

Linzer biol. Beitr.	41/1	747-751	30.8.2009
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***Protorhoe* of Turkey, with notes on their distribution and zoogeography (Lepidoptera, Geometridae, Larentiinae), with a new record**

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A b s t r a c t : Two species of *Protorhoe* are reported from Turkey: *Protorhoe unicata* (GUENÉE [1857]) and *Protorhoe corollaria* HERRICH-SCHÄFFER [1848]. The last was collected on Gökçeada *P. avetianae* VARDIKYAN 1974, is the first record for Turkey. The zoogeographic distribution of *Protorhoe* species was studied and genital organ photos of *P. avetianae* VARDIKJAN 1974 were given.

K e y w o r d s : Lepidoptera, Larentiinae, *Protorhoe avetianae*, new record.

Introduction

Islands are apart from mainland so they have significant ecological conditions. They have important bio-geographic properties in means of fauna and flora as they are apart from mainland. Especially in islands that are isolated and have no connection with mainland, the species variation can be different from mainland.

Gökçeada was geologically shaped at the end of tertiary period and is considered as the end point of southern Thrace. It is the biggest island of Turkey with an area of 285.5 km². It is 20 km away to Kabatepe port of Gelibolu peninsula. 77 % of the island is highlands, 12 % is pitched terrain and 11 % is grassy plain. The vegetation is basically short bushes but there are pine forests in the southwestern part (HOCAOĞLU 1988). Our knowledge about Gökçeada Lepidoptera fauna, are limited with KILIÇ 1987; OKYAR & AKTAÇ 2005; OKYAR & AKTAÇ 2007; SEVEN 2008. In these studies, new records were given for island fauna as well as Turkey Lepidoptera fauna.

Protorhoe species belonging to the Geometridae family of night butterflies are represented with *Protorhoe unicata* (GUENÉE [1857]) and *Protorhoe corollaria* HERRICH-SCHÄFFER [1848] in Turkey. Contribution to *Protorhoe* species was aimed in this study made in Gökçeada.

Methods

The research material was obtained from public highways resting facilities between Gökçeada Yuvalı-Dereköy in 1999. A 160W light trap with mercury vapor was used for collecting material. Material was prepared in a special stretching wood, was dried in 60-

80 °C drying oven, was labeled and became a museum material. In Lepidopters, the external genital organs show stable character and genital organ structures are considered as a basis in taxonomic evaluations, external genital organ preparation was prepared from the sample and its photo was taken. Publications about *Protorhoe* species, (LEDERER 1865; STAUDINGER 1881; AKBULUT et al., 2003; ÖZDEMİR 2007; KOÇAK & KEMAL 2007) were evaluated and the distribution of species in Turkey and the world was mentioned. Besides, a map showing the distribution of species in Turkey (Fig 1), Gökçeada map where *P. avetianae* was collected (Fig. 2), and photos of the male genitals of the species were also given (Fig. 3).

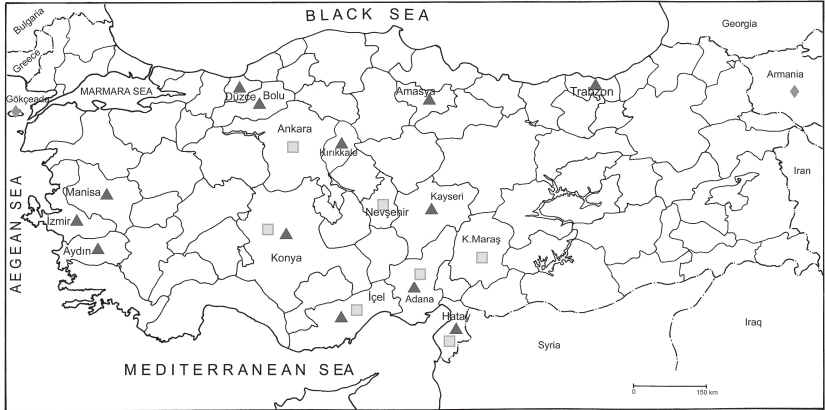


Fig. 1: The distribution of *Protorhoe* species in Turkey: ▲: *P. unicata* (GUENÉE [1857]); ■: *P. corollaria* HERRICH-SCHÄFFER [1848]; ♦: *P. avetianae* VARDIKYAN 1974.

