

Rediscovery of the snake genus *Eirenis* on Cyprus (Reptilia: Colubridae)

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Abstract. In April 2007, three *Eirenis (Pediophis) levantinus* SCHMIDTLER, 1993 were collected in the western part of the Kyrenia Mountains near Lapethos, Cyprus, in a Mediterranean mountainous forest. It is the first collection since KOTSCHY's expeditions ca. 150 years ago. Like most new (re)discoveries of snakes on Cyprus (*Hierophis cypriensis*, *Natrix natrix cypriaca*, *Platyiceps najadum*), this species must be considered as rare, with a restricted distribution area. Dwarf snakes were first recorded from Cyprus (identified as *Ablabes modestus*) by STEINDACHNER (1863) and UNGER & KOTSCHY (1866). A further specimen was even depicted by JAN & SORDELLI (1866; under the name „*Eirenis collaris*“), but no exact localities were given. Subsequently dwarf snakes were treated as erroneously reported or simply forgotten, due to the lack of more recent observations. The specimens recently found by us, morphologically (pileus pattern) as well as genetically (cytochrome *b* sequences), resemble *Eirenis levantinus*, and they are especially similar to the specimens inhabiting the opposite eastern Turkish mainland (Amanos and Misis mountains, respectively). The possibilities of immigration over a Kyrenia-Misis land bridge in the “Kyrenian-Misis zone” or by passive dispersion are briefly discussed. A further dwarf snake taxon – excellently depicted and originating from Cyprus, but forgotten later on (JAN & SORDELLI 1866: „*Eirenis modestus* var. *quadrilineata*“ – may be identical to or closely related to the mainland species *Eirenis (Eoseirenis) decemlineatus* (DUMÉRIL & BIBRON, 1854).

Key words. Reptilia, Colubridae, *Eirenis levantinus*, rediscovery, Cyprus.

Introduction

The herpetofauna of Cyprus appears to be a depleted and characteristically modified copy of that of the eastern Levantine coastal region. The majority of the taxa are either identical or closely related in both regions according to our present knowledge. One of the main characteristics is the rarity of amphibians and hydrophilic reptiles, compared with the opposite eastern mainland. In retrospect, the beginning of exploration in the 19th century exhibits an inextricable pack of rarities becoming extinct, early confusions of localities and names, and misidentifications. Even the early faunistic lists by STEINDACHNER (1863) and UNGER & KOTSCHY (1865) are puzzling. In the first list of STEINDACHNER (1863), allegedly based on the result of UNGER & KOTSCHY's expeditions, species like

„*Tropidonotus hydrus*“ (today *Natrix tessellata*), „*Coluber dahli*“ (*Platyiceps najadum*) and „*Ablabes modestus*“ (today any *Eirenis* species) appear. The species list published by UNGER & KOTSCHY (1865) lacks *Ablabes modestus* but it includes some European species like *Rana temporaria*, *Bufo vulgaris* (= *Bufo bufo*), *Anguis fragilis*. The reliability of both lists, as well as that of further discoveries and statements in literature, was repeatedly disputed. During the last few decades the scene has been clarified. In particular, the presence of the three rather rare amphibian species (SCHMIDTLER 1984, BÖHME & WIEDL 1994, GÖÇMEN et al. 1996) and of three snake species, *Natrix natrix cypriaca* (BLOSAT 1998), *Platyiceps najadum* (GÖÇMEN et al. 1996) and *Hierophis cypriensis* (SCHÄTTI & SIGG 1989) has been confirmed. In addition, new evidence for the presence of *Natrix tessella-*

ta in Cyprus has been revealed by GÖÇMEN & BÖHME (2002) based on the old museum material originated from 1960s in addition to the first records given by UNGER & KOTSCHY (1865) and CECCONI (1899). Nevertheless, the presence of dwarf snakes has remained unclear. In the following, the publication history of two species of the colubrid genus *Eirenis* – exemplary for this Eastern Mediterranean Island – will be presented.

