

INTERESTING SPECIES OF THE FAMILY GEOMETRIDAE (LEPIDOPTERA) RECENTLY COLLECTED IN SERBIA, INCLUDING SOME THAT ARE NEW TO THE COUNTRY'S FAUNA

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Abstract

Seventeen very interesting species were found in studying the fauna of Geometridae of Serbia. Ten of them are new to the fauna of Serbia (*Ennomos quercaria*, *Anticollix sparsata*, *Colostygia fitzi*, *Eupithecia absinthiata*, *E. alliarda*, *E. assimilate*, *E. millefoliata*, *E. semigraphata*, *Perizoma juracolaria* and *Trichopteryx polycommata*); five are here recorded in Serbia for the second time (*Dyscia raunaria*, *Elophos dilucidaria*, *Eupithecia ochridata*, *Perizoma bifaciata* and *Rhodostrophia discopunctata*); and two are recorded for the third time (*Nebula nebulata* and *Perizoma hydrata*). Information regarding where and when they were all found is given herein.

KEY WORDS: geometrid moths, measuring worms, new record, taxonomy

Introduction

With more than 23000 species, Geometridae is one of the largest families of the order Lepidoptera (Choi *et al.*, 2017). About 900 species have been found to date in Europe (Hausmann, 2001). Some of them are significant pests in agriculture and forestry (Carter, 1984; Barbour, 1988; Glavendekić, 2002; Pernek *et al.*, 2013). Around 380 species have so far been recorded in Serbia (Dodok, 2006; Djurić & Hric, 2013; Beshkov, 2015a, 2015b, 2015c, 2017a, 2017b; Beshkov & Nahimić, 2017; Nahimić & Beshkov, 2016). In the course of our investigations, we found species that were not previously recorded in Serbia or that were previously found at only one or two localities. These species are presented in this paper.

Materials and Methods

The geometrids presented in this paper were collected during the period from 2014 to 2017 at 13 localities in Serbia: 1) Arandelovac: Banja: Strmovo [44°16'08" N, 20°38'45" E, 300 m a.s.l. (above sea level)]; 2) Belgrade: Veliki Mokri Lug: Stepin Gaj (44°44'42" N, 20°31'57" E, 227 m a.s.l.); 3) Mt. Čemerno: Smrdljuč (43°35'09" N, 20°25'16" E, 1527 m a.s.l.); 4) Lazarevac: Barzilovica (44°19'50" N, 20°17'13" E, 256 m a.s.l.); 5) Lazarevac: Stubički Vis (44°20'47" N, 20°17'04" E, 276 m a.s.l.); 6) Negotin: Mihajlovac: Đalu Mare (44°23'01" N, 22°26'58" E, 256 m a.s.l.); 7) Podlužje: Surčin: Boljevci: Crni Lug (44°42'23" N, 20°12'30" E, 96 m a.s.l.); 8) Mt. Rudnik: Mali Šturac (44°07'59" N, 20°30'50" E, 942 m a.s.l.); 9) Mt. Rudnik: Prlovi (44°07'59" N, 20°30'35" E, 900 m a.s.l.); 10) Mt. Stolovi: Usovica (43°35'32" N, 20°36'22" E, 1123 m a.s.l.); 11) Mt. Stolovi: Orlovac (43°33'46" N, 20°39'52" E, 937 m a.s.l.); 12) Umka: Mala Moštanica: Duboko (44°39'25" N, 20°17'48" E, 164 m a.s.l.); and 13) Valjevske Planine Mts.: Jablanik (44°09'23" N, 19°40'11" E, 1086 m a.s.l.).

Geometrids were collected at night using a portable light source. An ultraviolet (UV) lamp positioned in front of a white sheet measuring 1.8 x 2.2 m was used as the light source. Car batteries were used to power the light source. Moths landing on the sheet were put directly into a killing jar. Those flying around in front of it were captured with an entomological net.

The collected moths were killed in the field (using killing jars with potassium cyanide) and then impaled on entomological pins and packed in plastic boxes. On arrival at the Natural History Museum in Belgrade, they were prepared by standard methods and photographed (adults and the genitalia). They were then deposited in the Lepidoptera collection of this museum, where they now reside. Genitalia of the analyzed specimens were placed in genitalia micro vials and are located on entomological pins together with the specimens.

Determination of all collected material was performed by Aleksandar Stojanović, conservator of the Natural History Museum in Belgrade.

Results and Discussion

In all, 2562 specimens belonging to 174 species were collected during our investigations of the fauna of Geometridae on the territory of Serbia. Among them, 17 species from three subfamilies (Laurentiinae 13, Ennominae 3, Sterrhinae 1) and 10 genera (*Eupithecia* 6, *Anticollix* 1, *Colostygia* 1, *Dyscia* 1, *Elophos* 1, *Ennomos* 1, *Nebula* 1, *Perizoma* 3, *Rhodostrophia* 1, *Trichopteryx* 1) are very significant for the Serbian Geometridae fauna. Of these species, 10 are new, five are here recorded for the second, and two are here recorded for the third time in Serbia (Glavendekić, 2002; Tomić *et al.*, 2002; Zečević, 2002; Dodok, 2006; Glavendekić & Mihajlović, 2004; Vajgand, 2009, 2016; Glavendekić & Medarević, 2010; Stojanović *et al.*, 2010, 2014; Djurić & Hric, 2013; Beshkov, 2015a, 2015b, 2015c, 2017a, 2017b; Beshkov & Nahirnić, 2016, 2017; Nahirnić & Beshkov, 2016; Jakšić, 2016, 2017). In the list to follow, they are placed in their subfamilies, which are arranged in alphabetical order. For nine of the newly recorded species, it can be said that their presence was to be expected because they are widely distributed in Europe or have already been found elsewhere on the Balkan Peninsula (Hausmann *et al.*, 2011). However, our finding of the species *Perizoma juracolaria* (Wehrli 1919) was a real surprise, since it is a high-mountain species not found before in southern Europe (Berard, 2005; Bryner & Ziegler, 2014; Huemer *et al.*, 2015). Its caterpillars live on the fruits of *Gentiana lutea* Krock. and *G. asclepiadea* L. (Bryner & Ziegler, 2014). Because these two species of gentian are present on the mountains of Serbia (Josifović, 1973), it is probable that *P. juracolaria* has a wider distribution in Serbia.

