

New records of lacertid genera, *Iranolacerta* and *Apathya* (Sauria: Lacertidae) in Iran

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This report presents a new record of *Iranolacerta brandtii brandtii* from 30 km south of Tekab City, West Azarbaijan Province and 130 km south of the previously known distribution range of the subspecies; a new record of *Iranolacerta zagrosica* in Kaljonun mountain peak, Lorestan Province, about 70 km northwest of the type locality; a new record of *Apathya cappadocica urmiana* in the Manesht protected area in Ilam Province, which is the southernmost known locality of the subspecies; and a new record of *Apathya yassujica* in Pire Ghar, south of Farsan city in Chaharmahal va Bakhtiari Province, about 200 km northwest of the type locality.

Key words: Lacertidae, *Apathya*, *Iranolacerta*, Zagros Mountains, Iran

INTRODUCTION

The lacertid lizards of the former inclusive genus *Lacerta* Linnaeus 1758 (*sensu lato*) which, following Arnold et al. (2007), have been separated into five genera including *Apathya* Mehely (1907), *Darevskia* Arribas (1997), *Timon* Tschudi (1836), *Iranolacerta* Arnold, Arribas and Carranza (2007) and *Lacerta* Linnaeus (1758) encompassing approximately 31 species. The five genera and 17 species and subspecies occur in Iran in the Zagros, Alborz, and western Kopet Dagh Mountains (Anderson, 1999; Arnold, 1973; Eiselt, 1995; Eiselt et al., 1992, 1993; Rastegar-Pouyani et al., 2008; Schmidtler et al., 1994).

Among Iranian lacertid lizards, important progress in the taxonomy of *Apathya* and *Iranolacerta* has been made (Nilson et al., 2003; Rastegar-Pouyani & Nilson, 1998). *Iranolacerta* is distributed in the Azarbaijan Republic and in Iran mainly in the Zagros mountains, with three recognized species and subspecies including *Iranolacerta brandtii brandtii* (De Filippi, 1863), *Iranolacerta brandtii esfabanica* (Nilson et al., 2003), and *Iranolacerta zagrosica* (Rastegar-Pouyani & Nilson, 1998).

Apathya is distributed in southeastern Turkey, northern Iraq, and western Iran (Arnold et al., 2007; Nilson et al., 2003; Rastegar-Pouyani & Nilson, 1998) with two taxa known in Iran, *Apathya cappadocica urmiana* (Lantz & Suchow, 1934) and *Apathya yassujica* (Nilson et al., 2003).

Detailed descriptions of the genera have been presented in Arnold (1973), Anderson (1999), Nilson et al. (2003), Arnold et al. (2007), and Rastegar-Pouyani et al. (2008). This paper reports additional data on the morphology and distribution of *Iranolacerta* and *Apathya* in Iran.

