

Checklist of the Superfamilies Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea and Noctuoidea: Notodontidae (Insecta: Lepidoptera) of Bulgaria, with Application of the IUCN Red List Criteria at National Level

Hristina O. Hristova & Stoyan V. Beshkov

National Museum of Natural History, 1 Tzar Osvoboditel Blvd., 1000 Sofia, Bulgaria; E-mails: h.hristova_@abv.bg and beshkov@nmnhs.com

Abstract: An updated checklist of some of the Bulgarian sphinges and bombyces is presented. The previous published checklist of the Bulgarian sphinges and bombyces contains 198 species; 115 of them belong to the higher taxa considered in the present list. Four species appeared to be wrongly reported for Bulgaria. Three of those four were included in the last catalogue. Here these are excluded from the species list of the Bulgarian fauna. Since 1984 seven species have been reported as new to the Bulgarian fauna and these are added to this list. At present 10 species of Cossoidea, one species of Thyridoidea, 15 species of Drepanoidea, 21 species of Lasiocampoidea, 35 species of Bombycoidea, and 37 species of Notodontidae (Noctuoidea), or 119 species in total, are unambiguously confirmed for Bulgaria. The extinction risk of all listed species was assessed at national level applying the IUCN Red List Criteria. Four species (40%) of Cossoidea, three species (20%) of Drepanoidea, six species (28.6%) of Lasiocampoidea, ten species (28.6%) of Bombycoidea and nine species (24.3%) of Noctuoidea: Notodontidae are considered threatened (Vulnerable, Endangered or Critically Endangered) after assessment.

Key words: Checklist, threatened species, Bugaria, bombyces, sphinges

Introduction

The superfamilies Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea are part of an artificial group without systematic value, previously known as “Sphinges and Bombyces”. This group contains diverse superfamilies, families and subfamilies, which do not form a monophyletic assemblage. It includes all families of the so-called “Macrolepidoptera”, except for the superfamilies Papilionoidea and Hesperioidea, as well as the families Geometridae and Noctuidae (sensu auct.). The artificial group “Sphinges and Bombyces” also includes some of the less evolved families (e.g., Hepialidae, which should belong to the artificial group “Microlepidoptera”), together with some of the most evolved lepidopteran lineages (e.g., Erebidae: Arctiinae).

The superfamilies presented in this list are evolutionarily more derived than superfamily Cossoidea; the latter superfamily is also included in the present list as it contains a species listed in Annex II of the Habitats Directive 92/43/EEC. Thyridoidea, which also belongs to “Microlepidoptera”, is also presented here.

In recent years, several species have been recorded as new to the Bulgarian fauna and others have been wrongly reported for the country. This provoked us to update the checklist of Bulgarian Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea: Notodontidae. To achieve that we took into account the existing knowledge on these groups in Bulgaria from all available sources, as well as original data of the present authors.

Material and Methods

The systematics used here for the super-families Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea and Bombycoidea follows KARSHOLT & RAZOWSKI (1996). The systematics used for Noctuoidea: Notodontidae follows FIBIGER & HACKER (2005). We used mainly binominal nomenclature; trinominal nomenclature was used for the species represented in Bulgaria by subspecies different from the nominotypical ones.

The biogeographic disposition was evaluated for all listed species following KUDRNA (1986). Biogeographic disposition is a term indicating the species' potential maximum viability in contemporary terms, regardless of the present anthropogenic pressures. It is defined by three relatively well-descriptive dimensions: size of the range within Europe / Range size (RS); continuity of colonies of the species within Europe/ Range composition (RC); relationship between the species' European distribution and its world range/ Range affinity of the species (RA). Range affinity is an indicator of the relative significance of the species' European colonies for the species overall survival.

All three aspects can be numerically expressed for the overwhelming majority of the European butterflies and moths. A cumulative value of the three dimensions discussed above is called chorological index (CI):

Range size (RS) + Range composition (RC) + Range affinity (RA) = Chorological index (CI).

The chorological index is an approximate numerical expression of the biogeographic disposition (or natural potential) of any species. The value of the chorological index increases with the reduction of the biogeographic disposition (i.e. the natural resistance potential) of the species. The lowest possible value is 4, which is an indicator of the most successful species. The highest possible value is 14 and indicates an endemic (European) species restricted to a very small territory.

The data concerning species distribution within and outside Europe was used for calculation of the CI. The distribution of the members of the Bulgarian Drepanoidea, Lasiocampoidea, Bombycoidea and Notodontidae (Lep.: Noctuoidea) follows DE FREINA & WITT (1987) and some more recent publications. The species distribution of Bulgarian Cossoidea and Thyridoidea follows mainly DE FREINA & WITT (1990).

The extinction risk of all listed species was assessed at national level in accordance with the IUCN Red List Categories and Criteria (IUCN 2012a) used in conjunction with the Guidelines for Using the IUCN Red List Categories and Criteria (IUCN 2014),

and the Guidelines for Application of the IUCN Red List Criteria at Regional and National Levels (IUCN 2012b). The species were assessed mainly against criterion B2 (area of occupancy) due to the nature of the available data. The area of occupancy was calculated by summing the number of grid squares occupied by each assessed species. Distribution maps and measurement of the area of occupancy (criterion B2) were made using Google Earth Pro 7®.