Among the species new to the fauna of Serbia, the finding of *Colostygia fitzi* (Schawerda 1914) is interesting, since up to now it had been recorded only in Croatia, Bosnia and Herzegovina, and Greece (Hausmann *et al.*, 2011). One of the species listed in the present paper is *Rhodostrophia discopunctata* Amsel 1935. It was raised to the species level by Hausmann (2004), who separated it from the species *Rh. tabidaria* (Zeller 1847). According to Hausmann, *Rh. tabidaria* in Europe is present only on the easternmost islands of Greece, and all of its earlier findings in the Balkans should be assigned to the species *Rh. discopunctata*. For this reason, Zečević's finding (2002) of the species *Rh. tabidaria* in Serbia is assigned to the species *Rh. discopunctata* in the present paper. Zečević's was the first finding of this species in Serbia, and our findings are the second and third.

Because geometrid moths have been extensively investigated in Serbia, it is fairly difficult to find new species. This is why the species mentioned in the present paper as new to the Serbian Geometridae fauna are very interesting. However, it is certain that other new species will be discovered in the future, since the number of species of Geometridae registered in Serbia to date (about 390) is still less than the number of species recorded in certain neighboring countries, where they have been somewhat more thoroughly investigated (460 in Bulgaria, 401 in Hungary) (Stojanović, 2010).

In the list below, it is indicated which species are here recorded for the first, second, or third time in the fauna of Geometridae of Serbia. Their names are given in conformity with the names found on the Fauna Europaea site (Hausmann *et al.*, 2011). All of them were photographed (photos were taken by A. Stojanović). In giving data on the listed species, we use the following initials: A.S. for Aleksandar Stojanović; and M.J. for Miroslav Jovanović. Since the listed species were all captured at night, the days before and after the nights when they were caught are given in stating the dates of their capture.

List of Recorded Species

Subfamily: Ennominae

Dyscia raunaria (Freyer 1852)

Mt. Stolovi: Orlovac 22-23.06.2014. (1 ♂) leg. A.S. & M.J. (Fig. 1.c. adult ♂, 3.a genitalia ♂). Second finding in Serbia. First finding in Serbia: Bela Palanka: Šljivovački Vis Mt. above Šljivovik Village 30.5.2016. (Beshkov, 2017b).

Elophos dilucidaria (Denis & Schiffermüller 1775)

Mt. Čemerno: Srdljuč 02-03.08.2017. (17 ♂♂ + 4 ♀♀) leg. A.S. & M.J. (Fig. 1.b adult ♂, 1.a adult ♀, 3.c genitalia ♂, 3.d genitalia ♀). Second finding in Serbia. First finding in Serbia: Divčibare August (Tomić *et al.*, 2002).

Ennomos quercaria (Hübner 1813)

Negotin: Mihajlovac: Đalu Mare 19-20.06.2017. (1 ♀) leg. A.S. & M.J. (Fig. 1.d. adult ♀, 3.b genitalia ♀). New species for Serbia.

Subfamily: Laurentiinae

Anticollix sparsata (Treitschke 1828)

Podlužje: Surčin: Boljevci: Crni Lug 19-20.05.2017. (1 ♀) leg. A.S. (Fig. 1.e adult ♀, 4.b genitalia ♀), 11-12.08.2017. (1 ♂) leg. A.S. (Fig. 4.a genitalia ♂), Umka: Mala Moštanica: Duboko 14-15.06.2017. (1 ♀) leg. A.S. New species for Serbia.

Colostygia fitzi (Schawerda 1914)

Valjevske Planine Mts.: Jablanik 08-09.08.2014. (1 ♂ leg. A.S. & M.J. (Fig. 1.f adult ♂, 4.c genitalia ♂).
New species for Serbia.

