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The Geometrid Moths of Poland
Vol. 1. Ennominae
(Lepidoptera: Geometridae)

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ABSTRACT. The Geometridae is one of the most species-rich families of the Lepidoptera, both in our part of Europe and worldwide. According to the latest count, we have 412 species in Poland, many of which have not been seen for a very long time. Like most families of butterflies and moths, this one has not yet been the subject of a separate, modern monograph in Poland.

The present revision of the Polish Ennominae is an extensive faunistic and anatomical/morphological study of the imaginal forms of this subfamily (114 spp.) that covers both the global distribution as well as the local life histories and habitats of the species, wherever they are sufficiently well-known.

The faunistic part contains the available data on species relatively rarely come across, at the edges of their ranges or expanding their distributions (41 spp.) in the form of a catalogue of information gleaned from the literature as well as from accessible museum collections and the larger private ones. Historical data and present-day habitats are shown on distribution maps based on the UTM grid. The latest distribution data on the relatively more common species are being accumulated in the computerized "Checklist – Lepidoptera of Poland" database and is listed according to province (voivodship). The reliability of historical records is critically analysed in the context both of voucher specimens in collections and of the probability of such records, judged on the basis of known present-day localities of the species concerned. The anatomical-morphological part stresses diagnostic features at the species level. They are characterized in the descriptions and the illustrations (72 tables b/w) in such a way as to facilitate comparison of similar species. There are illustrations in colour (18 plates) of all the species (including those known only from historical records); intraspecific variability is taken into account. The genitalia of both sexes of all but two species are illustrated. The recent occurrence in Poland of *Agriopis bajaria* (DENIS & SCHIFFERMÜLLER, 1775) and the present-day record of *Lycia zonaria* (DENIS & SCHIFFERMÜLLER, 1775) have been confirmed, but the Polish records of *Selidosema plumaria* (DENIS et SCHIFFERMÜLLER, 1775) and *Odontognophos dumetata* (TREITSCHKE, 1827) have been rejected. The question of whether there are permanent populations of a few other species in Poland at present (categories: EX?, DD) remains open.

CONTENTS

1. INTRODUCTION

The Geometridae are one of the most species-rich families of the Lepidoptera, both in our part of Europe and worldwide. According to the latest count, Poland can boast 412 species, many of which have not been sighted for a very long time (Malkiewicz & Sosiński 1999, 2000). Like most of the families in the Polish Lepidoptera, the Geometridae have not yet been described in a separate monograph. Romaniszyn's work of 1929 on Polish butterflies and moths covered mainly the central and eastern regions of the country, but is now largely of historical significance. The same applies to other regions of Poland, whose Lepidoptera were described in the 19th century and in the first half of the 20th century: Silesia – Wocke (1872; supplements 1879 and 1884), Raebel (1931); western and central Pomerania: Urbahn & Urbahn (1939); eastern Pomerania, Warmia and the Masurian Lakeland: Speiser (1903). To these works we can add the summary of Silesian geometrids by Raebel & Toll (1962), published rather belatedly, owing to the political complications of the 1940s and 1950s. The keys to the identification of Polish geometrids (Błeszyński 1960 - 1966), richly illustrated with black-and-white drawings, were a milestone in the dissemination of expert knowledge in this respect, the many errors and shortcomings in the faunistic part notwithstanding. They were also an attempt to systematize the views held at that time regarding the classification of taxa at the generic level. It should be added, however, that the final part of these keys – number 46c, covering most of the contemporary Ennominae – is incomplete and rather inaccurate: the morphologies of most female genital armatures were omitted on the grounds that they were of little use diagnostically. Later works, such as those by Fajčik & Slamka (1996) and Buszko (2000), did not fill this gap: their aim was to popularize the Lepidoptera among a wider readership, and for this reason did not include such specialized knowledge. The latter of these two works does, however, contain a range of valuable data on larval host plants and habitats, and also gives a better picture of intraspecific variation.

This revision of the Polish Ennominae is a comprehensive faunistic and morphological/anatomical overview of the imagines of this subfamily in the context of their global distribution and their local natural history, where these are sufficiently well known.

2. METHODS

The faunistic part includes data on forty species that are fairly rare, or are at their range limits, or are expanding, brought together from information gleaned from the literature and from collections in museums and private hands. The historical records and current localities of these species are shown on UTM grid distribution maps. Current records of the remaining, relatively common species, divided into provinces (voivodships), are stored in the "Checklist – Lepidoptera of Poland" database. The

reliability of the records reported only in the earlier literature was subjected to critical analysis, the principal criteria being the presence of these species in collections of voucher specimens and the probability of their occurrence based on a knowledge of present-day habitats in their areas of distribution. As a result, records of species that had been placed on national or regional lists of Polish fauna on the basis of erroneous or dubious identification or non-standard methods of describing collections were deleted. This applied in particular to specimens (or photographs of specimens) with ambiguous or incomplete labels that did not permit the locality and date of capture or emergence to be identified unequivocally and the record to be thereby authenticated.