The size of the species localities was defined by using the methodology in Article 17 of the Habitats Directive 92/43/EEC (ANONYMOUS 1992). According to this methodology the size of each locality is usually equal to UTM grid cell 10 x 10 km; UTM grids with size 5 x 5 km or 1 x 1 km were used when the size of suitable habitat was smaller than 100 km².

The IUCN Red List Categories abbreviations used in the text are as follows: Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Not Evaluated (NE).

Results and Discussion

The previous checklist of the Bulgarian Spingines and Bombyces contained 198 species (GANEV 1984a) and 115 of them belonged to the higher taxa Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea: Notodontidae. The rest of the species in that catalogue belonged to other groups and, for this reason, they were not considered and evaluated here.

Four species have been wrongly reported for the country and we excluded them from the present list of the Bulgarian fauna. Three of those species were presented in GANEV (1984a): *Lasiocampa eversmanni* (EVERSMANN, 1843) (Lasiocampoidea), *Lemonia dumi* (LINNAEUS, 1761) and *Hyles nicaea* (DE PRUNNER, 1798) (Bombycoidea). The last one, *Furcula bicuspis* (BORKHAUSEN, 1790) (Noctuoidea: Notodontidae), has been reported for Bulgaria (SCHINTLMEISTER 2013) but this finding is doubtful.

Since 1984 two species of Cossoidea, two species of Drepanoidea and three species of Bombycoidea have been recorded as new for Bulgaria and these were added to this list.

The present list contains 119 species unambiguously confirmed for Bulgaria: ten species of Cossoidea, one species of Thyridoidea, 15 species of Drepanoidea, 21 species of Lasiocampoidea, 35 species of Bombycoidea, and 37 species of Noctuoidea: Notodontidae.

Four species (40%) of Cossoidea, three species (20%) of Drepanoidea, six species (28.6%)

Table 1. Species arrangement within the different IUCN categories

Family	Number of the species in Bulgaria	LC	NT	VU	EN	CR	NE
		Species	Species	Species	Species	Species	Species
Cossidae	10	4	2	1	1	2	-
Thyrididae	1	1	-	-	-	-	-
Drepanidae	15	12	-	1	1	1	-
Lasiocampidae	21	13	2	1	5	-	-
Endromidae	1	-	-	1	-	-	-
Saturniidae	5	5	-	-	-	-	-
Brahmaeidae	3	1	-	1	1	-	-
Sphingidae	26	16	1	4	2	1	2
Notodontidae	37	28	-	3	6	-	-
Total number of the species	119	80	5	12	16	4	2

Species – number of species listed in the current category

of Lasiocampoidea, ten species (28.6%) of Bombycoidea, and nine species (24.3%) of Noctuoidea: Notodontidae are considered threatened at national level after assessment and were listed as VU, EN or CR. In Bulgaria only *Paradrymonia vittata* (STAUDINGER, 1892) is represented by more than one subspecies (different from the nominotypical ones) and these were assessed at the subspecific level.

The threatened species are not likely to experience any significant “rescue effect” from other subpopulations of the same taxa outside the country. Summarised results of the extinction risk assessments are given below (Table 1).

Systematic List of Bulgarian Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea: Notodontidae. Conservation assessments at the national level based on the IUCN Red List Criteria.

Superfamily COSSOIDEA LEACH, 1815

Family *Cossidae* LEACH, 1815

Subfamily *Cossinae* LEACH, 1830

Cossus cossus (LINNAEUS, 1758) = *Cossus balcanicus* LEDERER, 1863. **CI = 5; LC**

Acosus terebra ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 7; VU B2ab(iii)**

Parahypopta caestrum (HÜBNER, 1808). **CI = 6; LC**

Paracossulus thrips (HÜBNER, 1818). = *Catopta thrips*.

Listed in Annex II of the Habitats Directive 92/43/EEC. Presently, it probably exists only around Balchik (near Topola and Bozhurets villages) in Bulgaria, but the habitats in these localities are almost entirely destroyed by three golf courses and their accompanying infrastructure (BESHKOV 2011). The Bulgarian subpopulation is marginal, strongly isolated and habitats are fragmented. This species has been subject of unsuccessful field survey. Very likely it is already regionally extinct or is on the way to become extinct in Bulgaria. **CI = 7; CR B2ab(iii)**

Dypsessa salicicola (EVERSMANN, 1848). **CI = 7; NT**

Dypsessa ulula (BORKHAUSEN, 1790). **CI = 5; LC**

Stygia mosulensis DANIEL, 1965. Known only from two localities in SW Bulgaria: Ograzhden Mt. – Lebnitza Village (DE FREINA & WITT 1990); Kresna Gorge – Stara Kresna railway station (LEHMANN 1994). **CI = 8; EN B2ab(iii)**