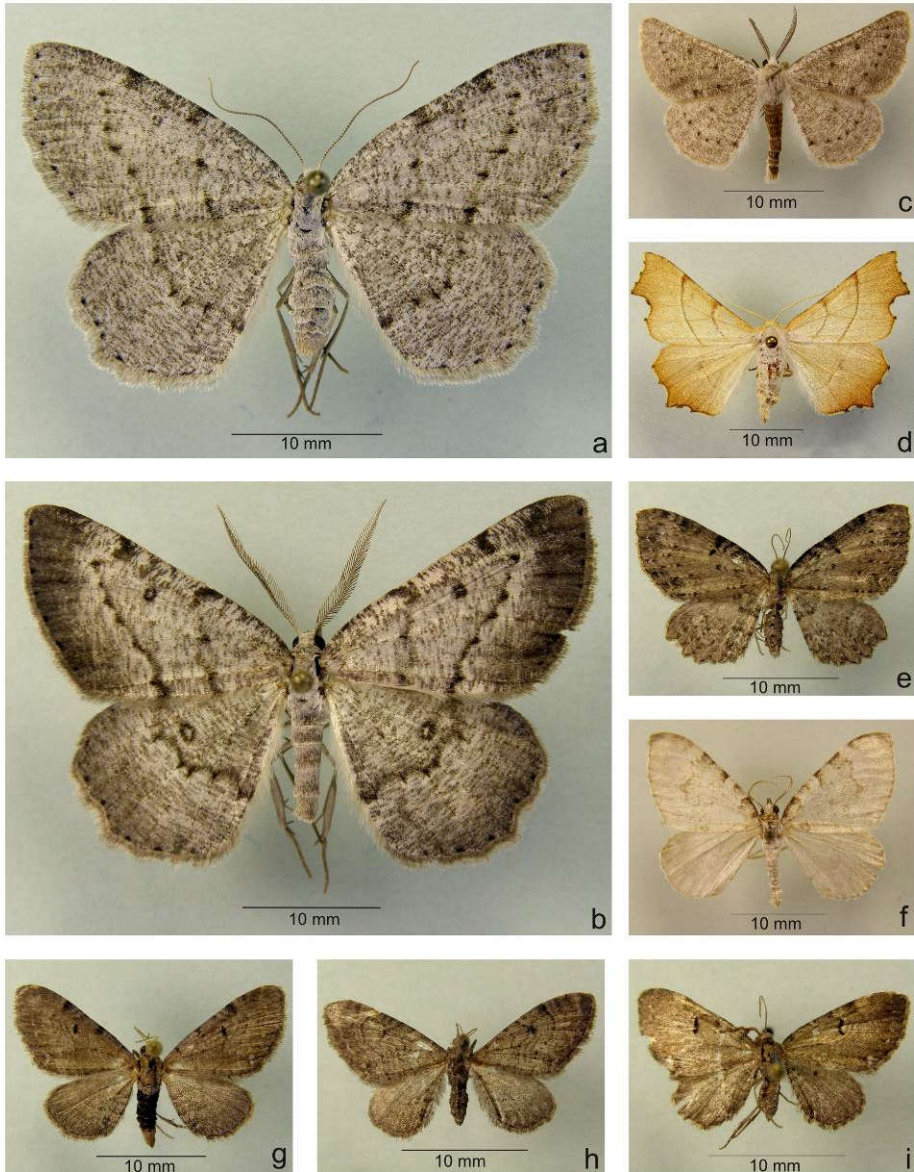


Figure 1. Adults. a – *Elophos dilucidaria* ♀, b – *E. dilucidaria* ♂, c – *Dyscia raunaria* ♂, d – *Ennomos quercaria* ♀, e – *Anticollis sparsata* ♀, f – *Colostygia fitzi* ♂, g – *Eupithecia absinthiata* ♂, h – *E. alliaris* ♀, i – *E. assimilata* ♂.

Eupithecia absinthiata (Clerck 1759)

Beograd: Veliki Mokri Lug: Stepin Gaj 02-03.09.2016. (6 ♂♂ + 2 ♀♀) leg. A.S. (Fig. 1.g adult ♂, 4.d genitalia ♂, 5.a genitalia ♀). New species for Serbia.

E. alliaris Staudinger 1870

Mt. Stolovi: Usovica 02-03.09.2015. (1 ♀) leg. A.S. & M.J. (Fig. 1.h adult ♀, 5.b genitalia ♀). New species for Serbia.

E. assimilata Doubleday 1856

Podlužje: Boljevci: Crni lug 19-20.05.2017. (1 ♂) leg. A.S. (Fig. 1.i adult ♂, 5.c genitalia ♂). New species for Serbia.

E. millefoliata Rössler 1866

Negotin: Mihajlovac: Đalu Mare 19-20.06.2017. (1 ♂ + 2 ♀♀) leg. A.S. & M.J. (Fig. 2.a adult ♀, 5.d genitalia ♂, 6.a genitalia ♀). New species for Serbia.

E. ochridata Schütze & Pinker 1968

Mt. Stolovi: Usovica 02-03.09.2015. (2 ♂♂) leg. A.S. & M.J. (Fig. 2.b adult ♂, 6.b genitalia ♂). Second finding in Serbia. First finding in Serbia: Niš (Tomić *et al.*, 2002).

E. semigraphata Bruand 1850

Mt. Stolovi: Usovica 02-03.09.2015. (1 ♂) leg. A.S. & M.J. (Fig. adult 2.c ♂, 6.c genitalia ♂). New species for Serbia.

Nebula nebulata (Treitschke 1828)

Mt. Rudnik: Prlovi 27-28.06.2014. (1 ♂) leg. A.S. (Fig. 2.d adult ♂, 6.d genitalia ♂). Third finding in Serbia. First and second finding in Serbia: Paštrik, Žljeb (Tomić *et al.*, 2002).

Perizoma bifaciata (Haworth 1809)

Lazarevac: Stubički Vis 29-30.08.2015. (1 ♀) leg. A.S. (Fig. 2.f adult ♀, 7.b genitalia ♀), Umka: Duboko 08-09.09.2017. (1 ♂) leg. A.S. (Fig. 2.g adult ♂, 7.a genitalia ♂). Second finding in Serbia. First finding in Serbia: Užice: Bela Zemlja 21.08.1996. (Dodok, 2006).

P. hydrata (Treitschke 1829)

Mt. Rudnik: Mali Šturac 01-02.07.2016. (1 ♀) leg. A.S. (Fig. 2.e adult ♀, 7.c genitalia ♀). Third finding in Serbia. First finding in Serbia: Fruška Gora (Tomić *et al.*, 2002). Second finding in Serbia: Pirot: Vidlič Mt.: Hotel Stara 06.07.2016. (Jakšić, 2017).

P. juracolaria (Wehrli 1919)

Mt. Čemerno: Smrdljuč 02-03.08.2017. (1 ♂ + 1 ♀) leg. A.S. & M.J. (Fig. 2.k adult ♀, 7.d genitalia ♂, 8.a genitalia ♀). New species for Serbia.

Trichopteryx polycommata (Denis & Schiffermüller 1775)

Umka: Mala Moštanica: Duboko: 10-11.03.2018. (1 ♂) leg. AS. (Fig. 2.h adult ♂, 8.b genitalia ♂). New species for Serbia.