Material and methods

Two scientific excursions to northern Cyprus were carried out in April and July 2007. Three dwarf snake specimens were collected from the Selvili Tepe (= Kornos), Kyrenia. All specimens were anaesthetised with ether, fixed by 96 % ethanol injection into the body cavity and deposited in 96% ethanol (YILDIZ et al. 2007). The specimens are deposited in the Zoological Department of the Ege University (ZDEU). The following material was examined: *Eirenis levantinus* (n = 3): ZDEU 199/2007, 1 (f), 2 (m), 3 (f), Selvili Tepe (= Kornos), Lapethos, (Kyrenia Mountain Range), Kyrenia District, N. Cyprus, 04.04.2007, air temperature 19 °C, leg. B. GÖÇMEN, M.Z. YILDIZ, D. YALÇINKAYA, B. AKMAN. All specimens were collected from the northern slopes of the Kyrenian Mountains at various elevations

(801 m, 938 m and 838 m, respectively) at the coordinates approximately 35°19' N, 33°09' E / 33°10' E. Data on the vegetation of the collection area are given in Table 1.

Several meristic, pholidotic and metric data and patterns were recorded in accordance with SCHMIDTLER & EISELT (1991) and SCHMIDTLER (1993). All pholidotic features were examined using a stereo microscope. Morphological measurements, except snout-vent lengths and tail lengths, were recorded using a digital calliper with an accuracy of 0.01 mm. SVL and TL were measured to the nearest millimetre using a ruler. The exact locality of the specimens was detected by GPS receiver. Data on colour patterns (and photos) were recorded on living animals.

Results and discussion

Eirenis (Pediophis) levantinus SCHMIDTLER, 1993

Early evidence of *Eirenis* in Cyprus

The early observations of „*Ablabes modestus*“ by Steindachner (1863) in Cyprus were already reported above. At the same time, JAN (1863a, b) and JAN & SORDELLI (1866: p. 10 and 15, livr. pl. IV) mentioned „*Eirenis collaris*“. In the latter, forgotten work, they also published an excellent drawing of a speci-

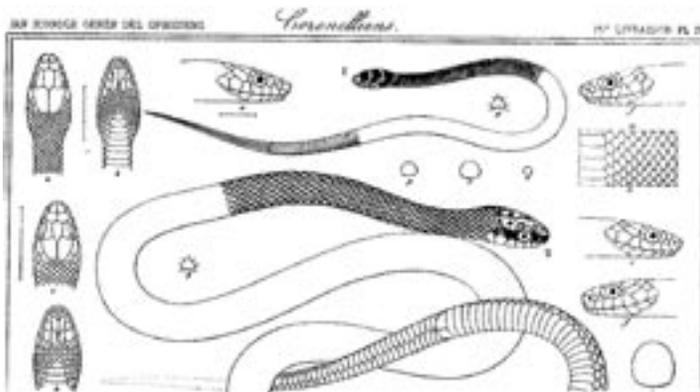


Fig. 1. „*Eirenis collaris*“ (= *E. levantinus*) from Cyprus, in JAN & SORDELLI (1866: 15. livr., pl. IV, fig. 1; upper part).

Tab. 1. Vegetation of Selvili Tepe, Cyprus during the spring period (by Dr. SALIH GÜCEL / Near East University, N. Cyprus, Nicosia); see Fig. 4.
* Endemics for Cyprus.