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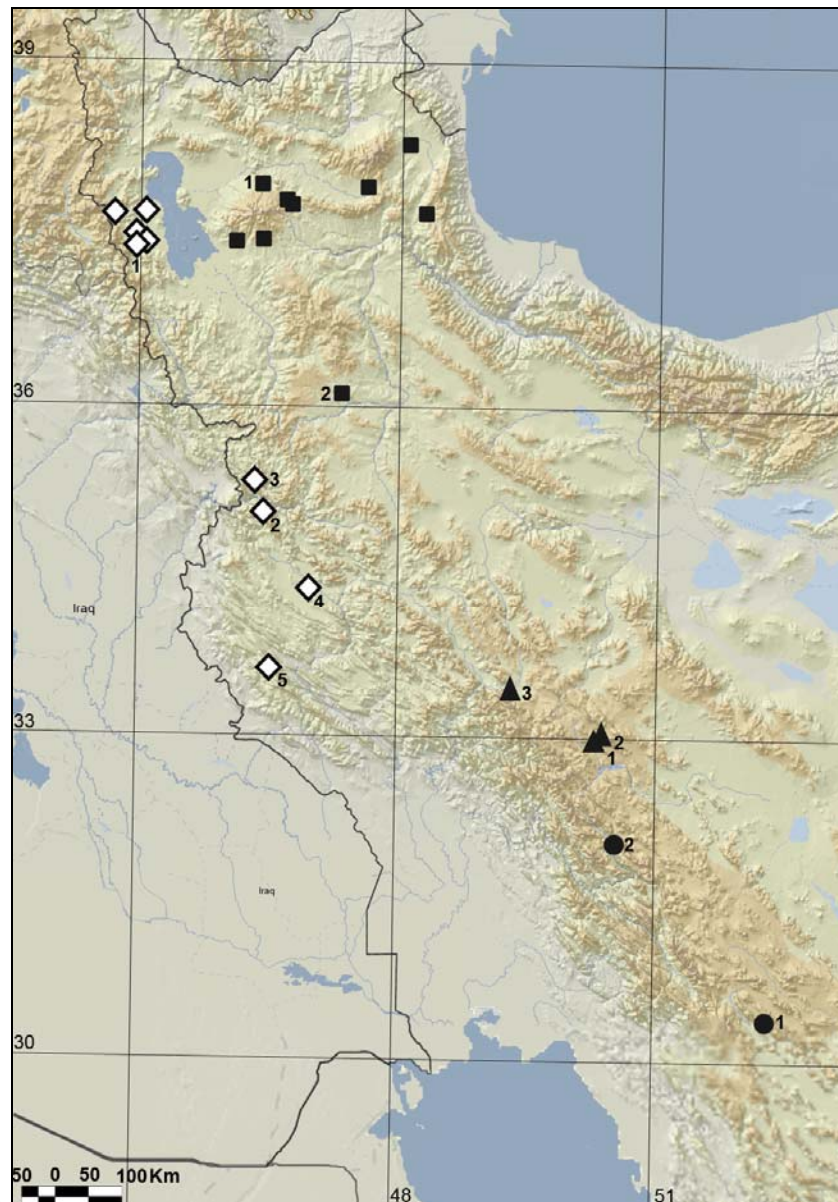


FIGURE 1. Distribution map of the newly found specimens. \diamond *Apathya cappadocica urmiana*, 1: type locality 20 km SW of Urmia city. 2: Shahu Mountains (Kermanshah Province) (Nilson et al., 2003). 3: newly found locality in Ghale-ji village (Kordestan Province). 4: Tagh Bostan Mountain (Kermanshah Province). 5: newly found locality in Manesht va Ghalarang protected area (Ilam Province). Remaining localities based on Anderson (1999). \bullet *Apathya yassujica*, 1: Type locality 30 km SW of Yasuj (Kohgiluyeh and Boyer-Ahmad Province). 2: newly found locality in Pire Ghar, south of Farsanj city (Chaharmahal va Bakhtiari Province). \blacksquare *Iranolacerta brandtii brandtii*, 1: Type locality in Basmanj, SE Tabriz (E Azarbaijan Province. 2: Newly found locality 30 km south of Tekab (W Azarbaijan Province). Remainder of marked localities are based on Anderson (1999) and Nilson et al. (2003). \blacktriangle *Iranolacerta zagrosica*, 1: Type locality 3 km NW of Fereidun Shahr (Esfehan Province). 2: newly found locality in Afus (Esfehan Province). 3: newly found locality in Kaljonun mountain peak, 20 Km south of Azna (Lorestan Province). 4: newly found locality in Kuhrang region (Chaharmahal and Bakhtiari Province).

MATERIAL AND METHODS

In extensive fieldwork throughout the Zagros Mountains during 2008 and 2009, new records of *Iranolacerta* and *Apathya* were recorded (Fig. 1). The specimens were preserved in 75% ethanol and deposited in RUZM (Razi University Zoological Museum) and ICSTZM (International Center for Science, High Technology, and Environmental Science Zoological Museum). All specimens were examined using morphological characters (Table 1). Morphological studies were carried out using a stereomicroscope and calipers measuring to the nearest 0.1 mm. Basic descriptive statistics of the examined specimens are provided (Tables 2-5).