Subfamily *Zeuzerinae* BOISDUVAL, 1828

Zeuzera pyrina (LINNAEUS, 1761). **CI = 5; LC**

Stygoides colhica (HERRICH-SCHÄFFER, 1851). BESHKOV & LANGOUROV (2004) reported it from the Eastern Rhodopi Mts.: the Arda River bridge, near the town of Madzharovo. There is also unpublished and unconfirmed data for the Black Sea Coast, district of Balchik. (B. ZLATKOV 2015, pers. comm., 1 December). **CI = 7; CR B2ab(iii)**

Phragmataecia castaneae (HÜBNER, 1790). Known only from a few localities in Bulgaria. GANEV (1984a) recorded it from the volcanic hill of Kozhuh near the town of Petrich; Srebarna Lake near Silistra, as well as several other localities on the Black Sea Coast. We recorded it from Kalimok Wetland, near Nova Cherna Village, Tutrakan district; the area between the towns of Gostilya and Knezha, Plevan Region. **CI = 7; NT**

Superfamily THYRIDOIDEA HERRICH-SCHÄFFER, 1846

Family *Thyrididae* HERRICH-SCHÄFFER, 1846

Thyris fenestrella (SCOPOLI, 1763). **CI = 4; LC**

Superfamily *DREPANOIDEA* BOISDUVAL, 1828

Family *Drepanidae* BOISDUVAL, 1828

Subfamily *Thyatirinae* SMITH, 1893

Thyatira batis (LINNAEUS, 1758). **CI = 5; LC**

Habrosyne pyritoides (HUFNAGEL, 1766). **CI = 4; LC**

Tethea ocularis (LINNAEUS, 1767). **CI = 5; LC**

Tethea or ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 5; LC**

Ochropacha duplaris (LINNAEUS, 1761). Rare and local species in Bulgaria: known from Rila Mts. (Kostenets); Petrohan Pass and Etropole Monastery (GANEV 1984a). New data: Elenova Gora Reserve near Skobebevo Village; Mazalat Forestry in Central Stara Planina Mts. **CI = 7; EN B2ab(iii)**

Cymatophorina diluta ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 5; LC**

Polyploca ridens (FABRICIUS, 1787). **CI = 5; LC**

Asphalia ruficollis ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 7; LC**

Achyla flavicornis (LINNAEUS, 1758). **CI = 7; VU B2ab(iii)**

Subfamily *Drepaninae* BOISDUVAL, 1828

Watsonalla binaria (HUFNAGEL, 1767). **CI = 5; LC**

Watsonalla cultraria (FABRICIUS, 1775). **CI = 5; LC**

Sabra harpagula (ESPER, 1786). Known only from Kresna Gorge (MÉSZÁROS *et al.* 1986). **CI = 7; CR B2ab(iii)**

Drepana falcataria (LINNAEUS, 1758). **CI = 5; LC**

Cilix glaucata (SCOPOLI, 1763). For a long time this species was confused with *Cilix asiatica* O. BANG-HAAS, 1907 due to misidentification. In Bulgaria, *C. glaucata* is known from many localities all over the country. GANEV (1984a) recorded it from Sofia; Dragalevski Monastery; Bunkera; Kresna Gorge; Slavyanka Mt.; volcanic hill of Kozhuh near Petrich; Zemen Gorge – Skakavitsa Railway Station; Prekolnitsa Village; Konyavska Mt.; Tavalichevo Village; Osogovo Mts. (Dvete reki, Kyustendil); Tsegrilovtsi Village near Tran; Lyulin Mt.; Sestrino Village; Burgas; Svilengrad; Strandzha Mts.; Nessebar; Chepelare; Belite Brezi Hut near Ardino; Ustino Village; Asenovgrad; Lukovitsa River; Sakar Mt.; Sliven; suburbs of Botevgrad; Iskar Gorge; Varna; Tarnovo; Razgrad; Euxinograd. MÉSZÁROS *et al.* (1986) recorded the species from Belogradchik; Kostinbrod; Kresna and Melnik. BESHKOV *et al.* (1999) reported it from Arkutino and Balchik. The species was also found near Aida Hut; Sredna Arda railway station; hunting enterprise Kroyatsite near Nanovitsa Village; Studen Kladenets Village; near Bivoljane Village; Momina Skala Hut; Madzharovo; Arda Hut near Dabovets Village; Meden Buk Village; Siv Kladenets Village (BESHKOV & LANGOUROV 2004). The last published localities are: Chepelare; Ustina Village; Asenova Krepost; Dabrash Hotel; above Trigrad Village (BESHKOV & LANGOUROV 2011). The species was found in many other localities. It is likely that some of the data on *C. glaucata* actually refer to *Cilix asiatica* because the two species were confused in the past. **CI = 5; LC**

