens were identified with available identification keys (Anderson 1999; Szczerback & Golubev 1996; Szczerback & Golubev 2003; Rastegar-Pouyani *et al.* 2007). Sexes of specimens were identified by observing of preanal pores in males and eggs of some females under skin of abdominal area.

TABLE 1. The morphological (9 morphometric and 10 meristic) characters examined in *Eublepharis turcmenicus* of the Razavi Khorasan province of Iran.

Abbreviations	Definition	Explanation
SVL	Snout- vent length	from tip of snout to anterior edge of cloaca
TL	Tail length	from anterior edge of cloaca to tip of original tail
HL	Head length	from tip of snout to the posterior of lower jaw
SL	Snout length	from the front nostril edge to front orbit edge
TED	Transverse eye diameter	maximum transverse eye diameter
MDEO	Maximum diameter of orbit	maximum diameter of orbit
HW	Head width	distance between posterior of eye corners
HH	Head height	maximum distance between upper head and lower jaw
DTL	Dorsal tubercle length	in one of two central rows in the middle of the back
ULS	Upper labial scales	number of upper labial scales in left (L) and right (R) sides of head
LLS	Lower labial scales	number of lower labial scales in left (L) and right (R) sides of head
NS	Nasal shields	number of nasal shields in one side of snout
SAH	Scales of above head	number of scales above head between middle of eyes
SDLT	Subdigital lamellae	number of subdigital lamellae along underside of 4 th toe
LDT	Longitudinal dorsal tubercles	number of dorsal tubercles from occiput to rump (above vent)
TDT	Transverse dorsal tubercles	number of dorsal tubercles at dorsum and flanks at mid body
SAUB	Scales along underside of body	along underside of body from first pair of postmental scales to vent
VSA	Ventral scales across abdomen	at the middle of body (ventral scales are larger than flank scles)
PP	Preanal pores	number of preanal pores of both sides

RESULTS

Family Eublepharidae

Eublepharis turcmenicus Darevsky, 1978

Brief description. Each postmental separated from the first infralabial by small granules; first pair of postmentals form a long suture or only point of contact behind mental; first pair of large postmentals contact each other (in 3 specimens) or separated by one to two scales (in 2 specimens); second pair of postmentals made by one or two scales on each side; mental scale shorter than wide (fig. 2); 10-12 supralabials and 10-13 infralabials; subdigital lamellae with weakly developed small tubercles; undivided terminal subdigital lamellar scales; ventral scales hexagonal and in 26-29 longitudinal rows, scales of anterior part are larger than posterior ones (fig. 8); 5-7 angularly bent



FIGURE 2. Mentals and postmentals of *Eublepharis turcmenicus* from Azadvar village, 34 km North West of Joghotaï Razavi Khorasan province (left, Field No.758, right, Field No.866).(photo by R.Babaei Savasari).



FIGURE 3. *Eublepharis turcmenicus* from Azadvar village, 34 km North West of Joghotaï Razavi Khorasan province in natural habitat (Field No.758, adult male).(photo by R.Babaei Savasari at night).



FIGURE 4. Dorsal view of *Eublepharis turcmenicus* from Azadvar village, 34 km North West of Joghotaï Razavi Khorasan province (Field No.873, Juvenile male).(photo by R.Babaci Savasari).

preanal pores; interrupted medially by 2 scales lacking pores, or separated by 1 scale in left part of one specimen; scales around tubercles are 9-12 above head, 11-16 in neck, 11-14 in anterior dorsum, 11-16 in mid dorsum and hind dorsum, 9-13 above forelimbs, 9-17 above hind limbs; dorsal tubercles are separated each other by 1-5 scales on top of head, 3-8 scales on neck, 3-7 on anterior and mid dorsum, 3-5 scales on hind dorsum, 0-3 scales on forelimbs, 0-5 scales on hind limbs. Meristic characters of new records are presented in table 3.

