

Range extension of four species of snakes (Ophidia: *Eirenis*, *Pseudocyclophis*, *Platyceps*) in eastern Anatolia

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Abstract. We report new locality records of *Eirenis (Pediophis) eiselti*, *E. (P.) punctatolineatus*, *Pseudocyclophis persicus* and *Platyceps collaris* in eastern Anatolia, Turkey. We recorded *Pseudocyclophis persicus* and *Platyceps collaris* in Erzincan province for the first time, representing a considerable range extension for these species. Additionally, we reported *E. (P.) eiselti* and *E. (P.) punctatolineatus* in Tunceli Province for the first time and extended their distribution.

Key words: Snakes, *Eirenis (Pediophis) eiselti*, *Eirenis (Pediophis) punctatolineatus*, *Pseudocyclophis persicus*, *Platyceps collaris*, distribution, Turkey.

Anatolia is one of the hot spots for reptile biodiversity because of its geographical history resulted in a different kind of habitats and high endemism rates. For this reason, taxonomy and distribution of Anatolian reptiles have been attracted herpetologists around the world. Scientific activities of local and foreign herpetologists have led to our present knowledge of snakes in Turkey with large herpetological surveys and recent new records and introduction of new species (eg. Ugurtas et al. 2001, Franzen & Wallach 2002, Geenier & Teynié, 2005, Olgun et al. 2007, Göçmen et al. 2007).

During our herpetological excursions in eastern Anatolia, Turkey in 2013, we have recorded new localities of *Eirenis (Pediophis) eiselti*, *E. (P.) punctatolineatus*, *Pseudocyclophis persicus* and *Platyceps collaris* and presented in this paper with their morphological characteristics and most recent distribution maps. Our new locality records make considerable range extensions of these species in Turkey.

Collected specimens were fixed and stored in 96% ethanol in order to keep DNA material more stable for future molecular phylogeny studies and deposited in the Zoology Museum of Adiyaman University (ZMADYU) in Adiyaman province, Turkey. Biometric measurements and meristic pholidolial characters are explained and presented in Table 1 and 2, respectively. The ventral plates were counted according to Dowling (1951) system. Snout-vent length and tail length were measured to the nearest millimeter using a ruler. Other morphometrical measurements were taken using a digital caliper of 0.02 mm sensitivity (Mitutoyo 500-181 U).

Eirenis (Pediophis) eiselti Schmidtler & Schmidtler, 1978

Material: ZMADYU 2013/60:1-2 (1 ♂, 1 ♀), Çemişgezek, province Tunceli, 2 May 2013, leg. B. Göçmen, B. Akman, N. İğci, M. A. Oğuz; ZMADYU 2013/63:1-3 (1 ♂, 2 ♀), Gözeler, Ovacık, province Tunceli, 2 May 2013, leg. B. Göçmen, B. Akman, N. İğci, M. A. Oğuz.

Postoculars 2, temporals 1+2 (1+3 for ZMADYU 2013/63-2, as an exception) and frenals 1 in all the specimens examined. Other morphometric and pholidolial characters are presented in Table 1 and Table 2, respectively. Morphological features of the collected specimens are in accordance with the data for *E. (P.) eiselti* given in the previous literature (Schmidtler & Schmidtler 1978, Tayhan et al. 2011, Göçmen et al. 2013, Mahlow et al. 2013). We observed *E. modestus* as a

Table 1. Biometrical measurements (mm) of *Eirenis eiselti*, *E. punctatolineatus*, *Pseudocyclophis persicus* and *Platyceps collaris* specimens examined. 1: Snout-vent length, 2: tail length, 3: rostral width, 4: rostral length, 5: distance between the nostrils, 6: pileus length, 7: pileus width, 8: anterior inframaxillary length, 9: posterior inframaxillary length.