Cilix asiatica O. BANG-HAAS, 1907. The confusion with *C. glaucata* in the past is the reason of the relatively small number of the publications concerning the Bulgarian population of *C. asiatica*. ZOLOTUHIN (1999) reported the species for Bulgaria from Svishtov. BESHKOV & LANGOUROV (2004) recorded it from the valley of Dishlik Dere River and above the Arda River bridge near Madzharovo. ABADJIEV & BESHKOV (2007) found three other localities: Ludogorie; Skriniski Gorge; Tarnovski hills. Mesta River valley is another known locality of the species (ZLATKOV 2007). The last two published localities are: Asenova krepost; between Asenova krepost and Lyaskovo Village (BESHKOV & LANGOUROV 2011). The present authors reported the following localities here for the first time: volcanic hill of Kozhuh near the town of Petrich; Silistra; Kamchia River; Sakar Mts.; Varna; Tsar-Petrovo Village; Suhata Reka River; Belasitsa Mt.; Ruse; Rishki pass; Kardam; Rositsa-Loznitsa Nature 2000 protected zone; Devetashko Plateau; Pastrina upland near Montana; Nikopolско Plateau; Korten Village; near Preslav town; Hristo Danovo Village; Stara planina Mts. – “Chamdzha” Reserve. **CI = 10; LC**

Superfamily LASIOCAMPOIDEA HARRIS, 1841

Family **Lasiocampidae** HARRIS, 1841

Subfamily **Poecilocampinae** TUTT, 1902

Poecilocampa populi (LINNAEUS, 1758). **CI = 5; LC**

Poecilocampa alpina canensis (MILLIÈRE, 1876). All localities for Bulgaria are situated in the most western part of the country. Perhaps the small number of known localities is owing to the very late flight period (October–November). **CI = 7; EN B2ab(iii)**

Trichiura crataegi (LINNAEUS, 1758). **CI = 6; LC**

Trichiura verena WITT, 1981. In the catalogue of GANEV (1984a), four localities of the species were listed for Bulgaria, one of which was doubtful. Presently, the species is known from some other localities in the country but some of them remain unpublished. The late flight period (October–November) might also be a reason of the small number of known localities. **CI = 11; NT**

Subfamily **Lasiocampinae** HARRIS, 1841

Eriogaster lanestris (LINNAEUS, 1758). **CI = 5; LC**

Eriogaster rimicola ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 8; LC**

Eriogaster catax (LINNAEUS, 1758). Listed in Annexes II and IV of the Habitats Directive 92/43/EEC, as well as in Appendix II of the Bern Convention. With fragmented distribution across the country. The population is likely in decline, although several new localities of the species have been found in the last few years. **CI = 7; VU B2ab(iii)**

Lasiocampa trifolii ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 5; LC**

Lasiocampa grandis (ROGENHOFER, 1891). **CI = 7; NT**

Lasiocampa eversmanni (EVERSMANN, 1843). SOFFNER (1965) firstly reported this species for Bulgaria from Nesebar, later on GANEV (1984a) quoted this record. The single known locality of the species remains unconfirmed and misidentification is possible. Here it was excluded from the list of the Bulgarian fauna.

Lasiocampa quercus (LINNAEUS, 1758). **CI = 5; LC**

Macrothylacia rubi (LINNAEUS, 1758). **CI = 5; LC**

Subfamily **Malacosomatinae** AURIVILLIUS, 1927

Malacosoma neustria (LINNAEUS, 1758). **CI = 4; LC**

Malacosoma castrensis (LINNAEUS, 1758). **CI = 5; LC**

Malacosoma franconica ([DENIS & SCHIFFERMÜLLER], 1775). GANEV (1984a) mentioned only four localities of the species. New locality for the country: Eastern Rhodopi, near the crossroad to Lensko Village, Ivaylovgrad District, 320m, N41°26'58.7"; E025°56'50.6", 14.6.2010 and 12.6.2011. **CI = 7; EN B2ab(iii)**

Subfamily **Pinarinae** KIRBY, 1892

Pachypasa otus (DRURY, 1773). GANEV (1984a) listed four localities of the species: Kresna Gorge; between Yambol and Sliven; Varna; the suburbs of Provadia. Known also from Kritschim – Kritschimska koriya and Belovo railway station (BESHKOV & LANGOUROV 2011). New localities: Belasitsa Mt., Belasitsa chalet (V. GASHTAROV 2015, pers. comm., 3 December). Fragmented distribution across the country. **CI = 7; EN B2ab(iii)**

Dendrolimus pini (LINNAEUS, 1758). **CI = 5; LC**

Phyllodesma ilicifolia (LINNAEUS, 1758). Fragmented distribution across the country. This species shares similar morphological characters with *Phyllodesma tremulifolia* (HÜBNER, 1810). Probably some of the data of *P. ilicifolia* actually refer to *P. tremulifolia*. **CI = 7; EN B2ab(iii)**

Phyllodesma tremulifolia (HÜBNER, 1810). **CI = 6; LC**

Gastropacha quercifolia (LINNAEUS, 1758). **CI = 5; LC**

Gastropacha populifolia ([DENIS & SCHIFFERMÜLLER], 1775). Known only from the Danube River plain: the town of Silistra and Belene Village (GANEV 1984a). The report for Sofia seems to be doubtful. New data: Baykal Village; Karaboaz near Gulyantsi, N43°40'40"; E024°42'36". **CI = 7; EN B2ab(iii)**