The main emphasis in the morphological/anatomical part is on diagnostic features at the species level. They are precisely characterized in the descriptions and illustrated in the photographs in such a way as to make it easy to compare similar species. All the species, including those for which we have only historical records, are presented on colour plates (pl. 1-16), and in such number as to demonstrate their variability in Poland. The genitalia of both sexes are illustrated for each (but two) species, and the locality (country, region) from which the material was obtained is stated (genitalia plates 1-72). For the males usually both valves, the tegumen-uncus complex, the saccus, the gnathos and sternum A8, if necessary, for females: ovipositor with apophyses, the corpus and the ductus bursae, the antrum and possibly other characters important for species identification are figured. The genitalia slides were prepared in accordance with the standards applicable to most groups of the "Macrolepidoptera" (Razowski 1973; Robinson 1976; Buszko 2000). The male genitalia of many species are illustrated both with the aedeagus in the resting position and with the vesica everted, depending on the diagnostic significance. In these cases the vesicae are shown in one or two positions. The techniques used here are our own modifications of the methods described by Dang (1993), Nowacki (1995), Sihvonen (2001) and those used by Stelmaszczyk (2010). The photography was done using a Nikon D80 digital SLR with a Tamron macro lens, a Nikon DS Fi1-U2i digital camera in conjunction with a Nikon SMZ1000 stereomicroscope, and Helicon software for processing photographs of spatial objects. The females of similar species are shown at comparable physiological stages (before or after fertilization) in order to avoid the artifacts often found in earlier publications. This morphological study is based on over 900 adult specimens: ca 430 were used for the colour plates and over 500 were dissected for genital and other preparations. Most of specimens used for the colour plates, originate from material collected by the author and Jarosław Buszko, other were obtained from various local breeders, collectors and institutions listed below.

The categories used in **Conservation status** units comes from Polish Red Data Book of Animals – Invertebrates (Głowaciński & Nowacki 2004) based on the same criteria and principles as those recommended recently by the IUCN. These are as following: Lower Risk (LR), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct (EX) and additionally - Probably extinct (EX?).

Abbreviations (= Acronyms) of institutions and collections:
ISEZ – Instytut Systematyki i Ewolucji Zwierząt PAN, Kraków;
MiIZW – Muzeum i Instytut Zoologii PAN, Warszawa;
MNHU – Museum für Naturkunde der Humboldt-Universität, Berlin;
MPJG – Muzeum Przyrodnicze, Jelenia Góra;
MPUŁ – Muzeum Przyrodnicze Uniwersytetu Łódzkiego, Łódź;
MPUWr – Muzeum Przyrodnicze Uniwersytetu Wrocławskiego, Wrocław;
USMB – Muzeum Górnośląskie, Bytom;
ZFMK – Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn;
ZIN – Zoological Institute, Russian Academy of Sciences, St. Petersburg.

Private collections:
AK – Andrzej Kokot;
AKw – Antoni Kwiczala;
AL – Adam Larysz;
AM – Adam Malkiewicz;
DŁ – Dariusz Łupiński;
HB – Henryk Brzezina;
ISz – Izabela Szeląg;
JB – Jarosław Buszko;
JBu – Jarosław Bury;
JG – Jörg Gelbrecht;
JJ – Jakub Józefczuk;
JK – Jarosław Kania;
JM – Janusz Masłowski;
JS – Janusz Sosiński;
ŁM – Łukasz Matuszewski;
MH – Marek Hołowiński;
MM – Maciej Matraj;
MMl – Mariusz Mleczak;
RSz – Romuald Szpor;
RZ – Roman Zamorski;
SF – Stanisław i Edmund Fuglewicz;
SŁ – Sebastian Łuczkowski;
ST – Stefan Sobczak;
TB – Tomasz Blaik;
WZ – Witold Zajda;
XD – Xawery Dobrzański.

Other abbreviations:
LHPs – larval host plants;
pers. comm. – personal communication;
obs. – observation;
phot. – photographic documentation;

distr. - district;
(UTM?) – localization impossible;
(XR18?) – location not sure;
?Olchowa near Sanok – doubtful – only an enigmatic literature record is available;
leg.? – unknown collector;
orig.? – specimen of unknown origin (on the plates).

Explanations to the UTM maps:
• - historical records and current localities;
▲ – dubious - not totally certain data or not certainly correct identification;
? – imprecise location or data of unclear origin (used exceptionally).

3. MORPHOLOGY OF THE IMAGO

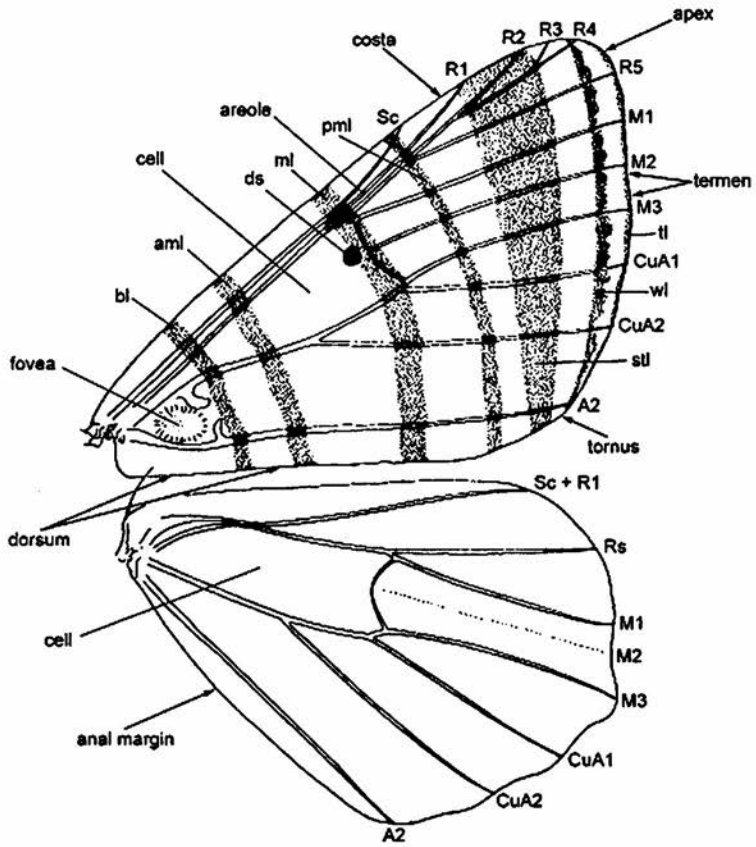
Polish geometrid moths have wingspans between ca 12 and 60 mm and overall body lengths (excluding antennae) not exceeding 35 mm. Some species exhibit seasonal size dimorphism, when the spring generation is considerably larger than the summer/autumnal one: good examples in the Ennominae are *Campaea margaritata* and *Hylaea fasciaria.* Wing size may also be sexually dimorphic, the best examples being the wing reductions in the brachypterous (short-winged) and apterous (wingless) females of such genera as *Phigalia*, *Apocheima*, *Lycia* (in part), *Agriopis, Erannis*, *Theria* and *Elophos* (in part) (SATTLER 1991). Well-developed but smaller wings are typical of e.g. *Dyscia*, *Pachycnemia* and *Selidosema*: this is always the consequence of reduced mobility and in most cases, extremely difficult climatic circumstances. In a less spectacular way, the males of such genera as *Angerona* and *Campaea* are smaller than the females, a common phenomenon throughout the Lepidoptera. There is only one example (in Europe) of the extreme reduction of hindwings – this is in *Celonoptera mirificaria* LEDERER, 1862 (Larentiinae).

