



**A first record from Yeşilkent (Nurhak, Kahramanmaraş/Turkey) : *Helix (Pelasga) pathetica* (Gastropoda, Helicidae)**

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**Abstract**

*Helix (Pelasga) pathetica* Mousson 1854, found at one locality in the town Yeşilkent (Nurhak), is firstly recorded from Kahramanmaraş, Turkey. It is a helicid land snail species that rarely comes across, shows a restricted distribution with middle-northern parts of Inner Anatolian Region and is endemic to Anatolia. This record is of quite significant because of being a species rarely encountered in Turkey. By giving information about figures, measurements and genital morphological data of this species, it was compared with other *Helix (Pelasga)* species.

**Key words:** Morphology, *Helix*, Nurhak, Kahramanmaraş, *Helix (Pelasga) pathetica*

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**Yeşilkent (Nurhak, Kahramanmaraş)'ten ilk kayıt: *Helix (Pelasga) pathetica* (Gastropoda, Helicidae)**

**Özet**

Yeşilkent (Nurhak)'te bir lokalitede bulunan *Helix (Pelasga) pathetica* Mousson 1854, Kahramanmaraş, Türkiye'den ilk defa kaydedilmiştir. Bu tür, İç Anadolu Bölgesi'nin orta-kuzey kısımlarında yayılış gösteren ve Anadolu'ya endemik bir salyangoz türüdür. Bu kayıt, türün yayılışı bakımından oldukça önemlidir. Tür hakkında şekiller, ölçümler ve genital sisteme ait veriler sunulurken diğer *Helix (Pelasga)* türleri ile karşılaştırılmıştır.

**Anahtar Kelimeler:** Morfoloji, *Helix*, Nurhak, Kahramanmaraş, *Helix (Pelasga) pathetica*

**1. Introduction**

The genus *Helix*, of which diversity center is especially in northerneast Mediterranean (Korábek, 2011), contains the land snail species with a Palearctic distribution and forms the most diverse and widespread genus within the family Helicidae in Turkey. Reproductive powers of its species as well as the ease with which its species adapt themselves to circumstances of climate and environment new to them are remarkable. These capabilities have fitted them for meeting widely diverse contidions of existence (Pilsbry, 1894) so that it often exists diverse geographical forms that make the determination of their systematical status difficult.

The taxonomy of *Helix* is mainly based on the genital morphology and conchological characteristics, which show intraspecific variability among close morphs, reflecting both internal and environmental factors. Based on primarily morphological characteristics of genital system, distribution patterns and conchological characteristics, the genus *Helix* was subdivided into five subgenera, *Helix sensu str*, *Pelasga*, *Maltzanella*, *Physospira* and *Rhododerma* in previous studies by some authors, especially by Hesse (1908, 1911, 1920, 1931). Of these subgenera, *Helix sensu str* includes more species than the others and its distribution in Anatolia is wider than the others.

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As pointed out by Hesse (1908, 1911, 1920) and Germain (1936), the species of the genus *Helix* exhibit an extensive geographical variations. Thus, it is of great importance for examining the geographical variations in the mitochondrial (mtDNA) sequences of the species in the genus *Helix*, and much more studies are necessary to elucidate the systematical and phylogenetical position of the genus *Helix*.

*H. (Pelasga) pathetica* Mousson, 1854 is a helioid species that rarely comes across and shows a sparse distribution in Anatolia plateau. It was first described from Anatolia (?) by Mousson (1854), and then reported from Tokat by Albers (1860), Hesse (1910, 1920), Wagner (1937), from Amasya and Tokat by Kobelt (1906), and from Aksaray, Nevşehir and Sivas (Audibert et al., 2010). Of these authors, Hesse (1920) was mainly focused on genital anatomical data rather than conchological one.

Anatolia is the geographic area with the highest species diversity, as expected in view of its diverse topography and climate types. In the course of its geological evolution, it has established various connections with the lands around it (Demirsoy, 2002; Çiplak, 2003). Due to its climate types and topography and these connections, its diverse environments and microhabitats are occupied by many organisms. Helioid land snails from these organisms disperse in wide various habitats from warm temperate environments to xerothermophil ones (Peake, 1978). In this regard, Anatolian plateau also offers plenty of opportunities for land snails.