Subfamily: Sterrhinae

Rhodostrophia discopunctata Amsel 1935

Arandelovac: Banja: Sirmovo 08-09.07.2016. (1 ♂ + 2 ♀♀) leg. A.S. (Fig. 2.i adult ♀, 8.d genitalia ♀), Mt. Rudnik: Mali Šturac 01-02.07.2016. (1 ♂) leg. A.S. (Fig. 8.c genitalia ♂), 23-24.06.2017. (1 ♂) leg. A.S (Fig. 2.j adult ♂). Second and third finding in Serbia. First finding in Serbia: Zaječar June 1972. (Zečević, 2002).

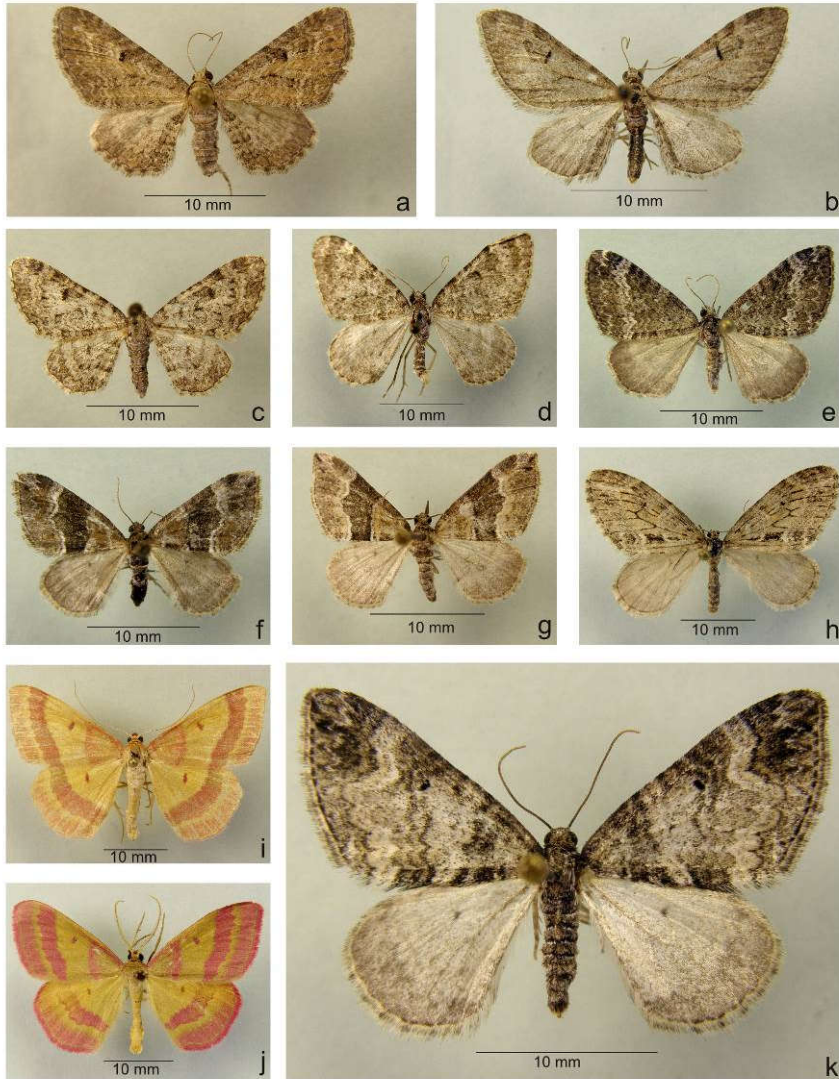


Figure 2. Adults. a – *Eupithecia millefoliata* ♀, b – *E. ochridata* ♂, c – *E. semigraphata* ♂, d – *Nebula nebulata* ♂, e – *Perizoma hydrata* ♀, f – *P. bifaciata* ♀, g – *P. bifaciata* ♂, h – *Trichopteryx polycommata* ♂, i – *Rhodostrophia discopunctata* ♀, j – *Rh. discopunctata* ♂, k – *P. juracolaria* ♀.