Most geometrid moths have delicate though relatively broad wings. With the exception of the Bistonini tribe, their wings are not as strong as those of most noctuids or sphingids. The terminology of wing parts and patterns adopted in this work follows MCGUFFIN (1972-87) with some modifications according to HAUSMANN (2001) (fig. 1). The leading edge of the wing is termed the costal margin , the outer edge is the outer margin or termen, and the posterior edge is the inner margin or dorsum. The forewing termen is usually smooth, but in the Ennominae is often scalloped, e.g. *Selenia* and *Odontopera*, or concave just below the apex, e.g. *Hypoxystis, Therapis* and *Macaria.* A pointed forewing apex is quite common, as in *Ennomos, Artiora* and *Epione.* Some genera, mainly from the Gnophini, have a slightly concave costal margin. Some species, like *Campaea* and *Ourapteryx*, have wedge-shaped projections or 'tails' on the hindwing termen. In others this margin is arched between the veins (*Charissa, Gnophos, Alcis*). Special structures, typical of Ennominae males (occasionally females) are the 'fovea' – small, round, blister-like areas at the bases of the forewing undersides. They

are located between the basal parts of veins CuA2 and A, probably functioning as a sense receptor, possibly an accessory wing tympanum.

3.1. *Venation*

The veins of the forewing are divided into a subcostal (Sc) vein; a 4- or 5-branched radial (R1-R5) vein, enclosing as a rule one or more (up to 3 in Ennominae) accessory cells (a.c.) or 'areoles'; a 3-branched medial (M1-M3) vein; a 2-branched cubital (CuA1-CuA2) vein; and a single anal vein (A2). A1 is usually lacking in the forewing; A2 and A3 are fused, but diverge near the base of the wing. In both wings the 'cell' is delimited distally by the 'discocellular vein'. The venation of the hindwing is similar, but Sc and R1 are totally fused (except in the genus *Orthostixis*), R2-R5 are fused into



1. Wing venation, margins and forewing pattern (after McGuffin 1972 and Hausmann 2001, modified): **bl** – basal line, **aml** – antemedial line, **ds** – discal spot, **ml** – medial line, **pml** – postmedial line, **tl** – terminal line, **wl** – wavy line, **stl** – subterminal line

one single vein Rs. Only one anal vein (A2) is present in most species. In a few cases a short second anal vein (A3) is present, and in some groups like the Orthostixinae and Archiearinae, there is a vein-like folding in the wing between A2 and CuA2 ('A1') which, however, is never tubular (HAUSMANN 2001). In the Ennominae, hindwing vein M2 is developed as a tubular vein only distally from the cell or is totally lacking.

3.2. *Wing pattern*

The wing pattern terminology largely follows that of McGUFFIN (1972-1987), with one transverse line only between the basal and medial areas, called the antemedial line (as a counterpart to the postmedial line) (fig. 1). In the characteristic planiform resting position of most Geometridae (and most Ennominae) the upperside of the wing is more intensely coloured than the underside. By contrast, in veliform (butterfly-like) resting species, such as *Chiasmia, Isturgia* and *Bupalus*, it is the underside that usually carries the bright colours and/or distinctive patterns. In the rarest tectiform position, the wings are held roof-like over the body, as in most other moths. In some non-ennomid arboreal genera like *Chesias* and *Trichopteryx* the forewings are rolled slightly around the twigs on which the moths are perched.

The colours and patterns of most species are cryptic, which is connected with their defence strategy. Wing coloration, more than other morphological features, varies within species and populations with a characteristic frequency and pattern. The usual, frequent 'variations' that produce forms transitional to the typical form should be distinguished from mutations, which can sometimes lead to totally different 'individual aberrations'.