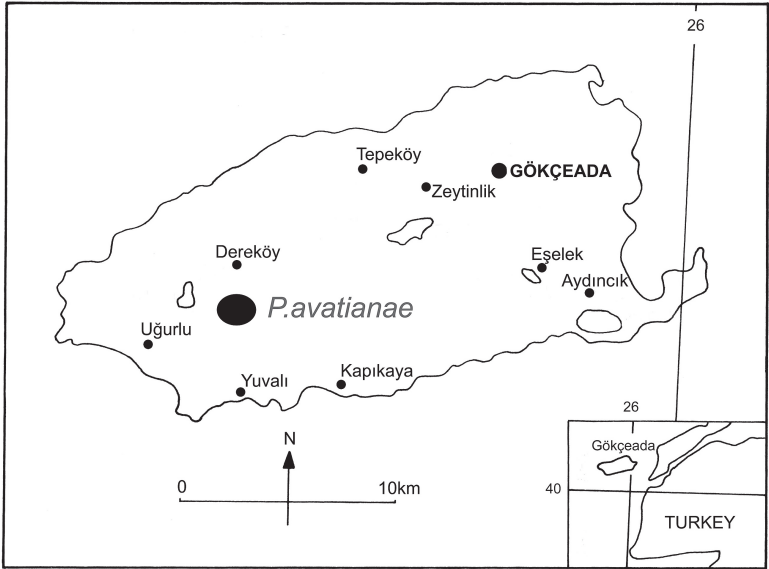


Fig. 2: The locality in Çanakkale-Gökçeada where *P. avetianae* species is collected.

Systematics

Protorhoe HERBULOT 1951

Protorhoe HERBULOT 1951 - Revue Fr. Lépid. **13**: 62.

Protorhoe unicata (GUENÉE [1857]) (Fig. 1)

Melaniphe unicata GUENÉE [1857] - Hist. Nat. Insects (Spec. Gén. Lépid.) **10**: 393,

Distribution in Turkey: Adana, Aydın, Trabzon (STAUDINGER 1881); İzmir-Bozdağ (LEDERER 1865); Düzcce (AKBULUT et al 2003); Amasya, Bolu, Düzcce, Hatay, İçel, Kayseri, Kırıkkale, Konya, Manisa (ÖZDEMİR 2007).

General distribution: Balkans, Caucasia, Central Asia, Iran and northern Iraq, Sicily, Transcaucasia, Turkey (ÖZDEMİR 2007).

Protorhoe corollaria (HERRICH-SCHÄFFER [1848]) (Fig. 1)

Larentia corollaria HERRICH-SCHÄFFER 1848 - Syst. Bearbeitung Schmett. Eur. **3** (32): 152.

Distribution in Turkey: Adana, Ankara, Hatay, İçel, Konya, K. Maraş, Nevşehir (KOÇAK & KEMAL 2007).

General distribution: Algeria, Armenia, Caucasia, Cyprus, Crimea, Greece, Iran, Iraq, Macedonia, Turkey (http://www.faunaeur.org/distribution_table.php).

Protorhoe avetianae VARDIKYAN 1974 (Fig. 1-3)

Cidaria avetianae VARDIKYAN 1974 - Dokl. Akad. Nauk armyan SSR **58** (1): pl. 1, figs 1-3.

Material examined: Çanakkale-Gökçeada, (between Dereköy-Uğurlu, public highways resting facilities), (40°08'57"N - 25°45'40"E): 22.06.1999, 1♂.

Distribution in Turkey: First record for Turkey Geometridae fauna.