TABLE 1. Morphological characters of *Iranolacerta* and *Apathya*

Characters	Definition
SVL (mm)	snout-vent length
TL (mm)	tail length
DS	number of dorsal scales rows at widest part of body
VR	number of ventral plates rows at widest part of body
VS	number of ventral plates
SUBX-p	number of pairs of submaxillary scales
SUP (contact with eye)	number of supralabial scales (SUP which are in contact with eye)
IFL	number of infralabial scales
SCS	number of supraciliary scales
SCG	number of supraciliary granules
GUL	number of gular scales from anterior postmentals to collars
COL	number of collar scales
FP	number of femoral pores on right femur
TMp	number of temporal scales between posterior eye and anterior tympanum
SUBL4 th T	number of subdigital lamellae under right fourth toe
SUBL4 th F	number of subdigital lamellae under right fourth finger
PN	number of post nasal scales
PPP	number of pre-prenasal plates
SEE	number of scales between eye and ear

TABLE 2. Morphological characters of newly found specimens of *Iranolacerta zagrosica*

	<i>I. zagrosica</i> (n = 6)*	RUZM barani22.1	RUZM barani22.2	RUZM barani22.3	RUZM barani22.4	ICSTZM 6H1065	ICSTZM 6H1073
Locality	Fereidunshahr	Kaljonun	Kaljonun	Kaljonun	Kaljonun	Afous	Afous
Characters							
SVL mm	54-70	67.47	71.15	76	74.68	72.90	72.94
TL mm	97-124	121.93	100.69	104.44	114.46	108.44	-----
DS	56.25±1.3	59	57	60	62	59	57
VR	9.83±0.4	10 (2)	10 (2)	10 (2)	10 (2)	10 (2)	10 (2)
VS	28.8±1.7	32	29	27	27	27	28
SUBX-p	5.71±0.5	6	6	5	6	7	7
SUP	9.0±0.0	11 (6)	12 (7)	11 (6)	12 (6)	10 (7)	10 (7)
IFL	6.6±0.8	9	10	10	10	8	7
SCS	6.5±0.5	7	6	6	6	9	8
SCG	11.83±1.2	14	12	11	12	8	9
GUL	29.8±1.1	35	31	28	29	28	30
COL	10.17±0.7	11	10	12	10	11	11
FP	20.17±1.1	22	23	22	21	19	19
SUBL4 th T	26.6±0.8	28	26	28	27	27	26
PN	1	2	2	2	2	2	2
SEE	-----	12	12	12	13	12	13

Nilson et al. (2003)

RESULTS

Iranolacerta zagrosica (Rastegar-Pouyani & Nilson, 1998)

The species is distinguished from *Iranolacerta brandtii* by a combination of the following characters: head and body strongly depressed; toes strongly compressed; presence of a single postnasal scale; presence of a short additional row of scales on each side of ventral plates increasing the number of ventral scale rows to 10. A single row of smooth scales under the toes directed ventrally (Rastegar-Pouyani & Nilson, 1998; Arnold et al., 2007). Dorsal skin color is green to olive brown with dark reticular spots. Ventral color is dark blue with dark dots. Upper surface of limbs is reticulated with a pattern of dark oval and round ocelli encompassing pale green spaces. Detailed description and morphological differences are in (Rastegar-Pouyani and Nilson, 1998; Nilson et al., 2003; Arnold et al., 2006; 2007)

NEW DISTRIBUTION

Iranolacerta zagrosica was originally described from Esfahan Province, from the mountains 3 km NW of Fereidunshahr (32°58'N, 50°04'E) at an altitude of 2450 m (Nilson et al., 2003).

Recently three new localities for *Iranolacerta zagrosica* have been identified. Two specimens were collected in Esfahan Province, NW of Fereidunshahr, in the Afus region (33°0'18"N, 50°3'47"E) at an altitude of 2200 m. about 5 km NW of the type locality of the species. Five specimens were collected in Lorestan Province, about 20 km S of Azna city at Kaljonun mountain Peak in the Oshtorankuh mountains (33°15'0.9"N, 49°25'44"E) at an altitude of 3841 m. In November 2010, two specimens of *Iranolacerta zagrosica* were collected in Chaharmahal and Bakhtiari province, Kuhrang region, Laleh valley (32°36'N, 50°11'E) at an altitude of about 2500 m.

