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Notes on Some Species of Gnophini (Ennominae, Geometridae, Lepidoptera) from Turkey, with New Records

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ABSTRACT

In this paper, three species of the tribe Gnophini are recorded for the first time from Turkey: *Charissa adjectaria* Staudinger, 1898; *C. annubilata* (Christoph, 1885) and *Gnophos sacraria* Staudinger, 1895. Furthermore, two little-known *Gnophos* Treitschke, 1825 species are presented: *G. mardinaria* Staudinger, 1901 and *G. libanotica* (Wehrli, 1931). Male genitalia and adult images of *Charissa annubilata, Gnophos sacraria* and *G. mardinaria* with female genitalia and adult images of *G. libanotica* are illustrated here as new.

Key words: Ennominae, Geometridae, Lepidoptera, new records, Siirt, Batman, Turkey.

INTRODUCTION

The subfamily Ennominae, in terms of described species largest and morphologically most diversified moths in the family Geometridae, with over 10.700 described species so far (Scoble, 1999; Scoble and Hausmann, 2007). Majority, of species are well defined by a morphological character, the weakening or absence of the vein M2 in the hind wings. On the other hand, the tribal composition and phylogeny of the subfamily are still far from being resolved (Beljaev, 2006; Sihvonen *et al*., 2011). In fact, some classification difficulties are ongoing in this group (Gnophini), even at the genus level. In this regard, detailed morphological and molecular studies are required to solve problems. To determine the distrubition areas and for identification of the species in this paper references of Prout, 1912-1916; Seven, 1991; Doğanlar and Kornoşor, 2003; Özdemir, 2007; Okyar and Mironov, 2008; Koçak and Kemal, 2009; Skou and Sihvonen, 2015 were used.

Studies on the family Geometridae are still inadequate, especially for the south east of Turkey. With this study, the author provides important new faunistic information, which is relevant not only for Turkey, but also for the adjacent areas. In addition, the illustration of species (adults and genitalia) as photographs are very valuable because in many instances these have not been published before.

MATERIALS AND METHODS

The materials were caught between in the years 2014 and 2015, on the territory of Batman and Siirt Provinces from SE Turkey. In addition, some specimens, which were collected in the 2013 and couldn't have been exactly identified, were also utilized. Moths were caught in an entomological light trap, killed by ethyl acetate, and pinned or packed in transport envelopes. Specimens were prepared, labeled, and deposited according to standard entomological methods. For the exact identification, the author prepared the genitalia of the species. The materials are deposited in the laboratory of Batman University, Faculty of Arts and Sciences, Department of Biology.

In this species-rich group, where relatively little has been published recently, for many taxa identifications appear impossible without genitalia dissections. External and internal morphological characters of the species in this study were compared with in the Museum für Naturkunde (Germany), for warranting the correct identification.

RESULTS

Charissa adjectaria Staudinger, 1897 (Fig. 1)

Material examined: 7♂♂, Batman, Batıraman, 570 m, 15.10.2015 (Genital dissection: Gp2015-57♂; Gp2015-58♂).

Diagnosis: Wing span 19-20mm in male. Antenna bipectinate, pale brownish-greyish. The discal spot and postmedian line of fore wing not very clearly marked. Hind wing dirty white-grey, discal spot darker colored. Underside dirty white-grey, quite weakly marked. *Male genitalia:* Uncus well developed, broad. Juxta long and has two-pronged arms almost half length of valva. Costa has a spine, slightly curved apically. Aedeagus long, with a cornutus covering almost half of its length.

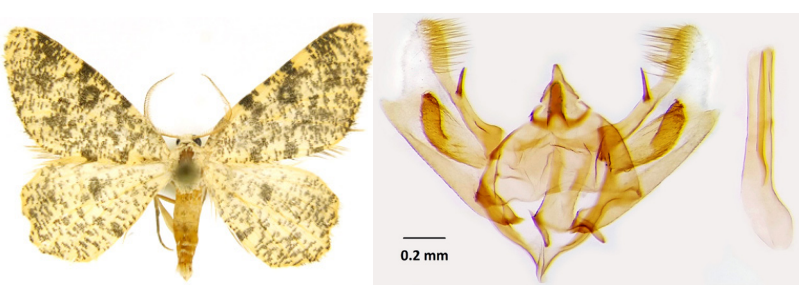

Fig. 1. Adult and male genitalia of *Charissa adjectaria* Staudinger, 1897 (Gp2015-57).