Life color and pattern. Background color of dorsum lemon yellow, with irregular roundish to squarish dark brown spots on back arranged to form more or less distinct broad transverse, these bars more distinct on tail; three wide bright purple transverse bands on shoulder, mid body and lumbar regions; pattern of irregular elongate dark brown blotches on head; lips, sides, tail and limbs covered with dots and spots in disorder; lower surfaces white, except regenerated part of tail, which is covered with a pattern of dark speckles; ventral scales are bright and two eggs are visible in female (figs 3, 4, 5 and 8).

Measurements. SVL of the longest male 129.01 and of female is 123.81mm. Other measurements of all five specimens are presented in Table 2.



FIGURE 5. *Eublepharis turcmenicus* from Azadvar village, 34 km North West of Joghotai Razavi Khorasan province (Field No.873, Juvenile male and Field No. 866, adult female).(photo by R.Babaei Savasari).

TABLE 2. Morphometric characters of new records of *Eublepharis turcmenicus* (F=female; M=male; Juv= Juvenile).

<i>E. turcmenicus</i> (n=5)	Field No.	Field No.	Field No.	Field No.	Field No.
Morphometric characters	758(M)	866(F)	873(M.Juv)	877(F)	870(F)
SVL	129.01	123.81	89.88	106.86	109.99
TL	–	–	66.46	–	69.12
HL	32.06	30.90	24.17	28.52	28.35
SL	9.90	8.14	6.15	7.52	7.67
TED	7.32	6.86	6.07	6.73	7.17
MDEO	4.70	4.45	3.84	4.11	4.53
HW	19.99	19.17	15.28	17.82	17.66
HH	14.41	13.22	9.33	10.68	9.71
DTL	1.84	1.80	1.39	1.47	1.48

Habitat. These lizards occur on stone foothills and mountains with soft soils, particles of limestone, shale, gypsum, ophiolite, sandstone, dolomite and hematite (fig. 6). There are borrows of rodents around of habitat. It was identified plants such as *Hordeum* sp, *Pteropyrum aucheri*, *Cirsium* sp, *Euphorbia* sp, *Launaea acanthodes*, *Salsola dendroides*, *Peganum harmala*, *Tamarix* sp, *Ephedra* sp in locality were found these lizards.

Sympatric amphibian and reptile species are *Pseudepidalea turanensis*, *Bunopus tuberculatus*, *Mediodactylus spinicauda*, *Tenuidactylus caspius*, *Platycephalus rhodorachis*, *Spalerosophis diadema*, *Telescopus rhinopoma*, *Macrovipera lebetina*. Sympatric mammal species are Brandt's Hedgehog (*Paraechinus*

hypomelas), Indian crested Porcupine (*Hystrix indica*), Golgen Jackal (*Canis aureus*), Striped Hyaena (*Hyaena hyaena*).

TABLE 3. Meristic characters of new records of *Eublepharis turkmenicus* (F=female; M=male; Juv= Juvenile) (number of left and right parts are separated).

<i>E. turkmenicus</i> (n=5)	Field No.	Field No.	Field No.	Field No.	Field No.
Meristic characters	758(M)	866(F)	873(M,Juv)	877(F)	870(F)
ULS	12-12	11-12	11-10	10-12	11-11
LLS	13-12	10-11	11-10	11-12	11-11
NS	1-1	1-1	1-1	1-1	1-1
SAH	24	25	29	22	25
SDLT	22-23	22-21	20-22	21-20	21-20
LDT	33	36	37	35	40
TDT	18	17	18	19	19
SAUB	155	149	150	147	143
VSA	27	26	26	29	28
PP	7	-	5	-	-



FIGURE 6. Habitat of *Eublepharis turkmenicus* in Razavi Khorasan province (photo by R. Babaei Savasari).

Natural History. These lizards were collected in September 5, 2014 and June 20 and 21, 2015. They were active at night in 21 to 24 pm, air temperature was 23- 27 °C. Limbs of males are stronger than females. They move slowly in general and escape from torch and go to between bushes, but in areas without plants they move about one meter and continue their activities. They can climb on rocks sometimes. They are aggressive in temporary contacts with hands, trying to bite fingers, produce voices and hold tails upward at first and move laterally in wave form. Duration of their voices continue 6 to 10 seconds. Their voices are like azzzzzzzz and are not uniform at any time. These



FIGURE 7. Feces of *Eublepharis turcmenicus* in Razavi Khorasan province in natural habitat (Field No.873) (photo by R. Babaei Savasari).

lizards move tips of tongues on snout, around of lips and eyes. Their dark feces are cylindrical, and pointed in one end. One of females (field No. 870) had two eggs, visible in ventral region; right egg is located some anteriorly. It was not laid eggs until June 28, 2015, then released all specimens in natural habitats.