MORPHOLOGY

The examined specimens possess a masseteric shield but not an eye window. Subdigital lamellae in all specimens are smooth. Tympanic shields are small, dorsal body scales are smooth; dorso-caudal scales keeled. Detailed morphometric and meristic data of the specimens is presented in Table 2. Color pattern in newly found specimens agrees with description of type specimen (Fig. 2).



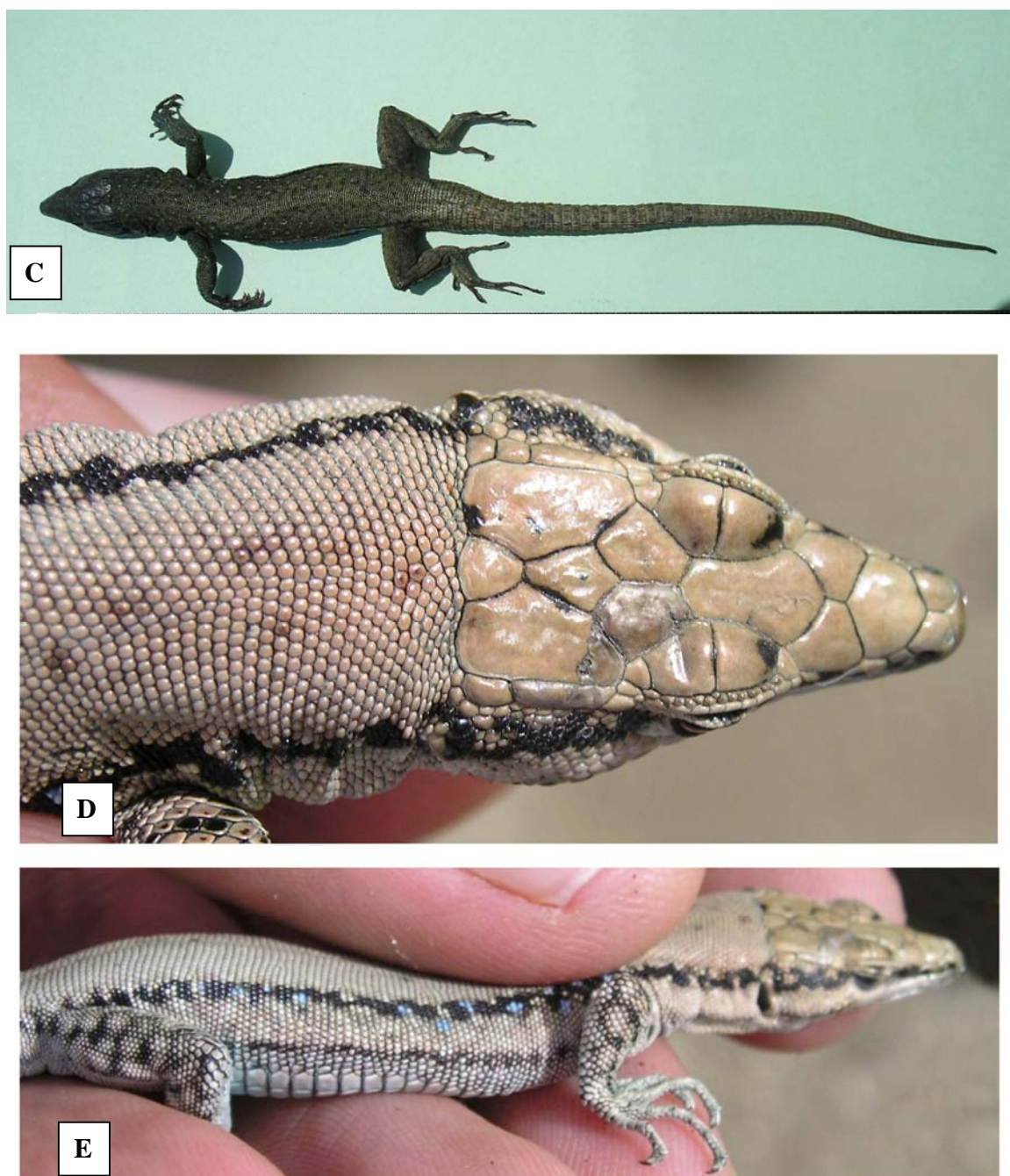


FIGURE 2. A: Dorsal view of a female *Iranolacerta brandtii brandtii* from Bijar (Photographed by Fariborz Heidary). B: Lateral view of the head of a male *Iranolacerta brandtii brandtii* from same locality. C: Dorsal view of *Iranolacerta zagrosica* from Kaljonun. D: Dorsal head of *Apathya yassujica* from Pire Ghar. E: lateral body view of *Apathya yassujica* from same locality.