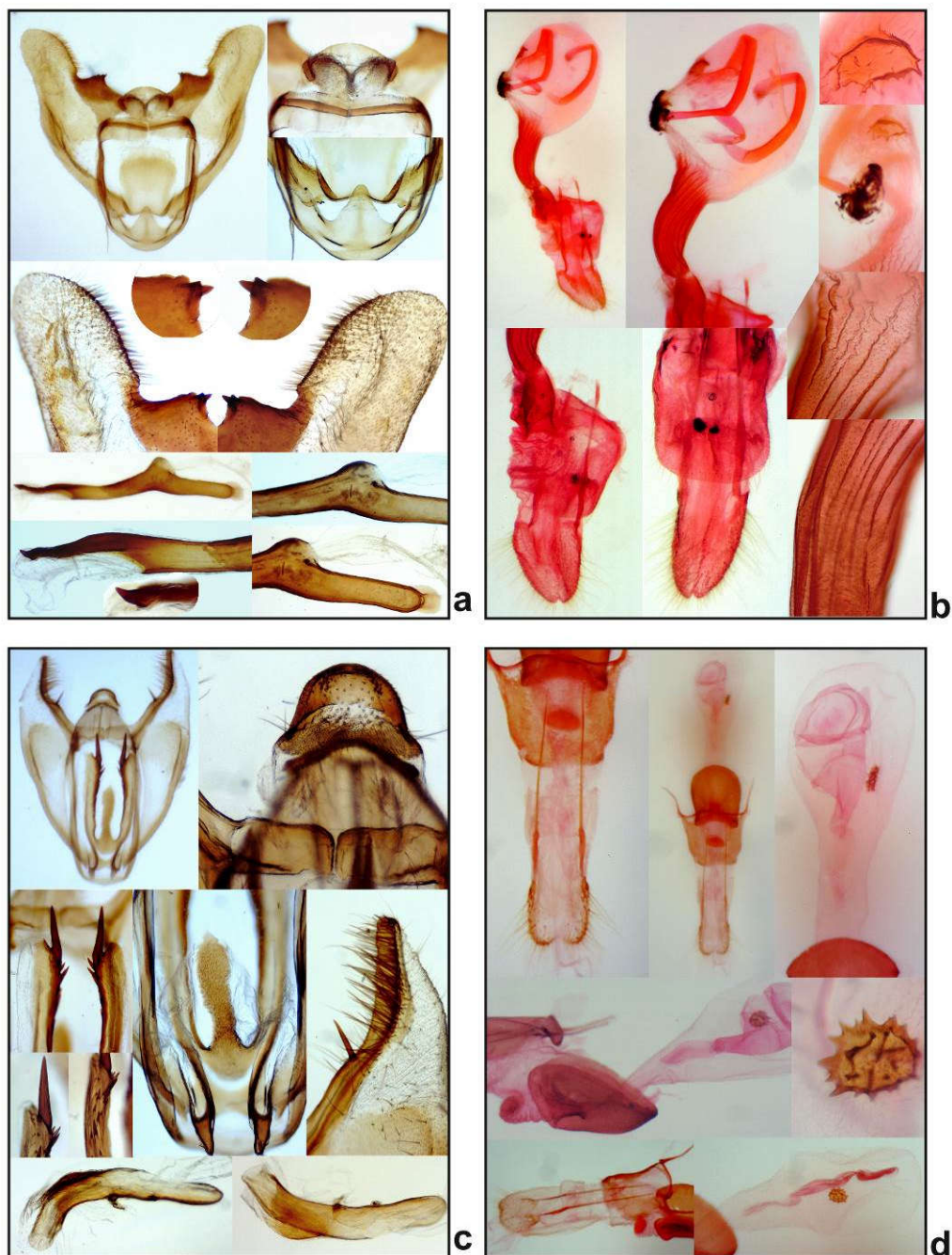


Figure 3. Male and female genitalia. a – *Dyscia raunaria* ♂, b – *Ennomos quercaria* ♀, c – *Elophos dilucidaria* ♂, d – *E. dilucidaria* ♀.

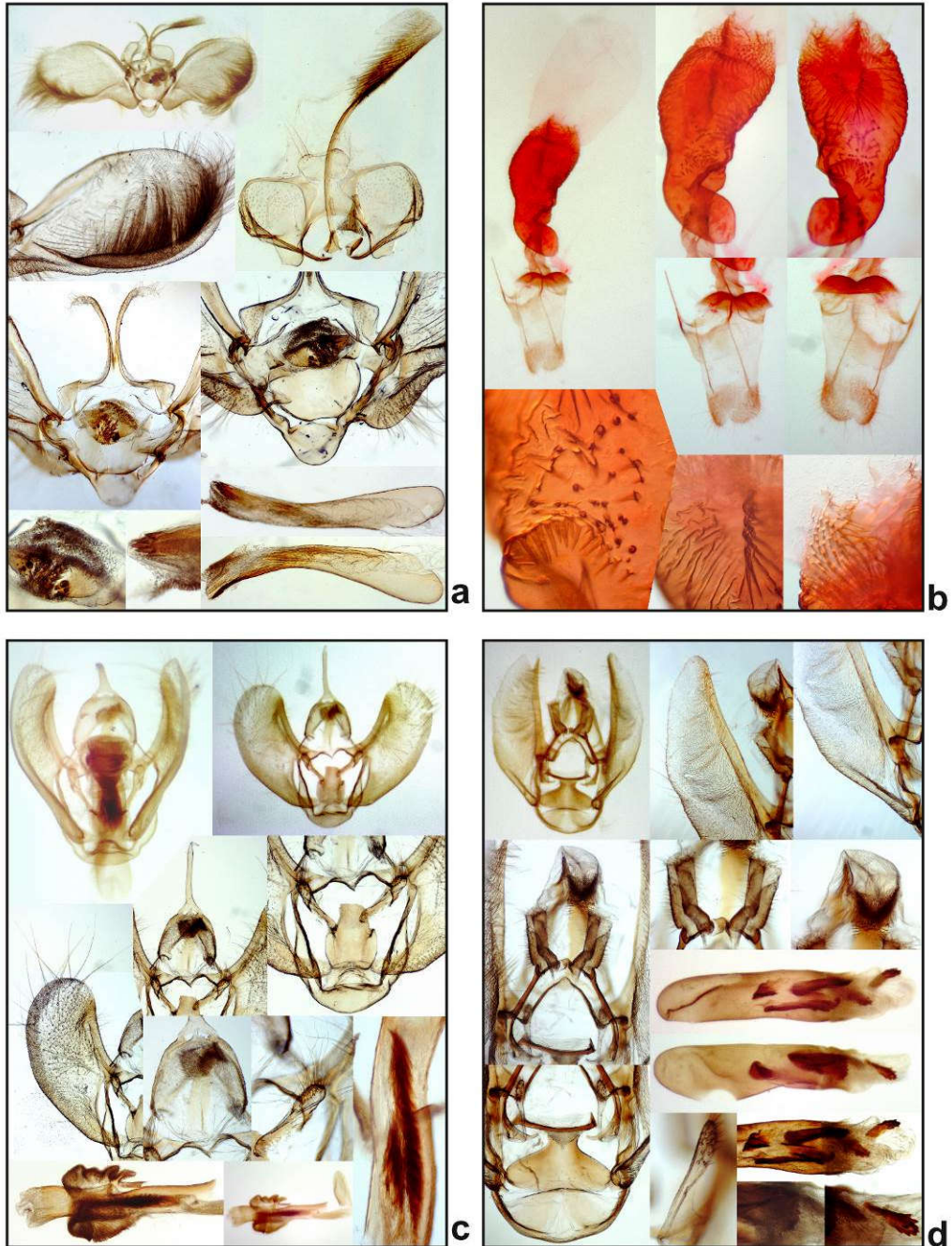


Figure 4. Male and female genitalia. a – *Anticollix sparsata* ♂, b – *A. sparsata* ♀, c – *Colostygia fitzi* ♂, d – *Eupithecia absinthiata* ♂.

