

A New Distribution Record of *Eirenis walteri* (Boettger, 1888) (Ophidia: Colubridae), in Yazd province, Central Iran

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ABSTRACT

Eirenis is a species of snake belonging to the Colubridae family native to Iran. The species is characterised by a small size, with a maximum recorded body length of 90 cm. The snakes of this family are closely related to those of the genera *Dolicophis* and *Hierophis*. This is due to the fact that the snakes of these two species are of a considerable size. It can therefore be surmised that these genera share a common ancestor, and thus that pygmy snakes evolved from larger snakes. One of the species belonging to this family is *Eirenis walteri* (Boettger, 1888). The specimen was collected through field investigation and, following identification, was included in the list of snakes native to the Yazd province for the first time. In accordance with the findings of this study, the specimen in question has been included in the checklist of snakes in Yazd province. In light of the difficulties associated with mapping the distribution of the genus *Eirenis* in Iran, the inclusion of new reports of its species distribution can facilitate the creation of an accurate map of the genus's distribution. The distribution of *Eirenis walteri* encompasses eastern Iran. This study presents the first record of *Eirenis walteri* in the Bafaq Mountain Protected Area, Qatrum village (Bafaq city), Yazd province, Iran. Consequently, a distribution map of *Eirenis walteri* can be prepared using data collected through direct observation. An examination of the distribution and population of *Eirenis walteri* enables a distinction to be made between them. It is now evident that this taxon has a vast distribution in the central and eastern regions of Iran.

Keywords: Colubridae, Ophidia, *Eirenis walteri*, Morphology, Iran.

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1. Introduction

The genus *Eirenis*, as defined by Jan (1863), encompasses 20 species of colubridae, colloquially referred to as "dwarf snakes" (3). These species are distributed across a range of countries, including southern Armenia, southern Turkmenistan, southern and southeastern Turkey, eastern Iraq, Iran, and potentially Pakistan, Afghanistan, and parts of India (1, 20, 13, 19). Additionally, they are found in southeastern Europe (21, 10). Dotsenko (1989) identified two subgenera based on the number of dorsum scales at *Eirenis* (*Eirenis*), which has 17, and *Eirenis* (*Collaria*), which has 15. Three distinct morphs have been documented for this species, which are designated as the *persicus*, *walteri*, and *nigrofasciatus* morphs. The *Walteri* morph exhibits pale dark blotches on the head similar to those observed in the *Persicus* morph, in addition to narrow dorsal crossbars on the anterior portion of the dorsum that gradually disappear towards the posterior portion of the body. All *Eirenis persicus* specimens exhibiting the *persicus* and *walteri* morphologies are designated as *Eirenis persicus persicus* (Anderson, 1872). This classification is based on the findings of Dotsenko (1989, 5, 20), who demonstrated that specimens exhibiting a *walteri* pattern are predominantly female, while those displaying a *persicus* pattern are primarily male (10, 16). A review of the literature revealed that the genus *Eirenis*, comprising 13 species, exhibits the greatest diversity in Iran (17, 7, 13) (Figure 1). Conversely, other studies have indicated that the highest diversity, with 11 species, occurs in Turkey (3, 21). A minimum of ten species within this genus are identical between Iran and Turkey (22). The genus has been divided into four subgenera based on mitochondrial Cytb and 16s genes, as follows: The new subgenus *Eoseirenis* (on *decemlineatus*), *Pseudocyclophis* Boettger, 1888 (on *persicus*) and *Pediophis* Fitzinger, 1843 (on all remaining taxa) (12) are also worthy of note. The identification of characters for the *Eirenis* species is as follows: small eyes, a circular pupil in the head, the presence of a loreal plate in most species, subcaudal scales that are divided, one preocular, a dorsum that is devoid of keeled scales, and an anal plate that is divided into seven, ten, and fourteen. A review of the literature reveals that 13 species of *Eirenis* have been documented in Iran. These include *Eirenis coronella* (Schlegel, 1837), *Eirenis collaris* (Ménétriés, 1832), *Eirenis coronelloides* (Jan, 1862), and *E.* The species include *Eirenis decemlineatus* (Duméril, Bibron & Duméril, 1854), *E. kermanensis* Rajabizadeh, Schmidtler, Orlov and Soleimani, 2012, *E. medus* Chernov, 1940, *E. modestus* (Martin, 1838) (9), *E. nigrofasciatus* (Nikolsky, 1907), *E. occidentalis* Rajabizadeh et al. In 2016, the following species were recorded: *Eirenis persicus* (J. Anderson, 1872), *E. punctatolineatus* (Boettger, 1892), *Eirenis rechingeri* Eiselt, 1971 and *E. walteri* (Boettger, 1888) (15, 8, 18). An investigation by Nilson and Rastegarpouyani (11) reported the presence of *Eirenis coronelloides* in the western region of Iran. They added it to the Iranian snakes checklist based on the incidence of two