| Specimens | Characters | | | | | | | | |
|----------------------------------------------------------|------------|-----|-----|-----|-----|------|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| <i>E. (P.) eiselti</i> (♂) ZMADYU 2013/60-1 | 240 | 72 | 2.2 | 1.3 | 2.8 | 9.07 | 5.1 | 2.7 | 1.9 |
| <i>E. (P.) eiselti</i> (♀) ZMADYU 2013/60-2 | 166 | 48 | 1.9 | 0.9 | 2.2 | 7.17 | 4 | 2 | 1.1 |
| <i>E. (P.) eiselti</i> (♂) ZMADYU 2013/63-1 | 266 | 88 | 1.3 | 2.4 | 3.4 | 10.1 | 6 | 3.1 | 2.4 |
| <i>E. (P.) eiselti</i> (♀) ZMADYU 2013/63-2 | 276 | 66 | 1.4 | 2.5 | 3 | 9.75 | 5.3 | 2.5 | 2.2 |
| <i>E. (P.) eiselti</i> (♀) ZMADYU 2013/63-3 | 210 | 65 | 1.1 | 2.3 | 2.7 | 8.57 | 4.6 | 2.4 | 2.1 |
| <i>E. (P.) eiselti</i> (♂) ZMADYU 2013/63-4 | 235 | 50 | 1.2 | 2 | 2.6 | 8.84 | 4.4 | 2.4 | 1.6 |
| <i>E. (P.) punctatolineatus</i> (juv.) ZMADYU 2013/65 | 158 | 52 | 1.6 | 1.1 | 2.3 | 8.68 | 4.5 | 2 | 1.9 |
| <i>Ps. persicus</i> (♀) ZMADYU 2013/53 | 136 | 29 | 1.2 | 0.7 | 1.8 | 5.8 | 3 | 0.8 | 1.3 |
| <i>Pl. collaris</i> (♀) ZMADYU 2013/57 | 362 | 134 | 2 | 1.1 | 2.3 | 10.3 | 5.2 | 2.3 | 3.5 |

syntopic reptile species in Ovacık. Previously known distribution range of *E. (P.) eiselti* was limited to southeastern Anatolia (Schmidtler & Schmidtler 1978, Mulder 1995, Sindaco et al. 2000). Tayhan et al. (2011) and Göçmen et al. (2013) reported this species from Van and Muş provinces, respectively. In this paper, we reported *E. (P.) eiselti* from Tunceli province for the first time, extending and confirming the range extension of this species to the north. New localities reported in this paper with previously known ones are given in Figure 1.

Eirenis (Pediophis) punctatolineatus (Boettger, 1892)

Material: ZMADYU 2013/65 (1 juv.), Munzur Valley, Ovacık, province Tunceli, 3 May 2013, leg. B. Göçmen, B. Akman, N. İğci, M. A. Oğuz.

Table 2. Meristic pholidolial characters of *Eirenis eiselti*, *E. punctatolineatus*, *Pseudocyclophis persicus* and *Platyceps collaris* specimens examined. For bilateral pholidotic features, counts were taken on the left side. 1: Preoculars, 2: supralabials, 3: sublabials, 4: temporals+dorsals around/touching the parietals, 5: collar band length (dorsal scales), 6: collar band width (dorsal scales), 7: ventrals, 8: dorsals, 9: subcaudals.

| Specimens | Characters | | | | | | | | |
|----------------------------------------|------------|---|---|----|----|---|-----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| <i>E. (P.) eiselti</i> (♂) | | | | | | | | | |
| ZMADYU 2013/60-1 | 1 | 6 | 8 | 13 | 15 | 5 | 159 | 15 | 63 |
| <i>E. (P.) eiselti</i> (♀) | | | | | | | | | |
| ZMADYU 2013/60-2 | 1 | 7 | 8 | 11 | 15 | 4 | 154 | 15 | 60 |
| <i>E. (P.) eiselti</i> (♂) | | | | | | | | | |
| ZMADYU 2013/63-1 | 2 | 7 | 8 | 9 | 15 | 5 | 154 | 15 | 64 |
| <i>E. (P.) eiselti</i> (♀) | | | | | | | | | |
| ZMADYU 2013/63-2 | 2 | 7 | 8 | 13 | 13 | 5 | 172 | 15 | 56 |
| <i>E. (P.) eiselti</i> (♀) | | | | | | | | | |
| ZMADYU 2013/63-3 | 1 | 7 | 7 | 11 | 15 | 5 | 151 | 15 | 59 |
| <i>E. (P.) eiselti</i> (♂) | | | | | | | | | |
| ZMADYU 2013/63-4 | 1 | 7 | 8 | 13 | 15 | 5 | 171 | 15 | 51 |
| <i>E. (P.) punctatolineatus</i> (juv.) | | | | | | | | | |
| ZMADYU 2013/65 | 1 | 7 | 9 | 13 | 13 | 4 | 161 | 17 | 78 |
| <i>Ps. persicus</i> (♀) | | | | | | | | | |
| ZMADYU 2013/53 | 1 | 7 | 7 | - | - | - | 203 | 15 | 64 |
| <i>Pl. collaris</i> (♀) | | | | | | | | | |
| ZMADYU 2013/57 | 2 | 8 | 9 | - | - | - | 193 | 19 | 88 |