| Species | English name |
|---|-------------------------------|
| <i>Pistacia lentiscus</i> | Mastic tree, lentisk |
| <i>Pistacia terebinthus</i> | Terebinth, turpentine tree |
| <i>Nerium oleander</i> | Oleander |
| <i>Cistus creticus</i> | Gum cistus |
| <i>Cistus parviflorus</i> | Pink cistus |
| <i>Cistus salviifolius</i> | Sage-leaved cistus |
| <i>Umbilicus rupestris</i> | Wall pennywort, navelwort |
| <i>Brassica hilarionis</i> * | St Hilary cabbage |
| <i>Bryonia cretica</i> | White bryony |
| <i>Cupressus sempervirens</i> | Cypress |
| <i>Juniperus phoenicea</i> | Phoenician juniper |
| <i>Echinops spinosissimus</i> | Echinops |
| <i>Carduus pycnocephalus</i> | Thistle |
| <i>Ptilostemon chamaepeuce</i> var. <i>cypricus</i> * | Cyprus shrubby ptilostemon |
| <i>Quercus coccifera</i> | Kermes Oak |
| <i>Micromeria myrtifolia</i> | Stone mint |
| <i>Prasium majus</i> | White hedgenettle |
| <i>Scutellaria sibthorpii</i> * | Cyprus skullcap |
| <i>Calycotome villosa</i> | Spiny broom |
| <i>Genista sphacelata</i> | Thorny Gorse |
| <i>Asphodelus aestivus</i> | Summer Asphodel |
| <i>Smilax aspera</i> | Green Brier |
| <i>Myrtus communis</i> | Myrtle |
| <i>Olea europaea</i> | Olive |
| <i>Papaver rhoeas</i> | Corn poppy |
| <i>Pinus pinea</i> | Stone pine |
| <i>Pinus brutia</i> | Calabrian pine |
| <i>Crataegus azarolus</i> | Azarole |
| <i>Asperula cypria</i> * | Cyprus woodruff |
| <i>Crucianella latifolia</i> | - |
| <i>Rubia laurae</i> * | Cyprus madder |
| <i>Rubia tenuifolia</i> | Narrow-leaved madder |
| <i>Antirrhinum majus</i> | Snapdragon |
| <i>Pimpinella cypria</i> * | Cyprus Anis |
| <i>Torilis tenella</i> | - |

men called „*Eirenis collaris* 1. Typique“ from „Île de Chypre – Musée de Milan“ (Fig. 1 *hoc loco*). Apart from the number of dorsals (17), pholidotic or metric data were not given. This specimen exhibits long and acute frontal endings of the collar, as it was described later on as characteristic for many *E. levantinus* by SCHMIDTLER (1993); see below. Subsequently, BOULENGER (1910) noted „*Contia collaris*“ as belonging to the fauna of Cyprus. Much later, CLARK (1963) reported a new sight record of „*Eirenis modestus*“ from Cyprus neither giving an exact locality nor a description. BARAN (1980: 62) reported five specimens from Cyprus (without exact locality data; Naturhistorisches Museum Wien, NMW 20178: 1-5; coll. KOTSCHY 1862), identified as „*Eirenis modestus*“. OSENEGG (1989: 152) investigated these specimens and discussed their classification, comparing them with *E. modestus* from different mainland localities and with the recently described *E. barani* SCHMIDTLER, 1988 from South Anatolia. She finally accepted the classification of these specimens as *E. modestus* but doubted their Cypriot origin (based on her own extensive researches). She also believed that KOTSCHY's collection was geographically confused and proposed to remove *Eirenis modestus* from the list of the Cypriot fauna. After personal researches in Cyprus, SCHÄTTI & SIGG (1989: 15) concluded that old records of *Eirenis* were questionable; BÖHME & WIEDL (1994: 36) thought *Eirenis* spp. to be absent from Cyprus.

In 1993, SCHMIDTLER described a new Levantine dwarf snake under the name *Eirenis levantinus* (terra typica: 6 km SW Karaisalı, Adana province, Turkey) with a distribution southwards to northernmost Israel. He also investigated the specimens deposited in NMW, and stated that they were morphologically similar to the specimens of *Eirenis levantinus* from the Amanos Mountains in Turkey. Nevertheless, he thought its presence in Cyprus to be questionable. ATATÜR & GÖÇMEN (2001) published a sight record of „*Eirenis modestus*“, „apparently an uncommon species“, from Lapethos-Kyrenia (Northern Cy-



Fig. 2. *Eirenis levantinus* (ZDEU 199/2007, Nr.1). female, from Selvili Tepe (=Kornos), N. Cyprus.



Fig. 3. *Eirenis levantinus* (ZDEU 199/2007, Nr.2) male, from Selvili Tepe (=Kornos), N. Cyprus.

prus), which was also observed by one of us (GÖÇMEN, in March 1997). This specimen was found in the westernmost part of the Kyrenia mountain range, the northern one of the two mountain ridges in Cyprus. Unfortunately, this specimen could not be collected. It escaped into a compact blackberry shrub within a rocky area (ca. 440 m a.s.l.), where rainwater was flowing. Since then, the same locality has been visited repeatedly, however without any success.