Yeşilkent (Nurhak), where three geographical regions (Mediterranean, East Anatolia and Southeast) converge, is located on the Southeastern Taurus - Anatolian Platform (37° 57.942' N; 37° 30.421' E, 1298 m). It has climate types which is transitional among the above-mentioned geographical regions, although its predominate climate is continental, with relatively low rainfall (Atalay and Mortan, 2006). The vegetation of the study area is present between Iran-Turanian Phytogeographical Region and Mediterranean Phytogeographical Region elements, which are very common almost everywhere, such as *Quercus coccifera* L., *Bromus* sp., *Cercis siliquastrum* L. subsp. *siliquastrum*, *Juniperus oxycedrus* L. subsp. *oxycedrus*, *Asparagus acutifolius* L., *Cornus sanguinea* L. *Fraxinus ornus* L. subsp. *cilicica* (Lingelsh.) Yalt., and *Festuca* sp. (Duman, 1995; Atalay and Mortan, 2006; Ok and Avşar, 2009) and limestones predominate. As this suggests, the land snail species that have recorded so far from the study area are mainly of mesophilic to xerophilic characteristic.

The aim of the study presented here is to document the southernmost known presence of *H. (Pelasga) pathetica* (Gastropoda: Pulmonata: Helicidae) in Yeşilkent (Nurhak, Kahramanmaraş).

## 2. Materials and methods

Field trips were carried out on April 2010 and May 2011 dates chosen to optimise the chances of finding live adults (Wiktor, 2000). Both empty shells and living materials were collected. Living specimens were killed in a relaxed state by cleaning them of mucus and dirt, placing them in a test tube or a jar so large that they could freely move and their muscles extend, and then drowning in water for 12-14 hours. Once dead, they were rinsed with cold water to remove mucus (Wiktor, 2000) and preserved in 80% ethyl alcohol with the addition of 5% glycerin to facilitate later dissection.

Empty shells were examined with a dissection microscope (Olympus SZ61); photographs were taken with an Infinity Lite Microscope Camera mounted on the dissection microscope and with digital cameras (Fujifilm FinePix s8000fd and Nikon P90). For the identification of specimens, structural characteristics, such as shell height and shell width (Örstan, 2003) aperture height and aperture width (Fiorentino et al., 2008) and whorl number (Kerney et al., 1983) were examined. The species was identified according to Schütt (2005).

Measurements of shell height, shell width, aperture height and aperture width was made using a digital caliper with 0.1 mm accuracy. Measurements of these characteristics were carried out with multi-read method. The following abbreviations have been used in the descriptive text and tables: D, shell width and  $D_{\text{mean}}$ , average shell width; H, shell height and  $H_{\text{mean}}$ , average shell height; AD, aperture width and  $AD_{\text{mean}}$ , average aperture width; AH, aperture height and  $AH_{\text{mean}}$ , average aperture height; mm, milimeter; m, meter; N, North; E, east.

## 3. Results

Genus *Helix* Linnaeus, 1758

Subgenus *Pelasga* Hesse, 1908

*H. (Pelasga) pathetica* Mousson 1854

Description (Figure 1): Shell dextral, small when compared with other *Helix* species; teleconch and protoconch with 4-5 and 1-1¼ whorls, respectively; globular with broad conical spire and pointed apex; thin-walled and translucent, last whorl broader and descending slightly towards the aperture; 7-9 reddish light brown bands. Very fine growth-ridges. Aperture oblique or rounded; inside white, with bands shining through and thin glossy lip; peristome sharp, only below broadened and reflected towards umbilicus; umbilicus almost completely obscured by the reflected columellar edge; the insertion points of peristome distant and connected by a thinner callus.



Figure 1. *H. (Pelasga) pathetica*. (Scale 1 cm).

Genitals (Figure 2a, b, c): According to Hesse (1920), albumen gland yellowish in color and very voluminous, connecting to sperm-oviduct at its wider base; hermaphroditic gland brownish and coiled; bursa copulatrix sac oval-like and diverticulum spindle-shaped or club-shaped and short; at its base, bursa copulatrix duct thick and broad; common duct of bursa copulatrix and diverticulum more pronounced than bursa duct; dart sac club-shaped, located on about middle of vagina; from the base of dart sac, mucus glands stemmed and branched off numerous branches and mucus glands broom-shaped; the point where connects penial retractor muscle thin; short and a bit bulge between this point and vas deferense; flagellum length being some thick at its proximal part more than twice total length of epiphallus and penis.