HABITAT

The Afous area is on the northern slope of the type locality with ecological factors similar to the type locality. The new specimens from Lorestan Province inhabited sharp vertical rocky slopes at 3100-3900 m altitude at Kaljonun mountain Peak, a remote and harsh habitat far from public access (Fig. 3). The specimens were observed on vertical stony slopes and in crevices. In June some adults were observed performing courtship displays. The population at the mountain peak was of high density. The specimens emerged from crevices in rocks and were easily captured. *Laudakia caucasia* was the only sympatric species observed in the habitat. In Kuhrang region, specimens were collected on stonewalls made by nomads on the mountainsides. *Astragalus* sp. was the predominant vegetation, and the area was overgrazed.



FIGURE 3. Habitats of collected specimens. A: *Iranolacerta zagrosica* in ery cold environment in top of Kaljonun mountain peak. B: *Apathya cappadocica urmiana* in oak forest habitat in Manesht va Ghalarang protected area. C: *Apathya yassujica* in sparsly vegetated habitat in Pire Ghar mountain side.

Iranolacerta brandtii (De Filippi, 1863)

The species is distinguished from *I. zagrosica* by a combination of the following characters: head and body not as depressed as *I. zagrosica*; presence of two postnasal scales; presence of eight ventral scales across belly (Rastegar-Pouyani & Nilson, 1998; Arnold et al., 2007). Dorsal pattern of male's vertebral region is uniformly brownish-olive-green. There is a large ocellated bluish spot on the side of each shoulder. Dorsal part of tail is uniformly greenish, while dark blotches are visible on the dorsolaterals and adjacent margins of ventrals. Ventral side is uniformly bluish-white. In females dorsal pattern is olive-brown with dark reticulations. Tail is light brown dorsally. Dorsolateral region and adjacent margins of ventrals are brownish. Ventral region is yellowish (Nilson et al., 2003).

DISTRIBUTION

Iranolacerta brandtii was described originally from Basminsk (Basmanj) between Tabriz and Tehran in Eastern Azarbaijan Province (38°00'40"N, 46°27'35"E), Iran by De Filippi in 1863. *Iranolacerta brandtii brandtii* inhabits a relatively limited area in northwestern Iran (Eastern Azarbaijan and Ardebil Provinces) and also has been reported in the Talysh area near Lenkoran in the former Soviet Republic of Azarbaijan (Boulenger, 1920; Anderson, 1974; Bischoff, 1991; Böhme, 1993).

On 04 June 2007, two specimens of *Iranolacerta brandtii brandtii* were collected in western Azarbaijan Province, 30 km S of Tekab, on the road to Bijar. (36°11'07"N, 47°19'55"E) at an altitude of 1850 m (Fig. 1).

MORPHOLOGY

The examined specimens are without an eye window. The masseteric shield is large in the male and small in the female. Subdigital lamellae in all the specimens are smooth. Tympanic shield in the male specimen is large and small in the female. Dorsal body scales are smooth; dorso-caudal scales are keeled. Detailed metric and meristic data of the studied specimens are presented in Table 3. Color pattern of newly found specimens agrees with description by Nilson et al. (2003) (Fig. 2).

HABITAT

Iranolacerta brandtii brandtii was observed in dry stream gullies, on hillsides, and on slopes of man-made redeposited volcanic tuff. They were observed taking refuge under and among boulders and running across open fields from bush to bush (Anderson, 1999). The newly found specimens were collected around a dry stream gully near an agricultural area. These were active between 15:00-16:00 when the temperature in the area was about 25°C.