Odonestis pruni (LINNAEUS, 1758). **CI = 5; LC**

Superfamily BOMBYCOIDEA LATREILLE, 1802

Family **Endromidae** BOISDUVAL, 1828

Endromis versicolora (LINNAEUS, 1758). So far there are only five published localities for the country. New localities: above Beledie Han, Kostinbrod district (V. GASHTAROV 2015, pers. comm., 3 December); Eastern Rhodopi Mts., Egrek Village, N41°19'18"; E025°38'17" (data of the present authors). **CI = 7; VU B2ab(iii)**

Family **Saturniidae** BOISDUVAL, 1837

Subfamily **Agliinae** PACKARD, 1893

Aglia tau (LINNAEUS, 1758). **CI = 8; LC**

Subfamily **Saturniinae** BOISDUVAL, [1837]

Saturnia pyri ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 5; LC**

Saturnia pavoniella (SCOPOLI, 1763) = *Saturnia pavonia* (LINNAEUS, 1758) auct. Although the Bulgarian specimens of the *pavonia-pavoniella* group possess several characters typical for both species, they undoubtedly belong to the taxon *Saturnia (Eudia) pavoniella* and evidence for this is provided by the structure of the male genitalia and hindwing pattern (ZLATKOV 2011). **CI = 5; LC**

Saturnia spini ([DENIS & SCHIFFERMÜLLER], 1775). Until the middle of the last century, this species was not rare in Bulgaria. Over the last few decades it has experienced strong population decline and has not been observed. Currently, the Bulgarian subpopulation of *S. spini* is growing. The species was collected again at some of the sites from where it has been disappeared, as well as from many new localities. **CI = 6; LC**

Saturnia caecigena (KUPIDO, 1825). This species is listed in the Biological Diversity Act of the Republic of Bulgaria (ANONYMOUS 2015), but this is due to lack of knowledge about its real distribution and abundance in Bulgaria. Actually *S. caecigena* is relatively widespread up to 1236 m a.s.l. and occurs in high abundance at many sites. For a long time it was considered to be rare because of its late flight period (September – November). **CI = 6; LC**

Family **Brahmaeidae** SWINHOE, 1892

Lemonia dumi (LINNAEUS, 1761). ILTCHEV (1921) recorded this species for Bulgaria from Krupnik Village (SW Bulgaria, Kresna Gorge). According to BESHKOV (2001) the species was probably wrongly reported from Krupnik Village, as well as for Bulgaria. The report of ILTCHEV (op. cit.) was based on a caterpillar. Such determination is not reliable enough, especially if the moth is not emerged. Many field studies were conducted in Kresna Gorge but *L. dumi* has never been found. Here it is excluded from the list of the Bulgarian fauna.

Lemonia taraxaci ([DENIS & SCHIFFERMÜLLER], 1775) = *montana* BURESCH, 1915. High mountain species flying in late July and August. Confirmed only for Rila Mts. at an altitude of 1850-2200 m a.s.l.. The report for Sliven probably concerns the next species. **CI = 7; EN B2ab(iii)**

Lemonia strigata ROUGEOT ET VIETTE, 1978. Balkan endemic; typically occurs in lowland habitats. Flight period between October – November. *Lemonia taraxaci strigata* is raised to full specific status as *L. strigata* by ANTOSHIN & ZOLOTUHN (2011). We support this conclusion because the chorological, phenological and morphological differences between the two species are well established. In Bulgaria *L. strigata* occurs only in the Struma River valley: from Kresna Gorge to the volcanic hill of Kozhuh (near the town of Petrich) and the slopes of the adjacent mountains up to 475m a.s.l.. **CI = 10; VU B2ab(iii)**

Lemonia balcanica (HERRICH-SCHÄFFER, 1847). **CI = 6; LC**

Family **Sphingidae** LATREILLE, 1802

Subfamily **Smerinthinae** GROTE & ROBINSON, 1865

Marumba quercus ([DENIS & SCHIFFERMÜLLER], 1775). **CI = 7; LC**

Mimas tiliae (LINNAEUS, 1758). **CI = 5; LC**

Smerinthus ocellata (LINNAEUS, 1758). **CI = 5; LC**

Laothoe populi (LINNAEUS, 1758). **CI = 5; LC**

Subfamily **Sphinginae** LATREILLE, 1802

Agrius convolvuli (LINNAEUS, 1758). **CI = 6; LC**

Acherontia atropos (LINNAEUS, 1758). **CI = 5; LC**

Sphinx ligustri (LINNAEUS, 1758). **CI = 5; LC**

Sphinx pinastri (LINNAEUS, 1758). **CI = 5; LC**

Dolbina elegans A. BANG-HAAS, 1912. All known localities of the species (including those which remained unpublished) are situated in the eastern part of the country. It was found mostly in longose forests along the Black Sea Coast, as well as from the Eastern Stara Planina Mts., Sakar Mts. and Eastern Rhodopi Mts. **CI = 7; NT**