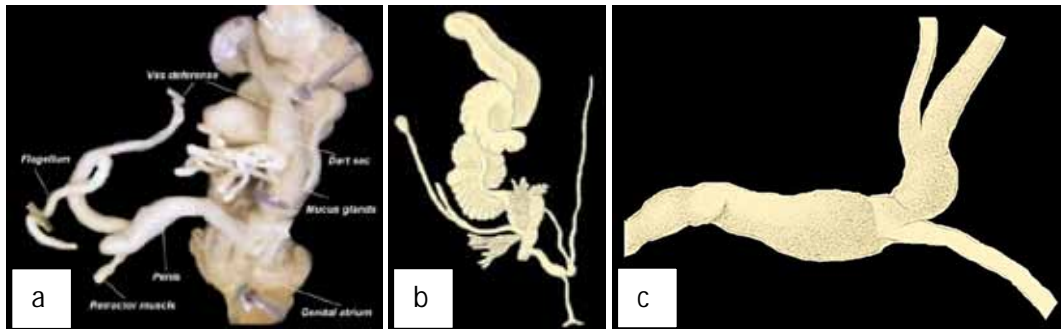


Figure 2. Genital system of *H. (Pelasga) pathetica*. a) From this study; b, c) General genital system and male distal genital part, respectively, from Hesse (1920).

Measurements (n=6): D= 22.15 – 27.85 mm,  $D_{\text{mean}} = 25.25$  mm; H= 24.48 – 29.35 mm,  $H_{\text{mean}} = 26.87$  mm; AD= 14.38 – 18.17 mm,  $AD_{\text{mean}} = 16.81$  mm; AH= 15.20 – 19.30 mm,  $AH_{\text{mean}} = 17.65$  mm.

Distribution (Figure 3): So far reported from Aksaray, Nevşehir, Sivas, Samsun, Amasya, Tokat, Çorum and Kahramanmaraş (in this study) provinces in Turkey. Found from gently sloping limestone cliffs and open habitats, especially with sparsely spread *Juniperus oxycedrus* and *Quercus coccifera*.

#### 4. Discussion

*Helix* is the largest sized land snail genus widely distributed in the Anatolia, as well as in the Western Palaearctic Region (Hesse, 1920; Schütt, 2005). One of the smallest members of this genus, *H. (Pelasga) pathetica* Mousson 1854, is reported for the first time from the present study area, and endemic to Anatolia. It shows a sparse distribution on the Anatolian plateau and has known from the middle - northern parts of Inner Anatolian Region so far (Schütt, 2005; Audibert et al., 2010). This report is its southernmost known presence and of uttermost importance, since closely related species have been reported from Western Anatolian parts in previous studies.

*H. (Pelasga) pathetica* can be a more xero-mesophilic species than other *Helix* species, e.g. *Helix (Helix) lucorum*. Although spending a much effort to find live adults in the period (Spring, namely from April to June) on which stylommatophoran land snails are generally active, only one live specimen has provided from the study area and failed to obtain detailed information about the genital anatomy of *H. (Pelasga) pathetica* from this material (Figure 2a). It could, however, notice that from figure 2a flagellum is some short and thick, and epiphallus some long when compared with Hesse's figure. But, more material needs to be investigated in detail to reach such a conclusion.

Moreover, variations observed in genital morphology, especially in distal genital, of the land snails should also be taken into account (Madec and Guiller 1994).