Iranolacerta brandtii esfahanica (Nilson, et al, 2003)

Detailed examination of the single population of *Iranolacerta brandtii* in Esfahan Province, Central Zagros studied by Nilson et al. (2003) allowed the description as a new taxon differing from *I. brandtii* at the subspecific level. *Iranolacerta brandtii esfahanica* differs from the nominal subspecies by the masseteric shield small or absent, a higher number of temporal scales, more longitudinal ventral plate rows, more gular scales, and a higher number of collar scales (Nilson et al., 2003). Detailed metric and meristic data of the studied specimens are presented in Table 3.

Apathya cappadocica urmiana (Lantz & Suchow, 1934)

The species is characterized by a lower eyelid consisting of 5-7 transparent shields; nostril surrounded by 3-6 scales including first supralabial; black edged scales; 7-8 (rarely 6) supraciliary scales; 52-60 dorsal juxtaposed scales at midbody position; 22-27 femoral pores; and 8 longitudinal rows of ventrals. Color pattern consists of light dots on dorsum arranged in 2-4 longitudinal rows with interrupted dark edges; light dorsolateral stripes are bluish white on dorsum and meet sharply at

TABLE 3. Major morphological characters of specimens of *Iranolacerta brandtii brandtii*

Characters	<i>I. b. brandtii</i> (n = 12)*	<i>I. b. esfabanica</i> (n = 5)*	RUZM. Bijar1.1	RUZM. Bijar 1.2
Locality		Fereidunshahr	S. Tekab	S. Tekab
SVL mm	52-67	50-68	63.92	55.44
TL mm	83-135	78-106	118.85	90.79
DS	54.33 ± 2.5	53.6 ± 2.5	51	50
VR	8.0 ± 0.0	9.2 ± 0.98	8	8
VS	29.00 ± 1.5	29.2 ± 1.6	30	29
SUBX-p	5.09 ± 0.3	5.6 ± 0.5	5	5
SUP	9.00 ± 0.0	9.4 ± 0.5	9 (6)	9 (6)
IFL	7.75 ± 1.4	7.4 ± 1.0	7	6
SCS	6.67 ± 0.6	6.8 ± 0.8	5	6
SCG	9.92 ± 0.9	9.6 ± 1.0	12	10
GUL	27.16 ± 2.5	28.2 ± 1.2	28	26
COL	9.75 ± 0.4	11.4 ± 1.0	11	9
FP	17.92 ± 1.7	17.0 ± 1.1	19	16
TMP	40.33 ± 5.7	63.2 ± 4.8	56	52
SUBL4 th T	28.58 ± 1.9	27.6 ± 1.0	27	28
PN	2	2.2 ± 0.4	2	2
PPP	6.83 ± 0.7	6.0 ± 0.6	7	7

* Nilson et al. (2003)

base of tail; tail gray or bluish gray; a row of enlarged blue ocelli on sides of body. Ventral bluish white, ventral side of tail blue (Anderson, 1999).

DISTRIBUTION

Apathya cappadocica urmiana described originally from gorges 20 km SW of Urumia City, western Azarbaijan Province. *Apathya cappadocica urmiana* inhabits a relatively small area located in mountains along and adjacent to the Iranian-Turkish-Iraqi border, also in northeastern Iraq and eastern and southeastern Turkey (Anderson, 1999). The southernmost record in Iran is from 45 km NE of Kermanshah city (Nilson et al., 2003).

Three additional specimens of *Apathya cappadocica urmiana* have been collected. A specimen (RUZM178) was collected in Kurdistan Province (35° 21' N, 46° 17'E) 25 km SE of Marivan, Ghale-Ji village, altitude 1200 m, in June, 2004. In 2004, a specimen (RUZM179) was collected from Kermanshah Province, just N of Kermanshah City, in the Taghe Bostan Mountains (34° 23'N, 47° 06'E) at an altitude of 1400 m. In October 2008 a single specimen of *Apathya cappadocica urmiana* (ICSTZM6H1190) was collected in Ilam Province, E of Ilam City, in the Manesht va Ghalarang protected area (33° 41'N, 46° 25'E) at an altitude of 1860 m (Fig. 1).