Remarks: The species ''*adjectaria*'' was described and illustrated by Staudinger (1897) from Jordan Valley. After that, Prout (1912-1916) presented on its distribution as "Palestine" without exact locality. This species is distributed in Central Asia (Turkmenistan), with a subspecies *C. adjectaria daritshevae* Viidalepp, 1991 (Vasilenko, 2016). *C. adjectaria* is recorded for the first time from Turkey. It was collected in October, at the rocky mountainous steppe area from Batman Province,

south-eastern Turkey. For identification, studies of Staudinger (1897), Prout (1912-1914) and Hausmann (1991) were used.

Charissa annubilata (Christoph, 1885) (Fig. 2)

Material examined: 6♂♂, 2♀♀ Siirt, Şirvan: 1♂ Nergizli, 650 m, 04.10.2013 (Genital dissection: Gp308♂♂); 3♂♂ Karaca crossroad, 1300 m, 13.10.2013 (Genital dissection: Gp310♂♂); 2♂♂ 1♀ Maden crossroad, 965 m, 17.10.2014; 1♀ Nergizli (rocky area), 650 m, 08.10.2014.

Diagnosis: Wing span: 16-17 mm in male, 20-21 mm in female. Antenna filiform. Fore wing yellowish-grey, towards the distal margin especially dark, discal spots weak, barely visible. Antemedial line broad, arcuated outwards, postmedial line angled obtusely near the costal margin and a little oblique, slightly dentate outwards. *Male genitalia:* Uncus narrow, well developed. Harpe elongated, tapering spine-shaped. Aedeagus small and weak sclerotized. Male genitalia of this species are characteristic and different from all others in the genus.

Fig. 2. Adult and male genitalia of *Charissa annubilata* (Christoph, 1885) (Gp310).

Remarks: The species was described and illustrated by Christoph (1885) from Khotchaldagh near Lagodekhi in Azerbaidjan. Prout (1912-1916) mentions it from “Transcaucasia”. The present knowledge on distribution of the species is from Georgia (Didmanidze, 2002), Azerbaidjan, Iran (Koçak and Kemal, 2014), to Turkmenistan (Vasilenko, 2016). It is reported as new for the fauna of Turkey. For identification, the original description of Christoph (1885) was used.

Gnophos libanotica (Wehrli, 1931) (Fig. 3)

Material examined: 2♀♀ Siirt, Şirvan, Nallıkaya (Dikilitaş), 1870 m, 12.06.2015 (Genital dissection: Gp2015-15♀).

Diagnosis: Wing span 29 mm in female. Antenna of female filiform. Medial line of fore wing broader and dentate, yellowish-brown colored, postmedial line not very definite. Pattern of hind wing similar to that of forewing but discal spot less definite. Underside pale-white and without spots. *Female genitalia:* Ductus bursae long, sclerotized and straight with many spines fused to inside and attached to the slender corpus bursae. Papillae anales large and sclerotized. Appendix bursae large and slipper shaped.

Remarks: The valid name ‘‘*libanotica*’’ was described in 1931 by Wehrli from Lebanon. In Turkey, this species is, hitherto known from Antalya (Koçak, 1966-2016)

and Niğde (Aladağları) Provinces (Riemis, 1998). It is new for the Lepidoptera fauna of Siirt Province and Şirvan discrict (Seven, 2014). The species inhabits humid area with intense *Quercus* and *Astragalus* plant species. For identification, the studies of Wehrli (1931) and Prout (1912-1914) were used.

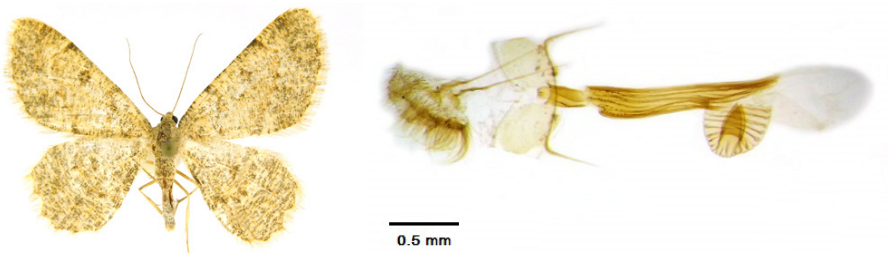

Fig. 3. Adult and female genitalia of *Gnophos libanotica* (Wehrli, 1931) (Gp2015-15).