Captivity. If keep with hands, emerge uric acids from cloaca and move their tails. They feed on meal worms (*Tenebrio molitor*). They are not active for feeding. The drink water with tip of tongue or tip of snout. Ecdysis continues less than one hour.

DISCUSSION

It was reported 148 lizard species from Iran, belonging to nine families (Safaei-Mahroo *et al.*, 2015). Body of eublepharids is not elongate or snake-like; both fore- and hind limbs are well developed. The skin is soft with numerous small, juxtaposed scales (Vitt & Caldwell, 2014). A curious structure in some eublepharid species is a deep axial pocket of unknown function. This is an invagination of the skin just behind the insertion of the forelimb. It is well developed in the Southwest Asian species of *Eublepharis*, but is absent in *Goniurosaurus* (Anderson, 1999). This axial pocket is very obvious in present studied *E. turcmenicus*.

The Asian *Eublepharis* occur in the Asian deserts from Iraq to northeastern India (Vitt & Caldwell, 2014). The distribution of these geckos as currently known extends primarily along the edges of the Iranian Plateau. This suggests that a once- continuous distribution has been fragmented by paleogeographic events antedating the development of the present fauna of Southwest Asia. Possibly the distributional discontinuity dates back to the uplifting of the Iranian Plateau during the Pliocene (Anderson, 1999).



FIGURE 8. Two eggs of *Eublepharis turkmenicus* in Razavi Khorasan province (Field No.870) (photo by R.Babaei Savasari).

It was not reported any subspecies in *E. turkmenicus* (Sindaco & Jemercenko, 2008). Most characters of our materials are the same as previous records. In the specimens I examined mental is followed by two large chin shields in contact with one another, or separated by a scale (Anderson, 1999). In our material, mental is followed by two large chin shields in contact with one another (2 specimens), or separated by a scale (1 specimen) or by 2 scale (1 specimen). Scales across head was reported 26-30 (n=3) (Szczerbak & Golubev, 1996), but are 22-29 in our materials (n=5). Scales around tubercles (n=4) are 10-13 (Szczerbak & Golubev, 1996), but in our material (n=5) are 11-14 in anterior dorsum, 11-16 in mid dorsum and hind dorsum. Scales along underside of body from first pair of postmental scales to vent (n=4) are 148-156 (Szczerbak & Golubev, 1996), but in our material (n=5) are 143-155.

Eublepharids with the exception of Bornean *Aeluroscalabotes* are terrestrial geckos with narrow digits, and all are nocturnal insectivores (Vitt & Caldwell, 2014). All studied materials collected at night and were terrestrial. They can climb on stone cliff slowly.

All eublepharids are surface foragers and have a clutch size of two eggs (Vitt & Caldwell, 2014). In July lays 1-2 oval white eggs with soft shells 19× 30-40 mm in size (Szczerbak & Golubev, 2003). One of three studied females had two eggs. It was visible in abdomen.

This species inhabits rocky foothills covered with thin bushes, xerophytic grassy and arboreal vegetation, up to 812 m above sea level (Szczerbak & Golubev, 2003). Snout-vent length 130mm, tail 80 mm (Anderson, 1999). Maximum body length is 143 mm in males and 135 mm in females (Szczerbak & Golubev, 1996). Snout-vent length and tail length of the Besangan male specimen was

140 and 73 mm respectively (Auer *et al.*, 2008). Snout-vent of adult male is 129.01 and of female 123.81mm in our material.

E. turkmenicus was reported only from 2 localities in north east of Iran. Our materials are the third confirmed locality of this species in Iran. This new records are located in about 170 km south west of first record and 330 km west of second record in Iran.

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