New observations in 2007

Ten years after the first sight of an *Eirenis* specimen, on 4 April, 2007, the area of Selvili Tepe (= Kornos) was surveyed vertically upwards by four of us (GÖÇMEN, YILDIZ, AKMAN, YALÇINKAYA). We were able to collect three *Eirenis* specimens at altitudes between 801 and 938 m a.s.l. (Figs. 2, 3). The specimens were found under stones in a densely forested mountainous area, with rich Mediterranean vegetation, typical for this northern Cypriot mountain ridge (see Fig. 4 and Tab. 1 for vegetation data). The ground consists of loose

substrate on limestone, enriched by organic wastes derived from the leaves of cypresses and terebinth trees. In the same area the following reptiles were also collected: *Ophisops elegans schlueteri*, *Ablepharus budaki budaki*, *Trachylepis vittata*, *Macrovipera lebetina lebetina*, *Malpolon insignitus*. At some distance, frogs of the *Pelophylax ridibundus* complex were seen in spring waters and man-made pools. According to our observations, *Eirenis*



Fig. 4. Biotope of Selvili Tepe (Kyrenia Mountain Range), Lapethos-Kyrenia, N. Cyprus, 801 -938 m a.s.l.

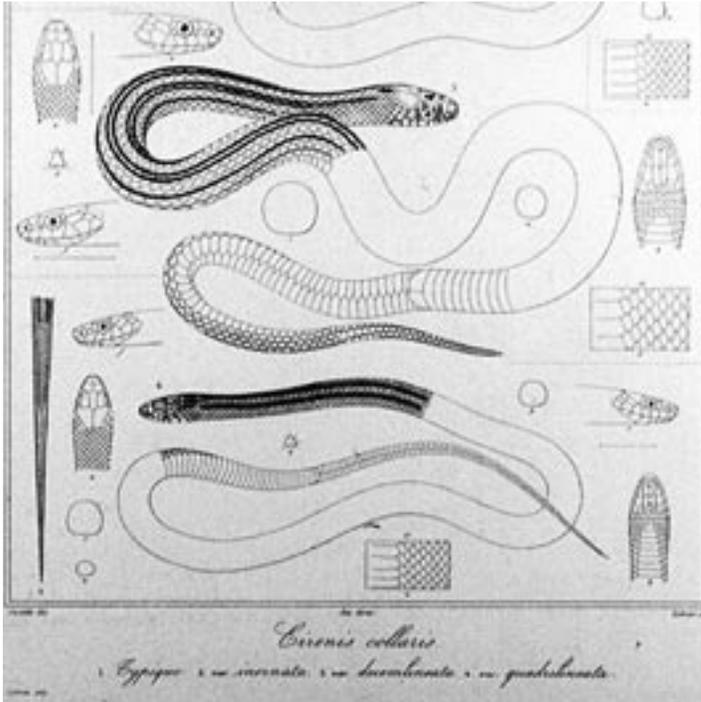


Fig. 5. „*Eirenis collaris* var. *quadrilineata*“ (probably *E. decemlineatus*) from Cyprus in JAN & SORDELLI (1866: 15. livr., pl. IV, fig.4; lower part).

levantinus seems to be rare in the Kyrenia mountains, but not only „rarely seen“ due to its hidden life style. Its activity in and close to open areas may be restricted to a short interval in March and April. Compared with the opposite Turkish mainland, *Eirenis* seems to prefer cooler air conditions at higher elevations in Cyprus. *Eirenis* might be even rarer than the skink *Eumeces schneiderii*. In the case of the latter species, only eight specimens were collected during the last 20 years (GÖÇMEN et al. 2002 and further unpublished observations) in the northern parts of the island.