3.3. *Legs*

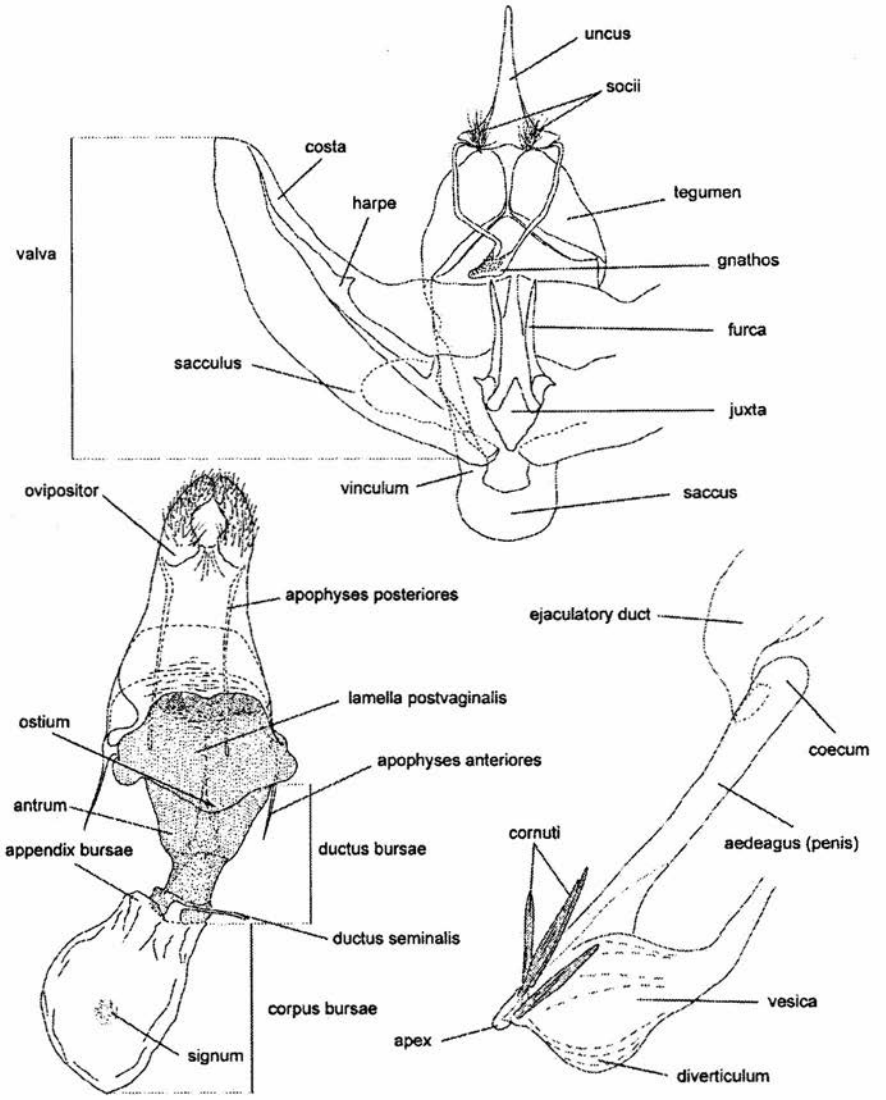
The leg of a geometrid moth, like other Lepidoptera, is typically divided into coxa, trochanter, femur, tibia and tarsus (with praetarsus). The foreleg tibia inner surface is often armed with an epiphysis, the organ used for cleaning the antennae and proboscis. The number of spurs on the fore- (prothoracic), mid- (mesothoracic) and hind- (metathoracic) legs is defined by the so-called 'spur formula'. The typical formula for Geometridae is 0-2-4. Spurs are sometimes reduced or absent, especially on the hindleg (as in some *Ennomos*). The hindtibia of some species bears a hairpencil, usually forming one of the male scent organs. It can also be dilated, e.g. in some Boarmiini. The tarsus consists of five tarsomeres. It is often reduced in the males of some geometrids (e.g. *Idaea*). The praetarsus ends in a pair of claws.

3.4. *Abdomen*

The abdomen consists of 10 segments, the last two being modified to bear the genital organs (see 'Genitalia'). Narrow appendages, called apodemes, can arise from different segments, e.g. laterally from sternum A2, or from the anterior margin of sternum A2 extending into the thorax. These apodemes may be strongly sclerotized,

as in *Eupithecia* and *Euchrognophos*. The paired setal patches on sternum A3 (in the Ennominae manifested as a transverse row of hairs) and external tufts of hair-like scales on the tergites are characteristic of many Geometridae.

Sterna A1-A2 are transformed into the paired tympanal organ, characteristic of the Geometridae, by the presence of the ansa, an invaginated sclerite, which is lacking in the other families. The shapes of the ansa in all the subfamilies of the Geometridae are illustrated in HAUSMANN (2001).



2. Male and female genitalia of Ennominae (semidiagrammatic; aedeagus with vesica everted) (orig.)

3.5. *Genitalia*

Both male and female genitalia usually provide some more or less diagnostic features. Here we use the terminology proposed by KLOTS (1970) and applied in most modern handbooks (SCOBLE 1995; HAUSMANN 2001).

The male genitalia (fig. 2) consist of some or all of these parts: uncus, gnathos, tegumen, vinculum, saccus, valves (often divided into costa, valvula and sacculus), transtilla, anellus, juxta (the ventral plate of the anellus), furca (a pair of dorsal projections of the juxta) and aedeagus. The aedeagus (penis) contains the eversible, membranous vesica, which bears sclerotized spines (cornuti) or other sclerites. In many Geometridae (including the Ennominae) the male sternum A8 produces special processes, known as octavals, cerata or the plate A8. It is regarded as belonging functionally to the copulatory system. This is the reason for its being adopted as diagnostic in many genera, but some of them (e.g. *Scopula* and *Glossotrophia*) exhibit polymorphism in the structure of the octavals (HAUSMANN 1999).