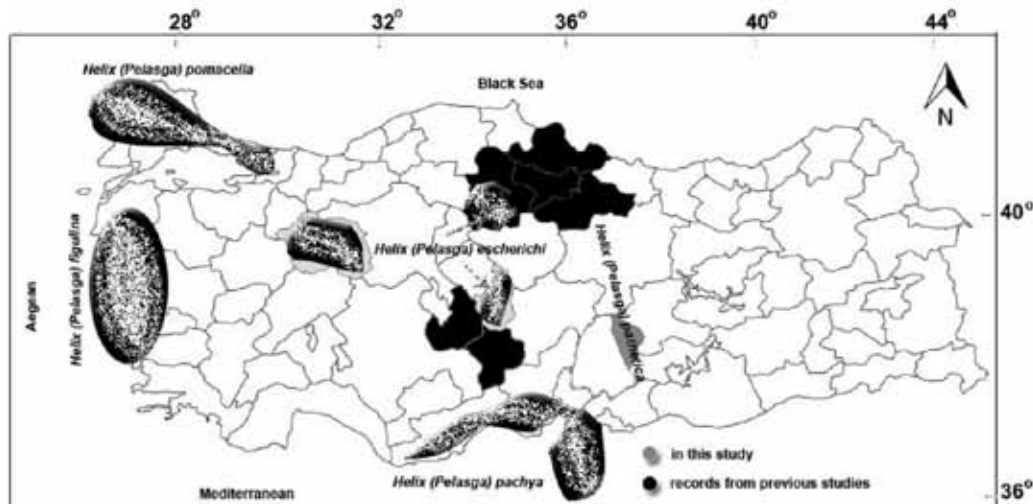


Figure 3. Estimated distribution map of *H. (Pelasga) pathetica* and of other *Pelasga* species.

Contrary to *H. (Pelasga) pathetica*, other species of the subgenera *Pelasga* are known from the westward areas, e.g. Eskişehir. Although *Helix (Pelasga) pathetica* has more often reported as *H. (P.) pathetica* and *H. (P.) pathetica armeniaca* from Amasya and Tokat (Albers, 1860; Kobelt, 1906; Hesse 1910, 1920; Wagner, 1937) and more recently as *Helix pathetica* from Aksaray, Nevşehir and Sivas (Audibert et al., 2010), it is only confirmed anatomically by Hesse (1920) and Wagner (1937). Furthermore, it was recorded as *H. (Pelasga) pathetica* samples collected from West Anatolia, presumably near İzmir, by Germain (1936). But these samples probably belong to *Helix (Pelasga) figulina*, since known presence of *H. (Pelasga) figulina* is the Aegean provinces of Turkey, and also in Greece, preferably in the South and the Islands of the Aegean. Besides, the species identified as *H. (Pelasga) pathetica* from some localities in Eskişehir by Semiz and Mısırlıoğlu (2010) could belong to *Helix (Pelasga) escherichi*, since general distribution of *H. (Pelasga) pathetica* is present in eastward when compared to other *Helix (Pelasga)* species. Towards Inner Anatolia, *H. (Pelasga) figulina* is replaced with first *H. (Pelasga) escherichi* and then *H. (Pelasga) pathetica* (Schütt, 2005). Moreover, *H. (Pelasga) pathetica* recorded from Bulgaria and pointed out as a very remarkable presence for Europe by Knipper (1939) possibly corresponds to *Helix (Pelasga) pomacella*, since it mainly exhibits a distribution from northernwest Anatolia to Bulgaria.

It could be argued that by evaluating its fossil records and general distributions (Schütt, 1983, 1984), the subgenus *Pelasga* had radiated out from an ancestral stock apparently originated in Inner Anatolia, which is a more arid region than coastal parts of Anatolia. Because, species distributed in the inner parts of Anatolia, including the study area, are mainly of mesophilic to xerophilic characteristic. In accordance with this, as mentioned above (Duman, 1995; Atalay and Mortan, 2006; Ok and Avşar, 2009), the vegetation structure of our study area partly reflects the fact that *H. (Pelasga) pathetica* can be mesophilic to xerophilic characteristic. In addition, the previously recorded land snail species (e.g. *Eopolita derbentina*, *Schileykula scyphus*, *Buliminus alepensis*, etc., Hausdorf, 1996; Schütt, 2005) from the study area and its surroundings exhibit these characteristics. Still, such a conclusion may not be certain and many field trips is required to confirm this.

## 5. Conclusion

From all of these findings mentioned above, it could be said that *H. (Pelasga) pathetica* distributes in middle – northern parts of Inner Anatolian Region, together with its occurrence at one locality in southward in our study. It, however, is thought to be necessary for reviewing in terms of anatomical features, conchological characteristics and phylogenetical relationships of both *H. (Pelasga) pathetica* and other *Pelasga* species. Besides, it is required to be determined their zoogeographical boundaries, and more importantly, their conservation status since the current status of the other Turkish *Helix* species, as well as of these taxa, is not known well enough.

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