specimens of this snake in Kermanshah Province of Iran. The genus *Eirenis* is currently unrepresented in Iran, as new species and subspecies continue to be identified. For instance, *Eirenis rafsanjanicus* sp. is distinguished by genetic data (6% in Cytb) that is most similar to the recently described *E. yassujicus*, which is endemic to high-altitude regions in southern Iran (2). It is therefore imperative that all reports from all regions be taken into account. *Eirenis walteri*. In the course of this research, one of the cases that merits particular attention is the examination of the distribution of species within the genus *Eirenis*.

2. Materials and Methods

The specimen was procured from Ghotrom village (Kouh-e-Bafgh Protected Area), situated 46 km southeast of Bafgh County, Yazd Province, Iran (31°25' 18.60" N and 55° 47' 51.58"E, elevation 1540 meters) during June 2019. Over 80% of the village is comprised of arid terrain. The village of Ghotrom is situated in a geographical area comprising two distinct regions: the Bajegan Mountains and the mountain valley. The village itself is concentrated in the valley, occupying a shape that reflects its topographical location. In general, the climate of the village is moderate and arid, semi-arid, or cold semi-humid (Figure 2).

3. Results

The specimen in this research was identified by examining the scales on all aspects of the body (Figure 3). Meristic characters and mensural characters were investigated (Table 1). pending present study, additional specimens of *Walteri* dwarf snake are reported in Ghotrom village (Kouh-e-Bafgh Protected area), in Yazd Province, central Iran (Figure 4). Records show that *E. walteri* is not invader species like the other morph of this species. Meanwhile rodents can be the main preys for the *E. walteri* in the Kouh-e-Bafgh Protected area. The *Eirenis walteri* is typically observed in habitats characterised by soft sand aunes in close proximity to vegetation, including bushes and other forms of ground cover. This is likely due to the species' utilisation of these areas as refuges (Figure 6). The *Eirenis walteri* is also found in semi-arid lowlands, rocky slopes in mountainous semi-desert regions, and limestone terrain with stony, sparse grassland. The only previously known precise locality for *E. walteri* in Iran was Dehbakri, situated in the Kerman province in the south-eastern region of the country (16). This record from Bafgh represents a southward extension of the species' range by approximately x km. The addition of these records from Iran enhances our understanding of the distribution and diversity of the herpetological fauna in the region. Nevertheless, further data are required in order to gain a fuller understanding of the distribution, taxonomy and historical biogeography of *E. walteri*.



Figure 1. Current Range of *Eirenis walteri* distribution in Iran.



Figure 2. Ghotrom village in Kouh-e-Bafgh Protected area. Photo by Hamid Morad Alizadeh.



Figure 3. Different aspects of the specimen found in Yazd, Dorsal head aspect (A), Lateral head aspect (B), Ventral head aspect (C), General aspect (D).

Table 1: List of morphological characters examined in *Eirenis walteri*.

Meristic characters		Mensural characters (mm)	
DS (DS1 : DS2 : DS3)	15:15:14	SVL (Body Length (From snout to the anal plate))	267
VS (Ventral scales)	222	TL (Tail length)	96
SS (Subcaudal scales)	110	HL (Head length)	9.01
UL (L-R) (Upper labial)	7-7	HW (Head width)	3.27
LL (L-R) (Lower labial)	7-7	HH (Head height)	2.03
TE (L-R) (Temporal scales)	1 + 1 – 1 + 1		
SO (Subocular)	0		
SPO (Supraocular)	1		
PO (Preocular)	1		
PSO (Postocular)	1		
AP	Divided		

DS : Dorsal scales (DS1 is one head length behind the head, DS2 is scale rows at mid-body and DS3 is five ventrals anterior to anal plate (Babocsay, 2003).