Subfamily **Macroglossinae** HARRIS, 1839

Hemaris tityus (LINNAEUS, 1758). **CI = 5; LC**

Hemaris fuciformis (LINNAEUS, 1758). **CI = 5; LC**

Hemaris croatica (ESPER, 1800). Fragmented distribution across the country. **CI = 7; VU B2ab(iii)**

Macroglossum stellatarum (LINNAEUS, 1758). **CI = 4; LC**

Daphnis nerii (LINNAEUS, 1758). Very rare and scarce in Bulgaria. It is not assessed according the IUCN Red List Criteria at national level because it is a vagrant. Even if the recorded individuals would be able to produce offspring, the species is not capable to overwinter in the country. The foodplant of the species is *Nerium oleander* L. which grows here only as an ornamental plant. **CI = 5; NE**

Sphingoneopsis gorgoniades (HÜBNER, [1819]). BESHKOV (1990) reported this species for Bulgaria from the district of Balchik. The single locality of the species, where it was found several times, is fragmented and almost completely destroyed by golf courses and their accompanying infrastructure that have been built up there. **CI = 7; CR B2ab(iii)**

Proserpinus proserpina (PALLAS, 1772). Although this species is listed in the Biological Diversity Act of the Republic of Bulgaria, Appendix II of the Bern Convention and Annex IV of the Habitats Directive 92/43/EEC, according to the IUCN Red List Criteria at national level *P. proserpina* is not threatened in Bulgaria. **CI = 7; LC**

Rethera komarovi drilon REBEL & ZERNY, 1931. Known only from the southwestern part of the country and Eastern Rhodopi Mts. GANEV (1984A) recorded it from Kresna Gorge and Slavyanka Mt. BESHKOV & LANGOUROV (2004) observed the species near and above the Arda River bridge in the vicinity of Madzharovo; Studen Kladenets Village; Dishlik-Dere River valley near Oreshari Village; Mandritsa Village. DOMOZETSKI (2012) reported the species from Struma River valley – St. Mina monastery, south of Strumyani Village; slopes of the Pirin Mts. above Ilindentsi Village; Struma River valley, south of Kresna. We found it from Byala Reka River near Meden Buk Village, Ivaylovgrad district. **CI = 7; VU B2ab(iii)**

Hyles euphorbiae (LINNAEUS, 1758). **CI = 4; LC**

Hyles gallii (ROTTEMBURG, 1775). GANEV (1984A) found it in only three localities: Petrohan Pass and Stoletov peak, both in Stara Planina Mts.; the town of Varna on the Black Sea Coast. Balchik is another known published locality (BESHKOV 1997). NEW LOCALITIES: NEAR SHKORPILOVTSI VILLAGE, N42°58'25"; E027°53'29"; Dobrogea, between Durankulak and Kardam, Kachamaka Place Northern of Bezhanovo Village, N43°42'53"; E028°24'50"; Eastern Stara Planina Mts, between Tushovitsa and Rish, N42°57'58"; E026°53'45". **CI = 7; VU B2ab(iii)**

Hyles nicaea (DE PRUNNER, 1798). TULESCHKOW (1931) firstly recorded this species for Bulgaria from Belasitsa Mt., 1800 m a.s.l., later GANEV (1984a) quoted this report. *Hyles nicaea* has never been reported again from the country so Tuleshkov's data remains unconfirmed. Here the species is excluded from the list of the Bulgarian fauna owing to a likely misidentification and confusion with the large females of *Hyles euphorbiae* seems very possible.

Hyles vespertilio (ESPER, 1800). Know from very few localities in the mountains Rila, Western Rhodopi and Central Stara Planina. It occurs at low altitudes in Kresna Gorge as well. **CI = 7; VU B2ab(iii)**

Hyles hippophaes (ESPER, 1789). Listed in Appendix II of the Bern Convention, as well as in Annex IV of the Habitats Directive 92/43/EEC. In Bulgaria it is known only from two localities: between Tuzlata and Balcik (BESHKOV 1998) and the Black Sea Coast – between the lake of Durankulak and Krapets Village (BESHKOV & ABADJIEV 2000). **CI = 7; EN B2ab(iii)**

Hyles livornica (ESPER, 1800). **CI = 5; LC**

Deilephila elpenor (LINNAEUS, 1758). CI = 5; LC

Deilephila porcellus (LINNAEUS, 1758). CI = 5; LC

Hippotion celerio (LINNAEUS, 1758). Very rare and scarce in Bulgaria: found only twice but over the last six decades *H. celerio* has not been recorded again. The species is not assessed according to the IUCN Red List Criteria at national level because it is a vagrant. CI = 4; NE

Theretra alecto (LINNAEUS, 1758). Known only from Kresna Gorge and Petrich (GANEV, 1984a). CI = 11; EN B2ab(iii)