Gnophos mardinaria Staudinger, 1901 (Fig. 4)

Material examined: 21♂♂ 10♀♀ Siirt, Şirvan: 5♂♂ 1♀ İncekaya, 1200 m, 16.07.2013; 1♂ Maden gate, 1400 m, 01.07.2013; 1♂ 1♀ Centre of Şirvan, 1000 m, 13.04.2013, 30.06.2013; 1♂ Boylu, 1000 m, 11.07.2013; 8♂♂ Yağcılar, 1150 m, 12.07.2013 (Genital dissection: Gp272♂, Gp291♂, Gp456♂); 2♀ Yayladağ, 1500 m, 16.07.2013; 2♂♂ Maden crossroad; 965 m, 27.06. 2014; 3♀♀ Suluyazı 1320 m, 28.04.2014; 2♂ Hürmüz crossroad, 1150 m, 12.05.2014; 1♂ Maden road, 1100 m, 05.07.2014; 3♀♀ Tomdere (bridge), 600 m, 27.05.2015.

Diagnosis: Wing span 29-31 mm in male, 31-32 mm in female. Antenna thick and filiform. Terminal line on the fore wing, indistinct, dark brown. Medial line unclear, discal spot big and definite. The distal margin of the hind wing is deeply arched. Underside yellowish and characterized by having a broad blackish distal border to both wings. *Male genitalia:* Uncus broad and well developed. Sacculus sclerotized, at tip projecting outwards. Ventral (posterior) arms of juxta broad, at tip truncate and pronged. Lateral arms of juxta short and digitiform. Aedeagus large, robust, with a thin stick-shaped cornutus.

Fig. 4. Adult and male genitalia of *Gnophos mardinaria* Staudinger, 1901 (Gp456).

Remarks: *Gnophos mardinaria* was described by Staudinger in 1901 from Mardin Province (Turkey). Prout (1912-1916) has indicated its distribution as “Mesopatamia”. Later, the species was reported by Koçak and Kemal (2014) from Turkey, Iran and Iraq. The reliable record was given in Turkey from Mardin Province by Staudinger (1901) and Kayseri Province (Koçak and Kemal, 2009; Koçak, 1966-2016). The

present record is new for the fauna of Siirt Province! For identification, the studies of Staudinger (1901) and Prout (1912-1916) were used.

Gnophos sacraria Staudinger, 1894 (Fig. 5)

Material examined: 8♂♂, 3♀♀ Siirt, Şirvan: 6♂♂ Kasımlı, 650 m, 06.10.2013 (Genital dissection: Gp283♂, Gp284♂); 2♀♀ Nergizli, 650 m, 07.10.2014; 2♂♂ 1♀ Maden crossroad, 965 m, 11.10.2014.

Diagnosis: Wing span 23-25 mm in male, 25-26 in female. Antenna bipectinate. Palpus extremely small. Fore wing brown-greyish, finely and densely spotted with dark scales, and with indefinite traces of antemedial line, small but definite discal spot, postmedian line consisting of dots. Hind wing with the discal spot unclear, postmedial line same on forewing. *Male genitalia:* Costa of valva sclerotized, with a short and thick horn. Uncus well developed. Ventral arms of juxta long and two-pronged shaped. Dorsal arms of juxta short, enlarged and sclerotized. Aedeagus long and thickened near apex.

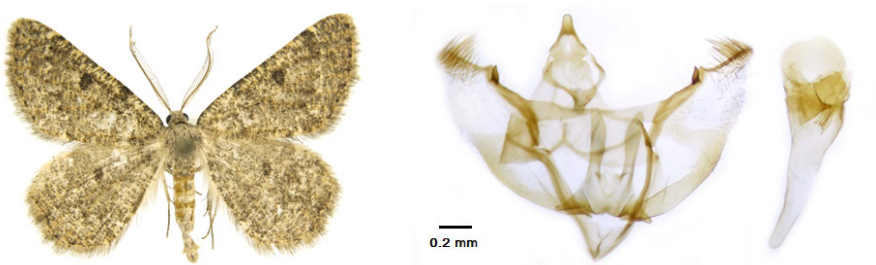

Fig. 5. Adult and male genitalia of *Gnophos sacraria* Staudinger, 1894 (Gp284)

Remarks: The species was described by Staudinger (1894) from Israel (Jerusalem). After that, Rebel (1912) has recorded it from Egypt and Prout (1912-1916) has specified its distribution as “Palestine”. In the current study the author suggests that this species shows a wider distribution in the northern countries of the Middle East. In Turkey, it was found only from Siirt Province, southeast of Turkey, with this study. It was captured in October near by river side. For identification, studies of Staudinger (1894) and Prout (1912-1916) were used.

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