The female genitalia (fig. 2) consist of a paired setose ovipositor (papillae anales), an ostium (ostium bursae) on the ventral side of A8 or A7, and a bursa copulatrix divided into antrum, ductus bursae and corpus bursae. The ostium bursae is surrounded by a sclerotized plate, the sterigma, which is often subdivided into the 'lamella antevaginalis' and 'lamella postvaginalis'. The ductus bursae, very diverse in shape, may be sclerotized in part, like the subterminal collar-like thickening – the colliculum – which is treated here distinct from the antrum (SCOBLE 1995). The antrum, often also strongly sclerotized, is the most distal part of the ductus bursae, into which in most cases, the ductus seminalis opens. The corpus bursae often has one or more sclerotized areas, the signa (sing. signum), which in the Ennominae usually takes the form of large plates (lamina dentalis). The shape of the corpus bursae may be very diverse and variable within the same population, depending on the physiological state of the particular female (i.e. pre- or post-copulation). Another small sac, known as the appendix bursae (digitabulum) (e.g. in the Gnophini), sometimes leads from the corpus bursae.

The ovipositor is sometimes densely covered by an anal tuft of hair (e.g. *Alsophila*), in other cases (*Aleucis*, *Theria*) it has broad-headed scales ('floricomus'); these are described in detail by PELLMYR (1980). In both cases the function of the modified scales is to cover the eggs and protect them. Other longer hairs probably fulfil an olfactory function by enlarging the pheromone precipitation surface.

4. DIAGNOSIS OF ENNOMINAE

The subfamily counts about 9 800 species, distributed worldwide, including nearly 300 in Europe (KARSHOLT & RAZOWSKI 1996; HAUSMANN 2001).

The monophyly of this subfamily has often been called into question (SCOBLE 1995; HAUSMANN 2001). There are only three characters in common: principally the reduction or absence of hindwing vein M2; in addition, the wing pattern of the fore- and hinwing are usually similar, and the structure of the tympanal organ is diverse with the ansa

narrow at the base. In some, possibly archaic, groups the caterpillar has vestigial prolegs on segment A5 (or segments A4-A5 in many genera outside Europe). This feature and the reduction of hindwing M2 may have occurred several times independently. In males of several species, and in females of some, a blister-like fovea occurs near the base of the forewing between veins Cu and A2. In the forewing, vein R1 commonly anastomoses with Sc, and always so when there are two accessory cells. Antenna of male simple, fasciculate or pectinate. Antenna of female usually simple. A hairpencil, usually concealed in deep groove, is often present on the tibia of the midleg.

The tribal subdivision is still in dispute and insufficiently resolved. Recent molecular analyses have yielded interesting results, correcting the existing concept of the subfamily Ennominae, *inter alia* by including the genera *Alsophila* and *Epirranthis* as well as the Orthostixinae/Orthostixini (ABRAHAM et al. 2001; SIHVONEN et al. 2011; WAHLBERG et al. 2010).

5. SYSTEMATIC CHECKLIST OF THE ENNOMINAE OF POLAND AND ADJACENT AREAS

The systematic order follows Fauna Europaea (http://www.faunaeur.org) with a few changes. This list consists from 114 names of the species recorded from territory of Poland. The synonyms included are only those used recently in the Polish and central European literature. Four species occurring in the areas adjacent to Poland are inserted (marked with an asterisk) in the list with an indication of their distribution in these adjacent countries.

Abraxini

***Abraxas* LEACH, 1815**

1. *Abraxas grossulariata* (LINNAEUS, 1758)
2. *Abraxas sylvata* (SCOPOLI, 1763)

***Ligdia* GUENÉE, 1857**

3. *Ligdia adustata* (DENIS & SCHIFFERMÜLLER, 1775)

Cassymini

***Lomaspilis* HÜBNER, 1825**

4. *Lomaspilis marginata* (LINNAEUS, 1758)
5. *Lomaspilis opis* BUTLER, 1878
   ssp. *nigrita* HEYDEMANN, 1944

***Stegania* GUENÉE, 1845**

6. *Stegania cararia* (HÜBNER, 1790)
7. *Stegania dilectaria* (HÜBNER, 1790)

*7A. *Stegania trimaculata* (DE VILLERS, 1789) [Germany-Brandenburg]

Macariini

***Heliomata* GROTE & ROBINSON, 1866**

8. *Heliomata glarearia* (DENIS & SCHIFFERMÜLLER, 1775)

***Macaria* CURTIS, 1826**

9. *Macaria notata* (LINNAEUS, 1758)

10. *Macaria alternata* (DENIS & SCHIFFERMÜLLER, 1775)
11. *Macaria signaria* (HÜBNER, 1809)
12. *Macaria liturata* (CLERCK, 1759)
13. *Macaria wauaria* (LINNAEUS, 1758)
14. *Macaria artesiaria* (DENIS & SCHIFFERMÜLLER, 1775)
15. *Macaria brunneata* (THUNBERG, 1784)
[=*fulvaria* (DE VILLERS, 1789)]

***Chiasmia* HÜBNER, 1823**

16. *Chiasmia clathrata* (LINNAEUS, 1758)

***Narraga* WALKER, 1861**

17. *Narraga fasciolaria* (HUFNAGEL, 1767)

***Isturgia* HÜBNER, 1823**

18. *Isturgia roraria* (FABRICIUS, 1776)
19. *Isturgia carbonaria* (CLERCK, 1759)
20. *Isturgia murinaria* (DENIS & SCHIFFERMÜLLER, 1775
21. *Isturgia arenacearia* (DENIS & SCHIFFERMÜLLER, 1775)

Lithinini

***Cepphis* HÜBNER, 1823**

22. *Cepphis advenaria* (HÜBNER, 1790)