Superfamily NOCTUOIDEA LATREILLE, 1809

Family **Notodontidae** STEPHENS, 1829

Subfamily **Thaumetopoeinae** AURIVILLIUS, 1889

Thaumetopoea processionea (LINNAEUS, 1758). CI = 8; LC

Thaumetopoea solitaria (FREYER, 1838). Fragmented distribution across the country. CI = 11; VU B2ab(iii)

Thaumetopoea pityocampa ([DENIS & SCHIFFERMÜLLER], 1775). CI = 5; LC

Subfamily **Pygaerinae** DUPONCHEL, [1845]

Clostera curtula (LINNAEUS, 1758). CI = 7; LC

Clostera pigra (HUFNAGEL, 1766). CI = 5; LC

Clostera anachoreta ([DENIS & SCHIFFERMÜLLER], 1775).

CI = 6; LC

Clostera anastomosis (LINNAEUS, 1758). CI = 5; LC

Subfamily **Notodontinae** STEPHENS, 1829

Notodonta dromedarius (LINNAEUS, 1767). CI = 7; LC

Notodonta tritophus ([DENIS & SCHIFFERMÜLLER], 1775).

CI = 7; LC

Notodonta ziczac (LINNAEUS, 1758). CI = 5; LC

Drymonia dodonaea ([DENIS & SCHIFFERMÜLLER], 1775).

CI = 5; LC

Drymonia ruficornis (HUFNAGEL, 1766). CI = 5; LC

Drymonia obliterata (ESPER, [1785]) = *melagona* BORKHAUSEN, 1790. CI = 7; LC

Drymonia querna ([DENIS & SCHIFFERMÜLLER], 1775). CI = 7; LC

Drymonia velitaris (HUFNAGEL, 1766). Fragmented distribution across the country. GANEV (1984a) recorded three localities of the species: Kyustendil; Kostenets; Belite Brezi chalet near Ardino. There are two other published localities: Gorni Lom Village (GEORGIEV & BESHKOV 2000); Iskar Gorge – Bov railway station (GANEV & BESCHKOV 1987). New data of the present authors: below the dam of Yazovir Iskar, above Pasarel Village. CI = 7; EN B2ab(iii)

Pheosia tremula (CLERCK, 1759). CI = 7; LC

Pheosia gnoma (FABRICIUS, 1776). Known only from Rila Mts. GANEV (1983) firstly recorded it for the country from Panichishte Resort. The present authors found it around Tiha Rila. CI = 7; EN B2ab(iii)

Paradrymonia vittata streckfussi (HONRATH, 1892). Known from a few localities in Western Bulgaria. CI = 7; EN B2ab(iii)

Paradrymonia vittata bulgarica DE FREINA, 1983. This subspecies is well presented in Eastern Rhodopi Mts., as well as in some other places in Eastern Bulgaria. Its distribution is fragmented across the country. CI = 7; VU B2ab(iii)

Pterostoma palpina (CLERCK, 1759). CI = 7; LC

Ptilophora plumigera ([DENIS & SCHIFFERMÜLLER], 1775). CI = 5; LC

Ptilodon capucina (LINNAEUS, 1758). CI = 5; LC

Ptilodon cucullina ([DENIS & SCHIFFERMÜLLER], 1775). CI = 5; LC

Rhegmatophila alpina osmana FRIEDEL, 1934. Known from Kresna Gorge and Lukovitsa River near Asenovgrad (GANEV 1984a, ABADJIEV & BESHKOV 2007); Eastern Rhodopi – Sredna Arda railway station (BESHKOV & LANGOUROV 2004). New data:

between Nova Lovcha and Paril Villages. CI = 9; EN B2ab(iii)

Gluphisia crenata (ESPER, [1785]). In Bulgaria it is known only from five localities. GANEV (1984a) firstly reported it for Bulgaria from Kubrat and “Srebarna” Biosphere Reserve. The present authors found it in three other localities published here for the first time: between Vasil Levski and Voynovo Villages; Silistra; Karaboaz near Gulyantsi Village. CI = 7; EN B2ab(iii)

Cerura vinula (LINNAEUS, 1758). CI = 6; LC

Cerura erminea (ESPER, [1783]). GANEV (1984a) firstly reported the species for Bulgaria from Vidin. The other two localities are published here for the first time: Tsar-Petrovo Village, Vidin Region; Baykal Village, Pleven Region. CI = 7; EN B2ab(iii)

Furcula furcula (CLERCK, 1759). CI = 5; LC

Furcula bicuspis (BORKHAUSEN, 1790). According to Fauna Europaea (SCHINTLMEISTER 2013) this species does occur in Bulgaria. We did not find any reliable report confirming this statement. *Furcula bicuspis* is here excluded from the list of the Bulgarian fauna.