Preocular 1, postoculars 2, temporals 1+2 and frenals 1. The dorsal ground colour is light brown with anterior dark crossbars, reducing posteriorly. Other morphological characters are presented in Table 1 and Table 2. Morphological characters of our specimen fits *E. (P.) punctatolineatus punctatolineatus* according to the data given in the literature (Başoğlu & Baran 1977, Baran 1982, Franzen & Sigg 1989, Rajabizadeh et al. 2012, Mahlow et al. 2013). In Turkey, *E. (P.) punctatolineatus* is known in southeastern and eastern regions (Fig. 2). We recorded this species from Tunceli province for the first time.

Pseudocyclophis persicus (Anderson, 1872)

Material: ZMADYU 2013/53 (1 ♀), Kemaliye, province Erzincan, 30 April 2013, leg. A. Demirsoy, Ş. Gültekin, B. Göçmen.

Preocular 1, postocular 1, temporals 1+2 and no frenals. Other morphological features are given in Table 1 and Table 2. Our specimen seems typical *P. persicus* in all pholidolial and colour-pattern features. Exceptionally, subcaudal number of our specimen is higher than previously reported data (Başoğlu & Baran 1977, Baran 1978, Baran et al. 2004b). We found 2 museum specimens in Prof. Dr. Ali Demirsoy Natural History Museum in Kemaliye, Erzincan which was collected near Kemaliye city centre. One of these specimens was taken and recorded to ZMADYU as a voucher. During our

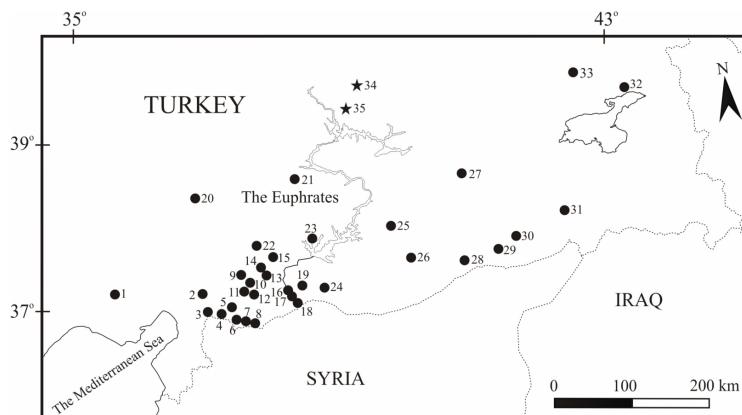
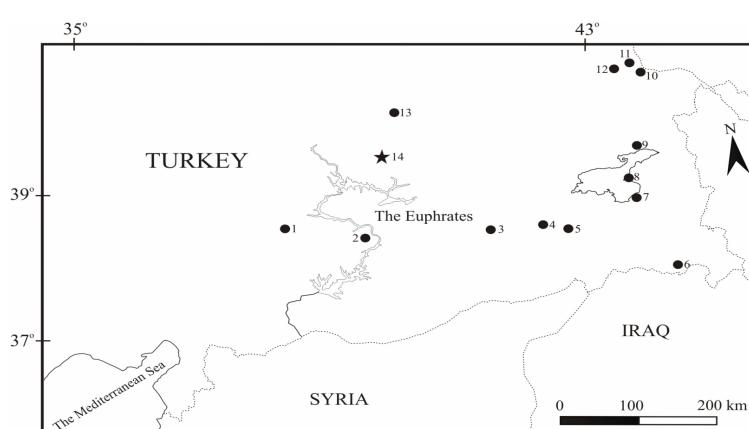


Figure 1. New localities (stars) of *Eirenis (Pediophis) eiselti* and its known distribution (circles) according to the literature (Schmidtler & Schmidtler 1978, Mulder 1995, Sindaco et al. 2000, Nagy et al. 2003, Tayhan et al. 2011, Göçmen et al. 2013).