MORPHOLOGY

The examined specimens have transparent, black-edged scales on the lower eyelid. Subdigital lamellae are keeled. The overall color pattern agrees with Anderson (1999) and Nilson et al. (2003) description. Detailed metric and meristic data of the studied specimens are presented in table 4.

HABITAT

Anderson (1999) observed this species west of the Urumia Lake, on rock outcrops near small waterfalls, in a narrow gorge with steep loose rock slopes. Hillsides had overgrazed steppe vegetation as well as *Juglans*, *Pistacia*, *Crataegus* along the watercourse, around the pools. In the newly found localities in the Manesht va Ghalarang protected area, the habitat consisted of rocky

TABLE 4. Morphological characters of specimens of *Apathya cappadocica urmiana*

Characters	<i>A. c. urmiana</i> (n=10)*	(RUZM178)	(RUZM179)	(ICSTZM 6H1035)
SVL	53-76	70.0	71.5	72.0
TL	63-125	152.0	153.2	153.0
VR	8.0±0	8	8	8
DS	70.0 ± 3.6	58	61	58
FP	22.8 ± 1.8	24	24	25
SUBL4 th T	25.9 ± 0.9	26	27	28
SUBL4 th F	—	19	20	19

* Nilson et al. (2003)

TABLE 5. Major morphological characters of specimens of *Apathya yassujica* and its comparison with previous records.

Characters	<i>A. yassujica</i> (n = 4)*	Pire Ghar specimen
SVL mm	48-50	-
TL mm	98-105	-
DS	54.0 ± 1.2	-
VR	8.0 ± 0.0	8
VS	29.75 ± 1.1	28
SUP	9.00 ± 0.7	-
IFL	7.2 ± 0.4	-
SCS	7.75 ± 0.4	10
SCG	17.0 ± 3.4	13
GUL	28.5 ± 0.5	25
COL	8.5 ± 0.9	-
FP	22.0 ± 0.7	23
SUBL4 th T	25.75 ± 0.8	-
PN	2	2
PPP	6.75 ± 0.4	5

* Nilson et al. (2003)

mountainsides with *Quercus* and *Astragalus* as the predominant vegetation. Two other localities showed a similar habitat although the vegetation on Taghe Bostan Mountain has mostly disappeared due to human intervention (Fig. 3).

Apathya yassujica (Nilson, et al, 2003)

This species differs from *Apathya cappadocica urmiana* by its smaller size, lower number of dorsal scales, fewer transverse ventral plate series, fewer gular scales, fewer collar scales, and by having smooth or obtusely keeled caudal scales. Color pattern also differs: dorsal surfaces uniformly grayish beige; tail blue in sunshine and greenish in shadow; belly mint green in both sexes; throat mint green in females and yellowish-orange in males. A series of small black blotches is present on lateral body, some with 2-6 blue spots. Scattered black dots are present on hind limbs (Nilson et al., 2003).

NEW RECORDS

An adult male was recently recorded (H. Barani-Beiranvand) and photographed in Chaharmahal va Bakhtiari Province, S of Farsan City, in the Pire Ghar region (32° 13'N, 50° 32'E) at an altitude of about 2100 m. Attempts to collect live specimens in this locality in spring 2010 failed; however, we regard Pire Ghar as a new distribution range for *A. yassujica*, based on photographic evidence of the observed specimens (Fig. 1).

MORPHOLOGY

Some meristic characters were described from photographs (Table 5). Throat is yellowish; up to 11 blue spots on right side of dorsal region. Other color pattern characters agree with first description (Fig. 2).

HABITAT

The typical habitat is characterized by rocky slopes with vertical rock faces in open *Quercus* forest. In this environment *Apathya yassujica* inhabits the vertical rock surfaces (Nilson et al., 2003). The new locality in Pire Ghar is a mountainous region. The natural vegetation of the Pire Ghar region has mostly disappeared and been partially replaced by cultivated trees. Remaining natural vegetation consists of grass, mostly of family Graminae, shrubs, including *Astragalus* sp., and *Pistacia* (Fig. 3).