***Petrophora* HÜBNER, 1811**

23. *Petrophora chlorosata* (SCOPOLI, 1763)

Hypochrosini

***Plagodis* HÜBNER, 1823**

24. *Plagodis pulveraria* (LINNAEUS, 1758)
25. *Plagodis dolabraria* (LINNAEUS, 1767)

***Pachycnemia* STEPHENS, 1829**

26. *Pachycnemia hippocastanaria* (HÜBNER, 1799)

Epionini

***Opisthograptis* HÜBNER, 1823**

27. *Opisthograptis luteolata* (LINNAEUS, 1758)

***Epione* DUPONCHEL, 1829**

28. *Epione repandaria* (HUFNAGEL, 1767)
[= *apiciaria* (DENIS & SCHIFFERMÜLLER, 1775)]
29. *Epione vespertaria* (LINNAEUS, 1767)
[= *paralellaria* (DENIS & SCHIFFERMÜLLER, 1775)]

***Therapis* HÜBNER, 1823**

30. *Therapis flavicaria* (DENIS & SCHIFFERMÜLLER, 1775)

***Pseudopanthera* HÜBNER, 1823**

31. *Pseudopanthera macularia* (LINNAEUS, 1758)

***Hypoxystis* PROUT, 1915**

32. *Hypoxystis pluviaria* (FABRICIUS, 1787)

Apeirini

***Apeira* GISTL, 1848**

33. *Apeira syringaria* (LINNAEUS, 1758)

Ennomini

***Ennomos* Treitschke, 1825**

34. *Ennomos autumnaria* (Werneburg, 1859)
35. *Ennomos quercinaria* (Hufnagel, 1767)
36. *Ennomos alniaria* (Linnaeus, 1758)
37. *Ennomos fuscantaria* (Haworth, 1809)
38. *Ennomos erosaria* (Denis & Schiffermüller, 1775)

***Selenia* Hübner, 1823**

39. *Selenia dentaria* (Fabricius, 1775)
    [= *bilunaria* (Esper, 1801)]
40. *Selenia tetralunaria* (Hufnagel, 1767)
41. *Selenia lunularia* (Denis & Schiffermüller, 1775)
    [= *lunaria* (Denis & Schiffermüller, 1775)]

***Artiora* Meyrick, 1892**

42. *Artiora evonymaria* (Denis & Schiffermüller, 1775)

***Odontopera* Stephens, 1831**

43. *Odontopera bidentata* (Clerck, 1759)

***Crocallis* Treitschke, 1825**

44. *Crocallis tusciaria* (Borkhausen, 1793)
45. *Crocallis elinguaria* (Linnaeus, 1758)

Ourapterygini

***Ourapteryx* Leach, 1814**

46. *Ourapteryx sambucaria* (Linnaeus, 1758)

Colotoini

***Colotois* Hübner, 1823**

47. *Colotois pennaria* (Linnaeus, 1761)

Angeronini

***Angerona* Duponchel, 1829**

48. *Angerona prunaria* (Linnaeus, 1758)

Bistonini

***Apocheima* Hübner, 1825**

9. *Apocheima hispidaria* (Denis & Schiffermüller, 1775)

***Phigalia* Duponchel, 1829**

50. *Phigalia pilosaria* (Denis & Schiffermüller, 1775)
    [= *pedaria* (Fabricius, 1787)]

***Lycia* Hübner, 1825**

51. *Lycia hirtaria* (Clerck, 1759)
    [= *hanoviensis* (Heymons, 1891)]
52. *Lycia zonaria* (Denis & Schiffermüller, 1775)
53. *Lycia pomonaria* (Hübner, 1790)
54. *Lycia isabellae* (Harrison, 1914)

***Biston* Leach, 1815**

55. *Biston strataria* (Hufnagel, 1767)
56. *Biston betularia* (Linnaeus, 1758)

***Agriopis* Hübner, 1825**

57. *Agriopis leucophaearia* (Denis & Schiffermüller, 1775)
58. *Agriopis bajaria* (Denis & Schiffermüller, 1775)
59. *Agriopis aurantiaria* (Denis & Schiffermüller, 1775)
60. *Agriopis marginaria* (Fabricius, 1776)

***Erannis* Hübner, 1825**

61. *Erannis defoliaria* (Clerck, 1759)

Boarmiini

***Synopsia* Hübner, 1825**

62. *Synopsia sociaria* (Hübner, 1799)

***Peribatodes* Wehrli, 1943**

63. *Peribatodes rhomboidaria* (Fabricius, 1776)
[= *gemmaria* (Brahm, 1791)]
64. *Peribatodes secundaria* (Denis & Schiffermüller, 1775)
65. *Peribatodes ilicaria* (Geyer, 1833)
[= *manuelaria* (Herrich-Schäffer, 1852)]

***Selidosema* Hübner, 1823**

66. *Selidosema brunnearia* (de Villers, 1789)
[= *ericetaria* (Villers, 1789)]
*66A. *Selidosema plumaria* (Denis & Schiffermüller, 1775)
[Czech Rep., Slovakia, Ukraine]

***Cleora* Curtis, 1825**

67. *Cleora cinctaria* (Denis & Schiffermüller, 1775)

***Deileptenia* Hübner, 1825**

68. *Deileptenia ribeata* (Clerck, 1759)

***Alcis* Curtis, 1826**

69. *Alcis bastelbergeri* (Hirschke, 1908)
70. *Alcis repandata* (Linnaeus, 1758)
71. *Alcis jubata* (Thunberg, 1788)

***Arichanna* Moore, 1868**

72. *Arichanna melanaria* (Linnaeus, 1758)