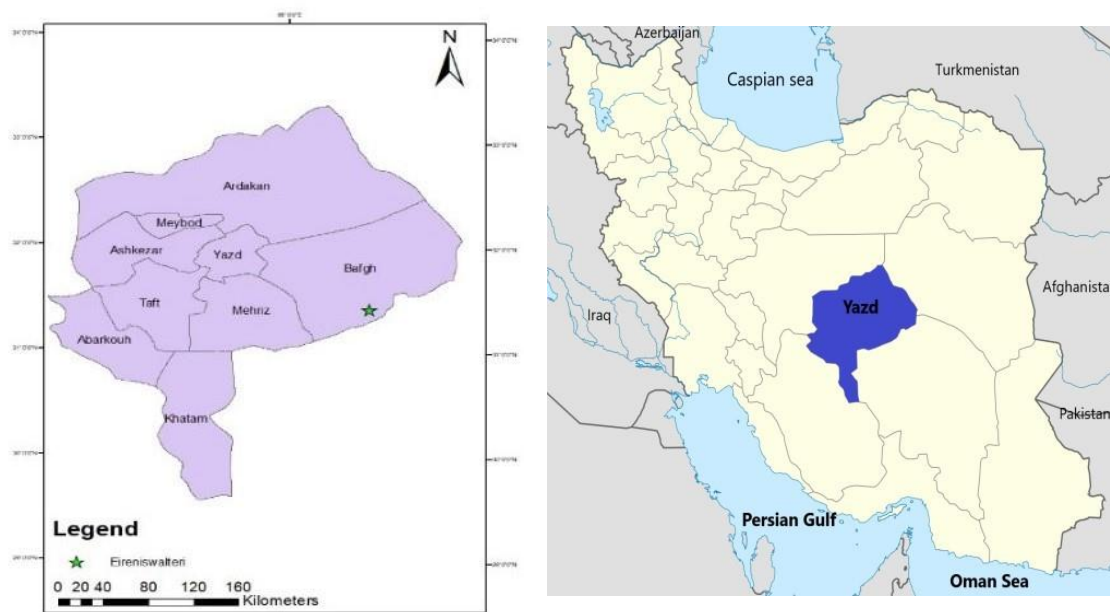


Figure 4. Location of Yazd province (blue) in central Iran (right), and accurate and approximate localities of the specimens of *E. walteri* from Ghotrom Village in Kouh-e-Bafgh Protected area (left).



Figure 5. Habitat of *E. walteri* at a locality, Ghotrom village that 46 km southeast of Bafgh County, Yazd Province, southeast Iran. Photo by Hamid Morad Alizadeh.

4. Discussion

It is noteworthy that Zare Khormizi (2023) included the *E. walteri* among the snake fauna of Yazd province based on the specimen of this species in this research. The genus *Eirenis* of dwarf snakes represents a critical group within the Colubridae family of snakes. The presented paper introduces new distribution records for the *Eirenis walteri* species and provides an updated, annotated list of the *Eirenis* species currently known from Iran. As previously reported by Rajabzadeh (16), the distribution of *E. walteri* is believed to be extensive, encompassing central and eastern areas of Iran. This conclusion is supported by the current report from Yazd Province (Figure 5). In a previous study, Rajabzadeh (16) simulated the distribution of the dwarf snake *Eirenis persicus* (Anderson, 1872), which included the eastern region of Iraq, southern and southeastern Turkey, southern Armenia, southern Turkmenistan, Iran, southern Turkmenistan, and potentially parts of Afghanistan, Pakistan, and northwestern India. The presence of this snake in the centre of Iran may represent the final component of this extensive distribution, thus increasing the geographical range of the Walters dwarf snake from the east to the centre of Iran. Based on this research, Yazd province is included within the distribution range of the *Eirenis walteri* species.

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Authors' Contribution

Study concept and design: A.S, M.Z

Acquisition of data: A.S, M.Z

Analysis and interpretation of data: A.S, A.T

Drafting of the manuscript: M.J, A.T

Critical revision of the manuscript for important intellectual content: A.S, M.Z

Statistical analysis:

Administrative, technical, and material support:

Study supervision: A.T

Ethics

Ethics committee of the Razi Vaccine and Serum Research Institute (No. RVSRI.REC.98.016).

Conflict of Interest

The authors declare that they have no conflict of interest.

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Data Availability

The data that support the findings of this study are available on request from the corresponding author.

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