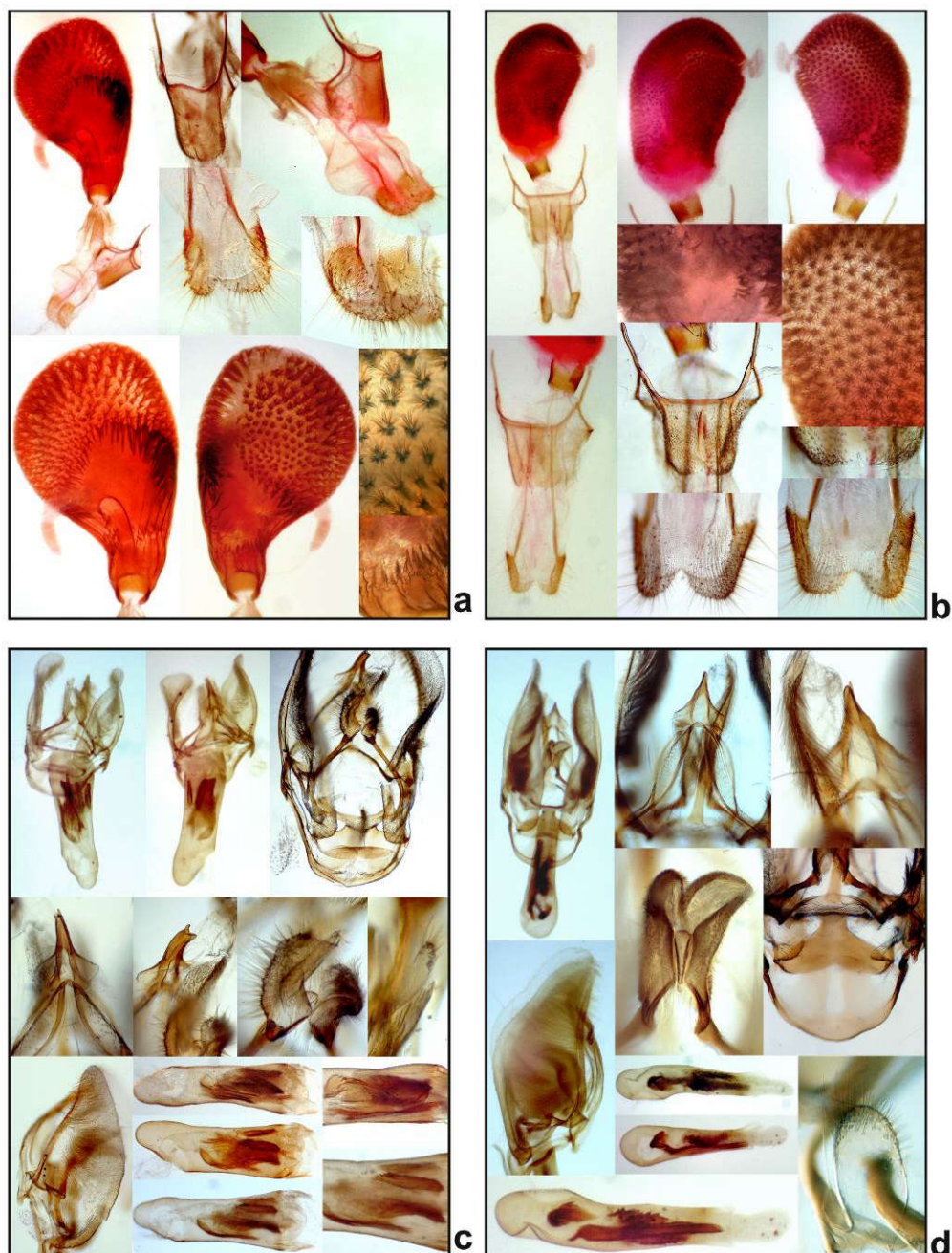


Figure 5. Male and female genitalia. a – *Eupithecia absinthiata* ♀, b – *E. alliaris* ♀, c – *E. assimilata* ♂, d – *E. millefoliata* ♂.