***Hypomecis* Hübner, 1821**

73. *Hypomecis roboraria* (Denis & Schiffermüller, 1775)
74. *Hypomecis punctinalis* (Scopoli, 1763)

***Fagivorina* Wehrli, 1943**

75. *Fagivorina arenaria* (Hufnagel, 1767)
[= *angularia* Thunberg, 1792]

***Ascotis* Hübner, 1825**

76. *Ascotis selenaria* (Denis & Schiffermüller, 1775)

***Ectropis* Hübner, 1825**

77. *Ectropis crepuscularia* (Denis & Schiffermüller, 1775)
[= *bistortata* Goeze, 1781)]

***Paradarisa* Warren, 1894**

78. *Paradarisa consonaria* (Hübner, 1799)

***Parectropis* SATO, 1980**

79. *Parectropis similaria* (HUFNAGEL, 1767)
[= *luridata* (BORKHAUSEN, 1792)]

***Aethalura* MCDUNNOUGH, 1920**

80. *Aethalura punctulata* (DENIS & SCHIFFERMÜLLER, 1775)

***Ematurga* LEDERER, 1853**

81. *Ematurga atomaria* HÜBNER, 1825

***Tephronia* HÜBNER, 1825**

82. *Tephronia sepiaria* (HUFNAGEL, 1767)

Bupalini

***Bupalus* LEACH, 1815**

83. *Bupalus piniaria* (LINNAEUS, 1758)

CABERINI

***Cabera* TREITSCHKE, 1825**

84. *Cabera pusaria* (LINNAEUS, 1758)
85. *Cabera leptographa* (WEHRLI, 1936)
86. *Cabera exanthemata* (SCOPOLI, 1763)

***Lomographa* HÜBNER, 1825**

87. *Lomographa bimaculata* (FABRICIUS, 1775)
88. *Lomographa temerata* (DENIS & SCHIFFERMÜLLER, 1775)

***Aleucis* GUENÉE, 1845**

89. *Aleucis distinctata* (HERRICH-SCHÄFFER, 1839)
[= *pictaria* THUNBERG, 1788)]

Theriini

***Theria* HÜBNER, 1825**

90. *Theria rupicapraria* (DENIS & SCHIFFERMÜLLER, 1775)
*90A. *Theria primaria* (HAWORTH, 1809)
[Germany – Brandenburg; Mecklenburg-Vorpommern]

Campaeini

***Campaea* LAMARCK, 1816**

91. *Campaea margaritaria* (LINNAEUS, 1761)
[= *margaritata* (LINNAEUS, 1767)]
92. *Campaea honoraria* (DENIS & SCHIFFERMÜLLER, 1775)

***Hylaea* HÜBNER, 1822**

93. *Hylaea fasciaria* (LINNAEUS, 1758)
[= *prasinaria* (DENIS & SCHIFFERMÜLLER, 1775)]

***Pungeleria* ROUGEMONT, 1903**

94. *Pungeleria capreolaria* (DENIS & SCHIFFERMÜLLER, 1775)

Gnophini

***Cleorodes* WARREN, 1894**

95. *Cleorodes lichenaria* (HUFNAGEL, 1767)

***Gnophos* TREITSCHKE, 1825**

96. *Gnophos furvata* (TREITSCHKE, 1827)
- **Gnophos dumetata* (TREITSCHKE, 1827)[Czech Rep.; Slovakia]

***Charissa* CURTIS, 1826**

97. *Charissa obscurata* (DENIS & SCHIFFERMÜLLER, 1775)
98. *Charissa ambiguata* (DUPONCHEL, 1830)
99. *Charissa pullata* (DENIS & SCHIFFERMÜLLER, 1775)
100. *Charissa glaucinaria* (HÜBNER, 1799)
101. *Charissa intermedia* (WEHRLI, 1917)

***Elophos* BOISDUVAL, 1840**

102. *Elophos dilucidaria* (DENIS & SCHIFFERMÜLLER, 1775)
103. *Elophos vittaria* (THUNBERG, 1788)
[= *sordaria* (THUNBERG, 1792)]
104. *Elophos operaria* (HÜBNER, 1813)

***Psodos* TREITSCHKE, 1827**

105. *Psodos quadrifaria* (SULZER, 1776)

***Glacies* MILLIÉRE, 1874**

106. *Glacies canaliculata* (HOHENWARTH, 1785)
ssp. *schwingenschussi* (WEHRLI, 1919)
107. *Glacies noricana* (WAGNER, 1898)
ssp. *carpathica* SCHWINGENSCHUSS, 1915
108. *Glacies coracina* (ESPER, 1805)
109. *Glacies alpinata* (SCOPOLI, 1763)

***Siona* DUPONCHEL, 1829**

110. *Siona lineata* (SCOPOLI, 1763)

Aspitatini

***Chariaspilates* WEHRLI, 1953**

111. *Chariaspilates formosaria* (EVERSMANN, 1837)

***Aspitates* TREITSCHKE, 1825**

112. *Aspitates gilvaria* (DENIS & SCHIFFERMÜLLER, 1775)

***Dyscia* HÜBNER, 1825**

113. *Dyscia fagaria* (THUNBERG, 1784)
[= *belgaria* (HÜBNER, 1790)]

***Perconia* HÜBNER, 1823**

114. *Perconia strigillaria* (HÜBNER, 1787)

6. SYSTEMATIC REVIEW OF POLISH ENNOMINAE

Abraxas Leach, 1815

1. *Abraxas grossulariata* (Linnaeus, 1758)

Phalaena (Geometra) grossulariata Linnaeus, 1758: 525.