General distribution: Central Asia - Armenia, Russia (VARDIKYAN 1974).

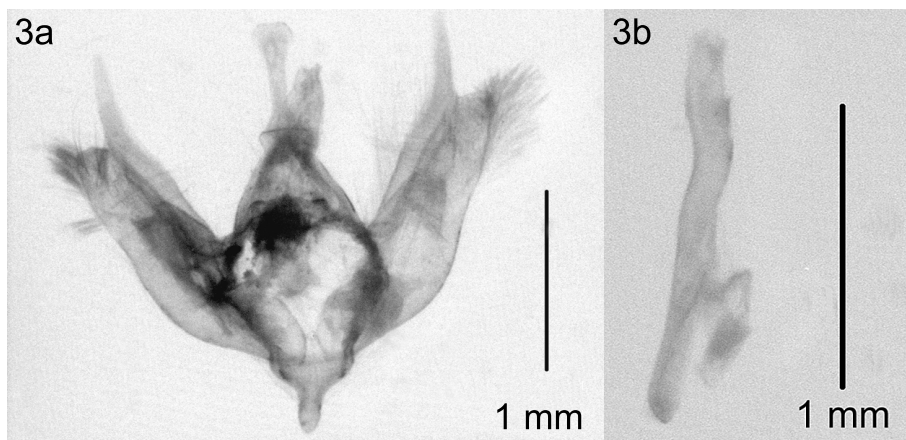


Fig. 3: *P. avetianae* VARDIKYAN 1974, male external genital organs. (a) valvae, (b) aedeagus.

Description: A very small species. Wind width is 20 mm. The median fascia of front wings are very dark, significantly fluctuated distal bordered. Eaves are checked. Rear wings are small compared with front wings. The base of rear wings has a few transverse stripes.

Male genitalia: uncus slenderer and longer with its tip more markedly bulbous, juxta higher, bi-ponted; saccus projection also longer. Costa, inner margin long (Fig. 3).

Discussion

P. avetianae VARDIKYAN 1974 first described in Armenia and are later observed in other Central Asian countries. *P. avetianae*, was found far away from its distribution area, in Çanakkale-Gökçeada so the distribution area of the species moved to west. The species not yet being observed in Anatolia, which is next to Armenia and Central Asian countries, is probably a coincidence. It should be examined in more detail like the other groups. The zoogeographic borders of *Protorhoe* species in west, has not been determined yet. For the problem to be solved, the genital organ preparations of Balkans, Turkey, Transcaucasia and Central Asia species should be serially examined. According to Viidalepp (personal communication), *P. avetianae*, is most probably present between the distribution areas of *P. unicata-centralisata* and *P. unicata-unicata*. However more material is needed rather than geographic areas in order to determine the distribution area of *P. avetianae*.

Acknowledgements

I would like to thank to Dr. Jaan Viidalepp (Estonian Academy of Sciences, Institute of Zoology and Botany) for his help in identification of *Protorhoe avetianae* VARDIKYAN 1974.

Zusammenfassung

Zwei Arten der Geometriden-Gattung *Protorhoe* (Lepidoptera, Geometridae, Larentiinae) waren bisher aus der Türkei nachgewiesen: *Protorhoe unicata* (GUENÉE [1857]) und *Protorhoe corollaria* HERRICH-SCHÄFFER [1848]. *P. avetianae* VARDIKYAN 1974 wurde nunmehr aus Gökçeada bekannt und ist somit ein Erstfund für die Türkei. Die zoogeographische Verbreitung der Gattung *Protorhoe* wurde dargestellt, zudem wurden Genitalfotos von *P. avetianae* VARDIKYAN 1974 wiedergegeben.

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Jahr/Year: 2009

Band/Volume: [0041_1](#)

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Artikel/Article: [Protorhoe of Turkey, with notes on their distribution and zoogeography \(Lepidoptera, Geometridae, Larentiinae\), with a new record 747-751](#)