1: Adana, 2: Hanağzi, Gaziantep, 3: between Kilis and Hassa, 4: 33 km west of Kilis, 5: Aşağıkalecik, Musabeyli, Kilis, 6: between Kilis and Gaziantep, 7: Küplüce, Kilis, 8: between Kilis and Elbeyli, 9: Karabyaklı, Gaziantep (border to Kahramanmaraş), 10: İncesu, Gaziantep, 11: Sarıslakım, Gaziantep, 12: Şehitkamil, Gaziantep, 13: Yavuzeli, Gaziantep, 14: Balık, Gaziantep, 15: between Arabat and Besni, Gaziantep, 16: Saray, Nizip, Gaziantep, 17: Nizip, Gaziantep, 18: Karkamış Dam, Gaziantep, 19: between Şanlıurfa and Birecik, 20: 24 km north of Göksun, Kahramanmaraş, 21: Malatya, 22: 30 km southwest of Gölbaşı, Adiyaman, 23: Bağpinar, Adiyaman, 24: between Suruç and Adiyaman, 25: Siverek, Şanlıurfa, 26: Viranşehir, Şanlıurfa, 27: 20 km south of Lice, Diyarbakır, 28: Kızıltepe, Mardin, 29: Mardin, 30: Midyat, Mardin, 31: Siirt (10 km west of Şırnak), 32: Erciş, Van, 33: Karakaya, Malazgirt, Muş, 34: new locality, Gözeler, Ovacık, Tunceli, 35: new locality, Çemişgezek, Tunceli.



1: Develi village, Malatya, 2: Kömürler, Malatya, 3: Silvan, Diyarbakır, 4: Baykan S, Siirt, 5: Soğanlı village, Siirt, 6: 35 km NE of Hakkari, 7: Edremit, Van, 8: Akdamar island, Van, 9: Erciş, Van, 10: Tuzluca N, İğdır, 11: Aydınkavak village, Kağızman, Kars, 12: 57 km SW of Kağızman, Kars, 13: Erzincan [point on a map by Sindaco et al. (2000)], 14: new locality, Munzur valley, Ovacık, Tunceli.

Figure 2. New locality (star) of *Eirenis (Pediophis) punctatolineatus* and its known distribution (circles) according to the literature (Başoğlu & Baran 1977, Baran 1982, Teynié 1991, Sindaco et al. 2000, Baran et al. 2004a, Rajabizadeh et al. 2012).

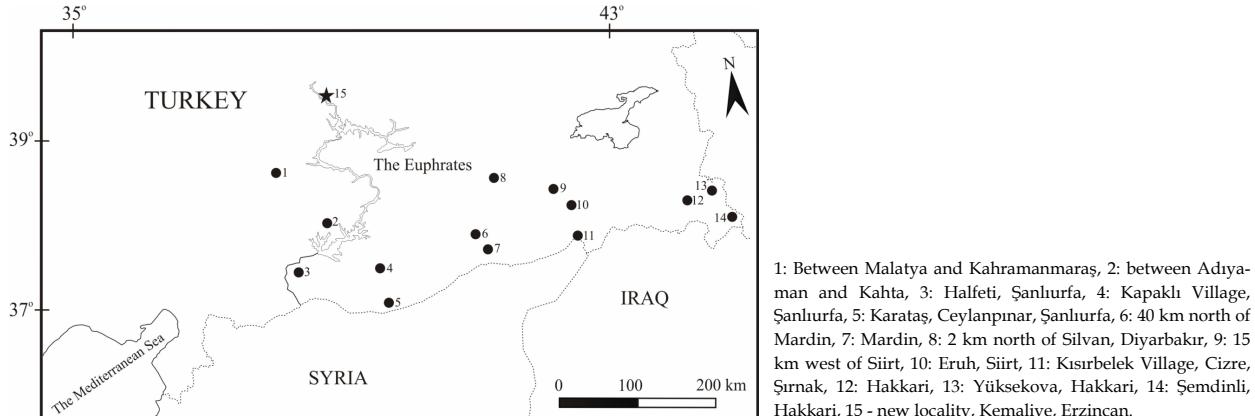


Figure 3. New locality (star) of *Pseudocyclophis persicus* and its known distribution (circles) according to the literature (Clark & Clark 1973, Baran 1976, Başoğlu & Baran 1977, Baran 1978, 1982, Teynié 1987, Budak et al. 1998, Sindaco et al. 2000, Nagy et al. 2003, Baran et al. 2004b).