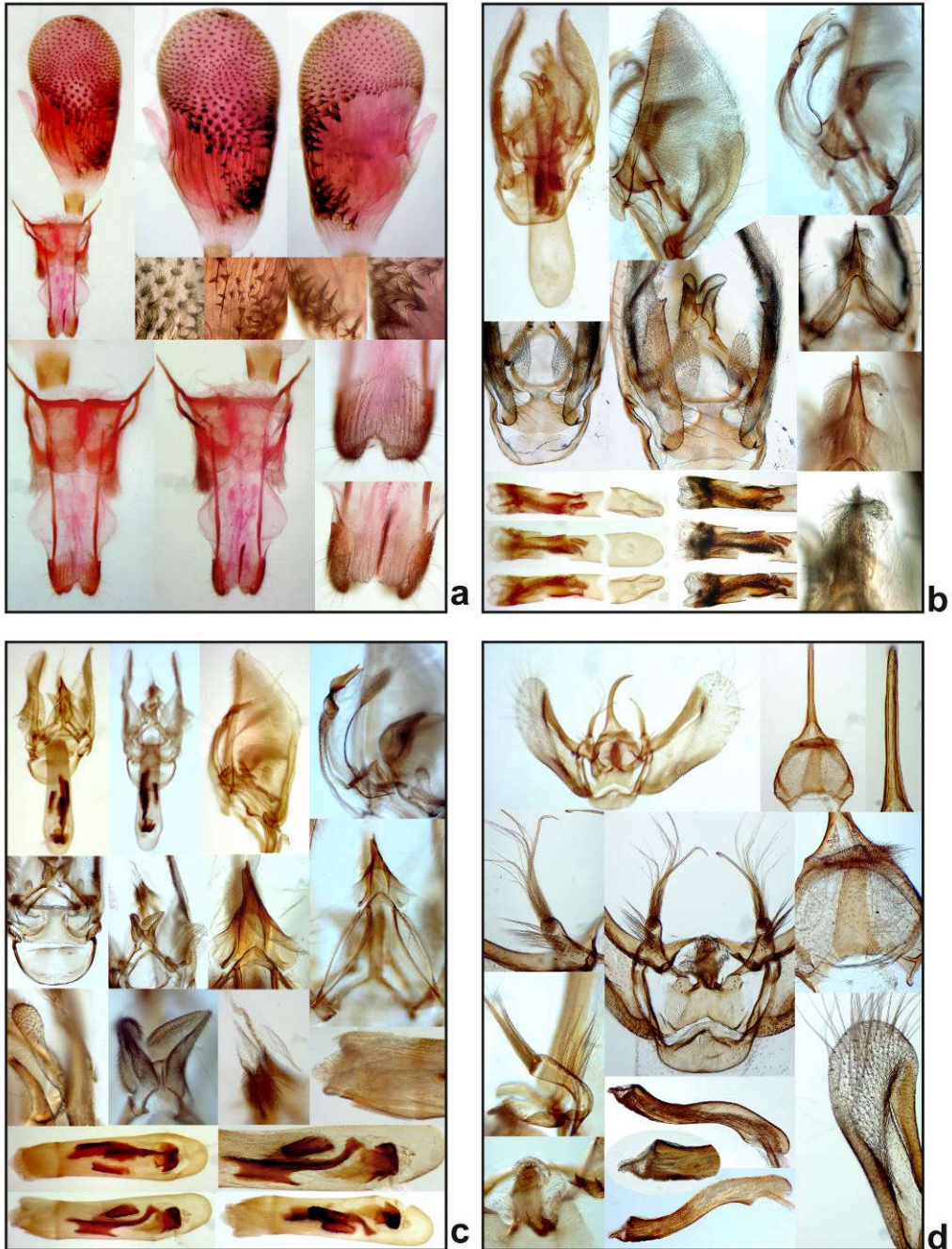


Figure 6. Male and female genitalia. a – *Eupithecia millefoliata* ♀, b – *E. ochridata* ♂, c – *E. semigraphata* ♂, d – *Nebula nebulata* ♂.

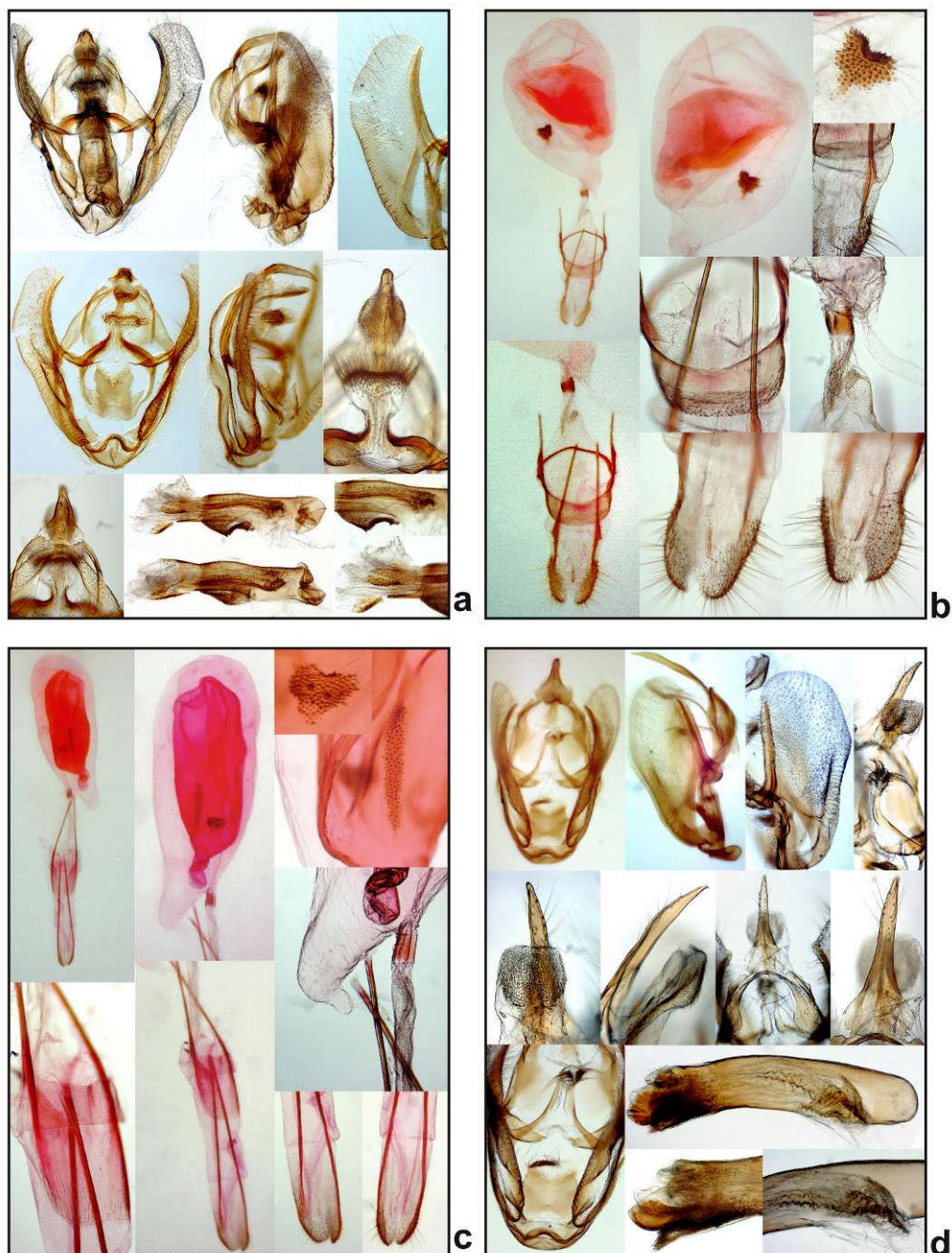


Figure 7. Male and female genitalia. a – *Perizoma bifaciata* ♂, b – *P. bifaciata* ♀, c – *P. hydrata* ♀, d – *Perizoma juracolaria* ♂.