Relationships of the Cypriot specimens

As stated before, the specimens collected by KOTSCHY in Cyprus belong to the recently described *Eirenis levantinus*, resembling

populations from the Amanos Mountains in southern Turkey (SCHMIDTLER 1993). Similarly the three specimens collected in 2007 also belong to *E. levantinus*. The large variation in their pileus pattern is very similar to that of the specimens from the Turkish Misis mountains (eastern Adana province) and the Amanos mountains between Osmaniye and Iskenderun (interocular band in two broad contacts with the parietal band or not in contact with the parietal band; supralabial projection of the collar band acute and long or not so; collar band with a gular projection or lacking such; Figs. 2 and 3; Tab. 2). In topotypical specimens from the Bolkar Mountains, the pileus pattern is uniform (interocular band in two broad con with the parietal band; supralabial projection of the collar band acute and long; collar band without a gular projection). *Eirenis levantinus* specimens from the southern Levantine region are quite different

Tab. 2. Data from three specimens of *Eirenis levantinus* from Selvili Tepe, N. Cyprus. Note: 'Preocular has a notch approximately at mid-level vertically in all specimens (emphasising a division into two parts).

| Voucher specimens: | ZDEU | ZDEU | ZDEU |
|---|-----------------|-----------------|-----------------|
| | 199/2007-No.1-♀ | 199/2007-No.2-♂ | 199/2007-No.3-♀ |
| Snout-vent length | 357 | 290 | 271 |
| Tail length | 99 | 90 | 62 |
| Pileus length/Pileus width | 11.97/5.64 | 10.72/4.88 | 10.40/4.38 |
| Frontal length/frontal width | 3.84/2.31 | 3.84/2.28 | 3.25/1.94 |
| Length of anterior inframaxillary | 3.84/4.24 | 3.61/3.35 | 2.88/2.95 |
| Length of posterior inframaxillary | 2.84/2.63 | 2.38/2.13 | 2.29/2.18 |
| Supralabials | 7/7 | 7/7 | 7/7 |
| Infralabials | 8/8 | 8/7 | 8/8 |
| Frenal touches supralabial no 1.2.3. | 2./2. | 2./2. | 2./2. |
| Preoculars | 1/1* | 1/1* | 1/1* |
| Postoculars | 2/2 | 2/2 | 2/1 |
| Temporals in 1 st -2 nd -3 rd vertical row (touching each other) | 1-2-3/1-2-3 | 1-2-3/1-2-2 | 1-2-3/1-2-2 |
| Temporals + dorsals touching parietals | 9 | 11 | 11 |
| Gular(s) touching anterior inframaxillaries | 1 | 1 | 1 |
| Gulars in a transverse row between last two infralabials | 10 | 11 | 12 |
| Dorsals around midbody | 17 | 17 | 17 |
| Ventrals | 161+3 | 154+2 | 164+2 |
| Subcaudals | 63 | 65 | 54 |
| Frenals | 1/1 | 1/1 | 1/1 |

with respect to morphological and genetic data (NAGY et al. in prep.). In this context, it is most interesting that the three specimens from the Kyrenia range show identical haplotypes (based on cytochrome *b* sequences) which are most similar to the haplotype known from the Misis mountains (south of Ceyhan, Adana province). The haplotypes of both regions are more similar to each other than to the haplotypes from the more eastern Amanos mountains at Osmaniye and Bahçe. The fact of genetic and morphological similarities of specimens from the Kyrenia range and the mainland Misis mountains gives rise to a discussion on their historical connections and on the colonisation of Cyprus by reptiles in general. The colonisation of Cyprus by reptiles has already been discussed by OSENEGG (1989), BÖHME & WIEDL (1994) and BĽOSAT (1998). The relevant question is

the possibility of immigration via land bridges and / or random rafting. In the meantime, our knowledge of the systematics and phylogenetic relationships of Turkish and Cypriot amphibians and reptiles has been enhanced, especially by the use of molecular genetic methods (e.g. in the cases of *Bufo variabilis*, *Phoenicolacerta laevis*, *Eirenis*). There is also new data available on the geological history of the Eastern Mediterranean region (e.g. ÖZEL et al. 2007). Admittedly, our questions on the most recent possible land bridges do not seem to have been addressed nor resolved in the last few years. In that regard however, our data on *Eirenis levantinus* might become an important milestone. For further discussion, three apparently conflicting points seem to be relevant: the well established geo-historical connection between the Kyrenia and Misis mountains (Cyprus / Anatolia; e.g. ÖZEL