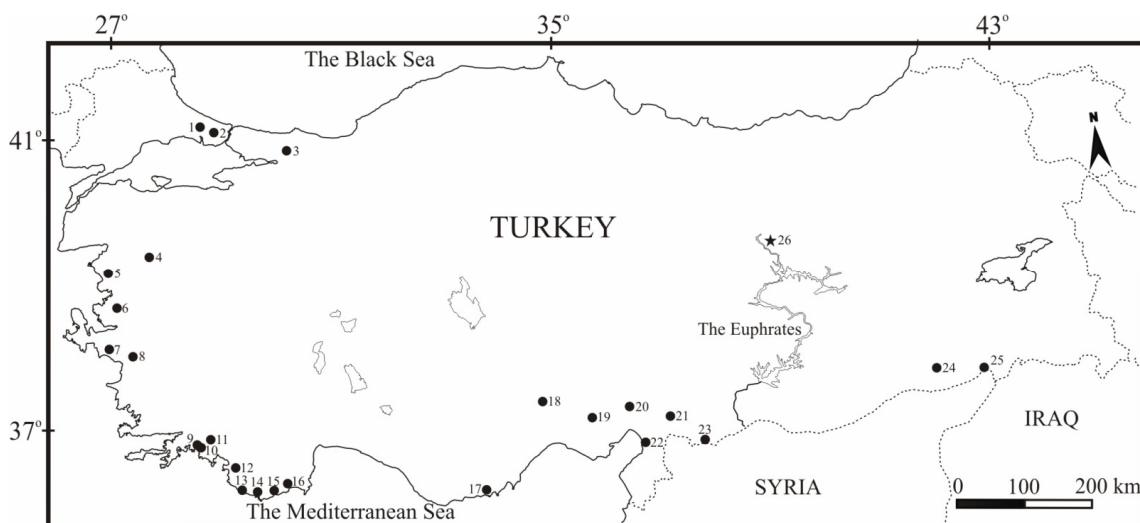


Figure 4. New locality (star) of *Platyceps collaris* and its known distribution (circles) according to the literature (Başoğlu & Baran 1977, Teynié 1987, Schätti et al. 2001, Kumlutas et al. 2004, Franzen et al. 2008, Göçmen et al. 2009, Arıkan & Çiçek 2010, Afsar et al. 2013). 1: Hadimköy, İstanbul, 2: Metris, İstanbul, 3: Orhaniye village, Kocaeli, 4: Savaştepe, Bahçeköy, 5: Dikili, İzmir, 6: Menemen, İzmir, 7: Gümüldür, İzmir, 8: Belevi, Selçuk, İzmir, 9: Ekincik, Muğla, 10: Çandır, Muğla, 11: Kavakarası, Muğla, 12: Letoon, Eşen, Muğla, 13: Snake island, Kalkan, Antalya, 14: Kaş, Antalya, 15: Finike, Antalya, 17: Büyükeceli, Mersin, 18: Bolkar mountain, Ulukışla, Niğde, 19: Çatalan, Adana, 20: Kadırılı, Osmaniye, 21: Zincirli höyük, İslahiye, Gaziantep, 22: Payas, Dörtyol, Hatay, 23: Küplüce, Kilis, 24: Midyat, Mardin, 25: Cizre, Şırnak, 26: new locality, Yeşilyamaç village, Kemaliye, Erzincan.

two days-survey in Kemaliye, we did not find any other individuals. Thus, its occurrence in Kemaliye should be confirmed with additional specimens. However, the occurrence of *P. persicus* in Kemaliye is not surprising, when we take into account its wide distribution from southeastern Anatolia and Iraq to Pakistan and northwest of India, including south of Armenia and Iran and Turkmenistan (Ananjeva et al. 2006, Budak & Göçmen 2008). In Turkey, this species is mainly distributed in southeastern Anatolia (Fig. 3). According to the map provided by Sindaco et al. (2000), there is a locality point for this snake near Malatya-Kahramanmaraş border. Our new record extends its distribution approximately 105 km air distance to the north, suggesting this snake may have a larger distribution in southeastern and eastern Anatolia.

Platyceps collaris (Müller, 1878)

Material: ZMADYU 2013/57 (1 ♀), Yeşilyamaç village, Kemaliye, province Erzincan, 30 April 2013, leg. B. Göçmen, B.

Akman, N. İğci, M. A. Oğuz.

Preoculars 2, postoculars 2, temporals 2+2, frenals 1. Other morphometrical and pholidolial characteristics are presented in Table 1 and Table 2, respectively. Our specimen is typical in all traits. Previous locality records of this species shows marginal distribution of this snake in Turkey (Fig. 1D). We recorded *P. collaris* in Erzincan province for the first time with a considerable range extension, suggesting this snake has widespread distribution in Turkey. *P. collaris* probably is similar to *P. najadum* in terms of distribution range and habitat selection.

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