DISCUSSION

A sister relationship in DNA phylogeny between *Iranolacerta brandtii* and *I. zagrosica* is strongly supported by Arnold et al. (2007), although *I. brandtii* is ground dwelling while *I. zagrosica* is found on rock surfaces and in crevices. Eiselt (1979) and also Nilson et al. (2003) reviewed the systematics of *Apathya* based on their morphology. *Lacerta brandtii* De Filippi, 1863 is type species of *Iranolacerta* containing one additional species (*I. zagrosica*) and two subspecies (*I. b. brandtii* and *I. b. esfabanica*) in west-central and northwestern Iran, respectively. Also *Lacerta cappadocica* Werner, 1902 is the type species of *Apathya* with one additional species (*Apathya yassujica*) and a subspecies (*Apathya cappadocica urmiana*) in southeastern Turkey, northern Iraq, and western Iran.

This study provides valuable data about the distribution, habitat, and morphology of two poorly known lacertid lizards in the Zagros Mountains.

Iranolacerta zagrosica is an endemic lacertid which has previously been recorded only from its type locality in the central Zagros Mountains. Based on this study, the distribution of *I. zagrosica* is extended into Kaljonun mountain Peak, about 70 km northwest of the type locality. The occurrence of *Iranolacerta zagrosica* in this locality is indicative of range extension of this species into harsh, alpine habitats in the Zagros Mountains. The presence of the species in such a cold and remote habitat also suggests that occurrence of isolated populations of *Iranolacerta zagrosica* in the highlands of the Zagros Mountains is of high interest for conducting taxonomic and biogeographic studies.

Morphological examination of specimens from Kaljonun mountain Peak and comparison with topotypes as well as the Afus specimens shows that specimens belonging to the Kaljonun population possess a higher number of supralabials (11-12 compared to 9-10) and infralabials (9-10 compared to 6-8).

Apathya yassujica is also an endemic lacertid which, prior to this study, had only been reported from the type locality. The new data on occurrence of this species in Pire Ghar, about 200 km NW of the type locality, reveals a wider distribution of the species in the Zagros Mountains. Morphological examination of the Pire Ghar specimen shows that this specimen has a higher mean number of supraciliary scales (10 compared to 7.75), a lower number of supraciliary granules (13 compared to 17), a lower number of gular scales (25 compared to 28.5), and a lower number of prenasal plates (5 compared to 6.75) than the topotype population.

The newly found locality for *Iranolacerta brandtii brandtii* extends its distribution up to 130 km S of its formerly known range. Although data on individual specimens of *Iranolacerta brandtii brandtii* from different localities in Iran were not available to allow us to study patterns of clinal variation, it is interesting that two key characters distinguishing *Iranolacerta brandtii brandtii* from *Iranolacerta brandtii esfabanica* are higher number of gular and collar scales in *I. b. brandtii* than *I. b. esfabanica*. The male and female specimens of *Iranolacerta brandtii brandtii* which have been collected in Bijar, show an intermediate state.

Currently, five subspecies of *Apathya cappadocica*, have been recognized including: *Apathya cappadocica cappadocica* Werner, 1903 from south-central Anatolia; *Apathya cappadocica wolteri* Bird, 1936 from southeastern Anatolia and northern Iraq; *Apathya cappadocica muhtari* Eiselt, 1979 from E of the Euphrates to Lake Van in Turkey and S to northern Iraq; *Apathya cappadocica schmidtlerorum* Eiselt, 1979 from the vicinity of Diyarbakir and Viransehir, Turkey; and *Apathya cappadocica urmiana* Lantz & Suchow, 1934, in eastern Turkey from Siirt and Cizre, northeastern Iraq and northwestern Iran, (Anderson, 1999). It is apparent that of the widest distribution and diversity of the species occurs in Turkey, and only *Apathya cappadocica urmiana* is distributed in Iran. This subspecies was previously known only in northwestern Iran around Urumia basin in western Azarbaijan Province and Byelyaki on the Iran-Turkey border in Kurdistan Province, but new localities presented in this paper from Kurdistan, Kermanshah, and Ilam Provinces extend the distribution range of this subspecies southerly through the central Zagros Mountains and its western slopes.

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