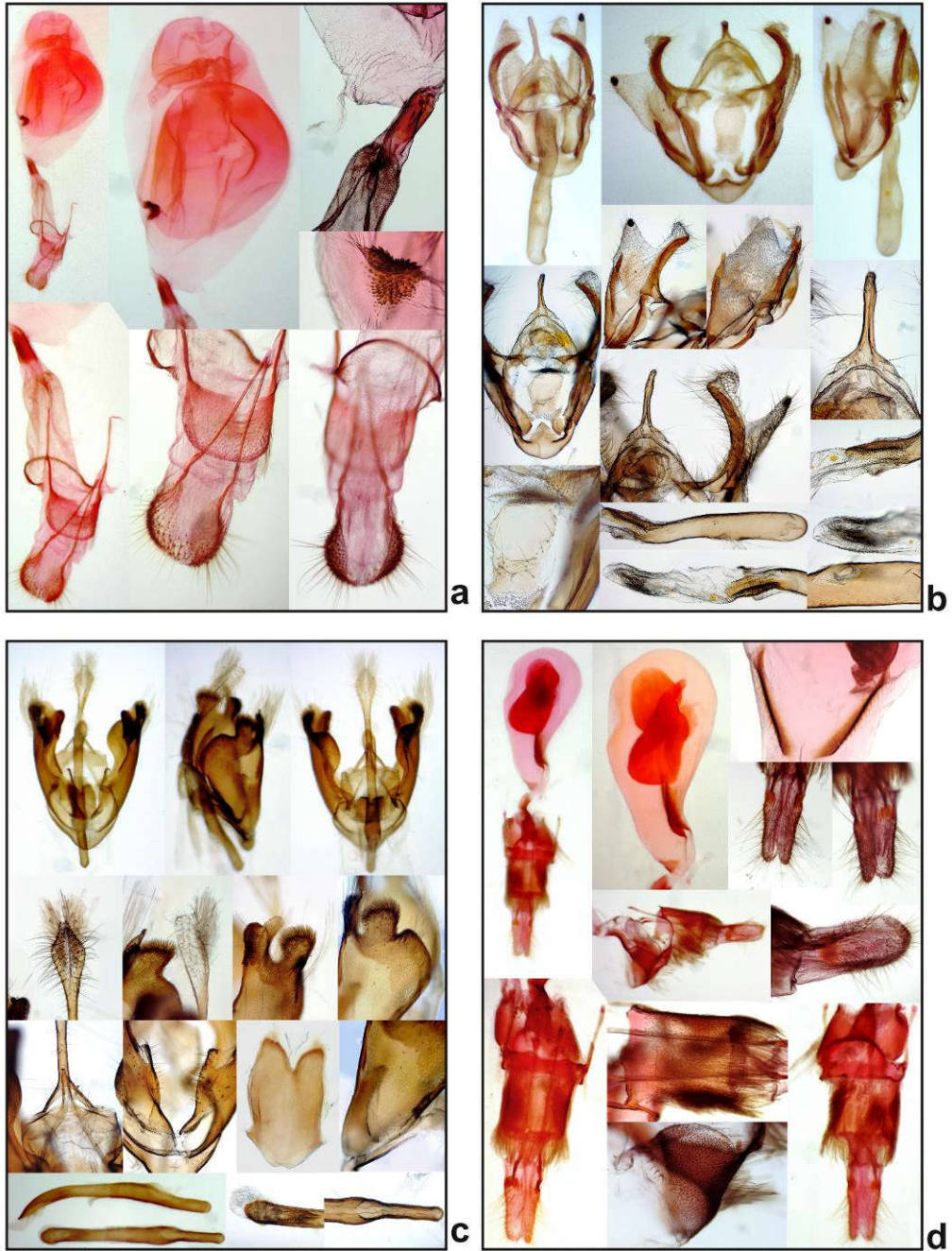


Figure 8. Male and female genitalia. a – *Perizoma juracolaria* ♀, b – *Trichopteryx polycommata* ♂, c – *Rhodostrophia discopunctata* ♂, d – *Rh. discopunctata* ♀.

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НОВЕ И ИНТЕРЕСАНТНЕ ВРСТЕ GEOMETRIDAE (LEPIDOPTERA) НЕДАВНО ПРОНАЂЕНЕ У СРБИЈИ

АЛЕКСАНДАР СТОЈАНОВИЋ, МИРОСЛАВ ЈОВАНОВИЋ и ЧЕДОМИР МАРКОВИЋ

Извод

Проучавањем фауне Geometridae Србије пронађено је 17 врло интересантних врста. Међу њима 10 су нове за фауну Србије (*Ennomos quercaria*, *Anticollix sparsata*, *Colostygia fitzi*, *Eupithecia absinthiata*, *E. alliarda*, *E. assimilata*, *E. millefoliata*, *E. semigraphata*, *Perizoma juracolaria*, *Trichopteryx polycommata*), 5 су други (*Dyscia raunaria*, *Elophos dilucidaria*, *Eupithecia ochridata*, *Perizoma bifaciata*, *Rhodostrophia discorunctata*) а 2 трећи пут (*Nebula nebulata*, *Perizoma hydrata*) у Србији констатоване. За све њих у раду је наведено где су и када пронађене.

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