et al. 2007), where similar *Eirenis* populations exist (at first glance, it is more likely an argument for an immigration over a former land bridge). Paradoxically, the similarity between the haplotypes from the Kyrenia and the Misis mountains (NAGY et al. in prep.) appears to be contradictory: even without an exact calibration, a separation of these populations might not have happened earlier than in the late Pleistocene; but there is consensus that the last land bridge(s) should have existed much earlier, in Tertiary times (e.g. ÖZEL et al. 2007). On the other hand, due to the strictly cryptic life style of *E. levantinus* (SCHMIDTLER personal observations) in both of the middle parts – and not in coastal areas – of the Kyrenia range and in the mainland Misis mountains, a passive dispersal over the sea seems rather unlikely.

Eirenis (Eoseirenis) decemlineatus
(DUMÉRIL & BIBRON, 1854)

The description of „*Eirenis collaris* var. *quadrilineata*“ from Cyprus was made in three stages: a very short description without any distinguishing characters from the other varieties *decemlineata* and *inornata* (JAN 1863a); a second one on the two *quadrilineata* specimens from the Natural History Museum of Munich with data on the dorsal pattern (four dorsal black lines), including some morphological data on the larger specimen (total length 60”, tail 16”) possessing 177 ventral and 76 subcaudal scales (JAN 1863b); and the third part including an excellent figure of the larger dwarf snake specimen (JAN & SORDELLI 1866; Fig. 5 *hoc loco*) showing head, body and different sides of the pileus. MÜLLER (1878: 595) mentioned this form as a variety of *Eirenis decemlineatus*, while BÖTTGER (1880: 147) described it as a variety of „*Ablabes modestus*“ and referred some further specimens from Palestine. Later on, these figures of „*quadrilineata*“ from Cyprus, published in the famous but extremely rare monumental series of JAN & SOR-

DELLI (1860-1881, 50 „livraisons“), were forgotten. The two type specimens of the Cypriot „*quadrilineata*“ could not be traced in the Zoologische Staatssammlung München, which housed most of the specimens of the „Museo di Monaco“, neither in the old catalogues, nor in the collection (personal observation and M. FRANZEN personal communication). They were therefore not included in the most recent type catalogue (FRANZEN & GLAW 2007).

The form „var. *quadrilineata*“ is still awaiting its rediscovery in Cyprus, though confusion on locality data cannot be excluded. The large total length (60” = about 60 cm) as well as the high numbers of ventrals (177 in both specimens) and subcaudals (76, 70, respectively) indicate closer similarities to the Southern Levantine form of *Eirenis decemlineatus* (and to the holotype of „*Ablabes decemlineatus*“ DUMÉRIL & BIBRON, 1854) rather than to the Turkish form (see SCHMIDTLER & EISELT 1991: 228; Tab.1 for comparison of southern and northern forms). At least the close relationships between „*quadrilineata*“ and the mainland *Eirenis decemlineatus* (now within the subgenus *Eoseirenis* NAGY et al. 2003) is without doubt. We may notice that the Mediterranean – Levantine distribution of *Eirenis levantinus* and *E. decemlineatus* (from the Turkish province of İçel / Mersin southward to the north of Israel), shows remarkable similarities. When both species co-exist, the larger *E. decemlineatus* occurs much more infrequently.

Moreover, our knowledge on the occurrence of recently described or revalidated taxa of *Eirenis* is continuously increasing: At present, beside *E. levantinus* and *E. decemlineatus*, ca. seven taxa of the genus *Eirenis* are known in the mainland regions at the opposite side of Cyprus: *Eirenis (E.) aurolineatus* (VENZMER, 1919), *E. (E.) modestus semimaculatus* (BÖTTGER, 1876), *E. (E.) modestus ciliatus* SCHMIDTLER, 1993, *Eirenis (Pediophis) b. barani* SCHMIDTLER, 1988. Especially in the southern part of the Levantine region, *E. (Pediophis) rothi* JAN, 1863, *E. (P.) lineomac-*

ulatus SCHMIDT, 1939, and *E. (P.) coronella* (SCHLEGEL, 1837) (SIVAN & WERNER 2003) occur near coastal areas.

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