Furcula bifida (BRAHM, 1787). CI = 5; LC

Dicranura ulmi ([DENIS & SCHIFFERMÜLLER], 1775). CI = 7; LC

Subfamily **Phalaerinae** BUTLER, 1886

Phalera bucephala (LINNAEUS, 1758). CI = 5; LC

Phalera bucephaloides (OCHSENHEIMER, 1810). CI = 7; LC

Peridea anceps (GOEZE, 1781). CI = 5; LC

Peridea korbi (REBEL, 1918). Fragmented distribution across the country. GANEV (1984a) indicated the species presence in Kresna and Zemen Gorges. Another known localities are: the volcanic hill of Kozuh near the town of Petrich (GANEV 1984b); Dripchevo Village (GANEV 1987). BESHKOV & LANGOUROV (2004) observed the species in Eastern Rhodopi Mts: Sredna Arda railway station; Studen Kladenets and Mandritsa Villages. Skrinski pass is the last published locality of the species for the country (ABADJIEV & BESHKOV 2007). New data of the present authors: S Pirin Mts. – Kalimantsi and Vlahi Villages; Sakar Mts. – Matochina Village; Sredna Gora Mts. – Lyulyakovitsa above Oborishte Village, Panagyurishte district, 896 m a.s.l., N42°32'13"; E024°07'50", 06.6.2015. CI = 7; VU B2ab(iii)

Subfamily **Heterocampinae** NEUMOGEN & DYAR, 1984

Stauropus fagi (LINNAEUS, 1758). CI = 5; LC

Harpypia milhauseri (FABRICIUS, 1775). CI = 5; LC

Spatalia argentina ([DENIS & SCHIFFERMÜLLER], 1775). CI = 6; LC

Conclusions

About one-third (32 taxa) or 27% of the Bulgarian Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea: Notodontidae are considered threatened at national level based on the assessment conducted in accordance with the IUCN Red List criteria (Fig. 1).

No one of the species considered here are listed in the Red Data Book of the Republic of Bulgaria. Several of the species included in the previous checklist have not been found in Bulgaria for decades, but these have been wrongly reported for the country or were cases of vagrant species.

Biological Diversity Act (BDA) of the Republic of Bulgaria (ANONYMOUS 2015) in fact adopted the European Directives (e.g. 92/43 EEC) and

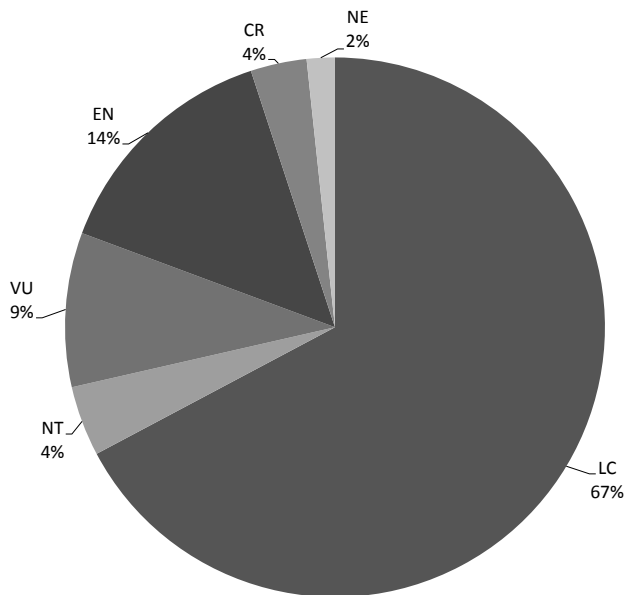


Fig. 1. Percentage of the Bulgarian Cossoidea, Thyridoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, and Noctuoidea: Notodontidae species within the different IUCN categories

LC – Least Concern (80 species = 67.2 %); NT – Near Threatened (5 species = 4.2 %); VU – Vulnerable (12 species = 9.2 %); EN – Endangered (16 species = 14.3 %); CR – Critically Endangered (4 species = 3.4%); NE – Not Evaluated (2 species = 1.7%)

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International conventions (Bern Convention, CITES). As a result, in Annexes II and III of the BDA are listed species mainly from Central and Western Europe.

Only one species (*Eriogaster catax*) of those considered here is listed in Annex II of the BDA. *Eriogaster catax* is also included in Annexes II and IV of the Habitats Directive 92/43/EEC, as well as in Appendix II of the Bern Convention.

In Annex III of the BDA are listed only four species of the groups considered here: *E. catax*, *Proserpinus proserpina*, *Hyles hippophaes* and *Saturnia caecigena*. Three of those four (*E. catax*, *P. proserpina*, *H. hippophaes*) are included in Annex II of the Bern Convention. Only *S. caecigena* is added at national level (listed in Annex III of the BDA as *Perisomena caesigema* [sic]). Among the four species protected by BDA in Bulgaria only *E. catax* (VU) is actually considered threatened at national level.

The implementation of the European Legislation and the adoption of the lists of Central and Western Europe render the Annexes of the BDA insufficient, or even misleading. The protection of the endemic and rare species in each country is a national responsibility. We strongly recommend all the 37 taxa listed in this publication as threatened (VU, EN or CR) to be eventually included in Annex III of the BDA of the Republic of Bulgaria. Further, we recommend *S. caecigena* (LC) to be excluded from Annex III of the BDA.

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