Adults: colour pl. I: fig. ♂ 1; ♀ 1.

Genitalia: ♂ - pl. 1: figs. 1, 1a, 1b; ♀- pl. 40: 1.

Description. Wingspan 38-44 mm. Head black with a smooth-scaled frons. Antennae grey, ciliate in the male, filiform in the female. Thorax orange with two large black spots on the dorsal side and small black spots on the tegulae. Wing ground colour white; the pattern consists of numerous black spots, often merging, forming broken lines. Forewing basal area black and orange. An orange line in the terminal area between two rows of merging black spots. A row of black spots along the termen of both

3. Distribution of *Abraxas grossulariata* (Linnaeus, 1758) in Poland

wings, extending onto the fringes. Discal spot large, black, usually contiguous with the adjacent spot on the costal margin. Abdomen orange with rows of black spots on the dorsal and lateral surfaces.

Life history and habitat. Flight season: one generation, from mid-June to mid-August. LHPs: various *Ribes* spp., including *Ribes uva-crispa* L., less often shrubs such as *Prunus padus* L., *Prunus spinosa* L., *Crataegus* spp., *Euonymus* spp. and *Salix* spp. Larva forages in autumn, overwinters, and then resumes feeding in May and June. Pupates in a flimsy cocoon among LHP leaves. Occurs in ash-alder riverine forest, alder swamps, and secondarily in gardens, orchards and black-/redcurrant and gooseberry plantations. Used to reach pest proportions in plantations, but nowadays much rarer, usually only single individuals seen.

Distribution. Palaearctic. From the Iberian Peninsula to Japan and from the Mediterranean Basin to the Arctic Circle. Widely distributed throughout Poland and not uncommon in suitable habitats, particularly in the eastern part of the country; up to ca 700 m in the mountains.

Localities in Poland: Kłodzko (XR18), Bystrzyca Kłodzka (XR17) (Stephan 1925); Jelenia Góra – Cieplice (WS43), Złotoryja (WS66), Tarnowskie Góry (CA49), Kończyce (CA47), Maciejów (CA47), Orzegów (CA47), Pogrzebień (CA04) (Raebel & Toll 1962); Lubomia (CA04) (Drozda 1962); Bagieniec (XS03) (J. Masłowski leg., coll. AM); Odyniec ad Szczepanów (XS17) (R. Szpor leg., coll. RSz); Wołów (XS19) (M. Matraj leg., coll. MM); Wrocław-Klecina (XS45) (A. Kokot leg., coll. MPJG); Pietrzyków (VT92) (Kokot 2000); Kożuchów (WT43), Pasterzowice (WT31), Tarnów Bycki (WT53) (E. & S. Fuglewicz leg., coll. SF); Żuków (WT71) (A. Malkiewicz leg., coll. AM); Sobibór (FC80), Orchówek (FC71), Pszczeliny (FV24) (A. Malkiewicz leg., coll. AM); Niedzica Zamek (DV47), Krościenko (DV57) (Błeszyński et al. 1965); Jabłonki (EV95), Baligród (EV96), Zatwarnica (FV15), Leszczawa Dolna (FA00) (Bielewicz 1973); Szczawnica (DV67) (P. Senn phot.); Biały Dunajec (DV27) (P. Guzik obs.); Pleszew (XT95) (P. Żurawlew obs.); Spała (DC41) (P. Pawlikiewicz leg.); Białuty (DD59) (M. Guzowski obs.); Pociecha (DC89) (D. Marczak obs.); Zelwa (FE68), Giby (FE59) (W. Kamocki obs.); Łapajówka (FA03), Łętownia (FA21) (J. Bury leg., coll. JBu); Bukowiec ad Szczucin (EA07) (coll. ISEZ); Antoniów (EB61) (A. Malkiewicz leg., coll. AM); Osowiec Twierdza (FE02), Bagno Ławki (FE00) (K. Deoniziak obs.); Kłótno (CD81) (K. Ulanowski obs.); Zawadówka res. (FB66), Macoszyn (FB79), Serniawy res. (FB69) (M. Hołowiński obs.) (www. lepidoptera.pl); Ojcowski P.N. (DA16) (Razowski 1995); Kraków (DA24) (Razowski & Palik 1969); Uherce Tunel (FV08), Rudawka (FE67) (W. Zajda leg., coll. WZ); Borowiec (FA47), Lublin (FB07), Milejów (FB37) (J. Chmiel leg., coll. ISEZ); Wola Krzywiecka (FA11), Uście Gorlickie (EV08) (S. Gruszka leg., coll. ISEZ); Węgierka k. Pruchnika (FA12) (W. Soltys leg., coll. SF); Las Piwnicki res. (CD38) (Buszko 1991); Górsk (CD27), Bierzgłowo (CD29), Chełmno (CE21), Wierzchlas (CE03) (Prüffer & Soltys 1974); Starogard Gdański (CE38), Kajanka (FD31) (W. Łuczkowski leg., coll. SŁ); Łódź (CC93) (Śliwiński & Marciniak 1991); Puszczykowo (XT29) (J. Nowacki leg., coll. AM); Czerlonka (FD84), Przewłoka (FD83) (Buszko et al. 1996a); Mołowiste (FE47), Dołżyca (EV95), Dębki (CF17) (Ł. Matuszewski leg., coll ŁM); Gruszki (FE57) (J.

GELBRECHT leg.[ex larva], coll. JG); Hołubla (FA11), Przemyśl (FA21), Sromowce (DV57), Odyniec (XS17), Będkowice (DA15) (R. SZPOR leg., coll. RSz); Mielnik (FD30) (G. SZOSTEK leg., coll. MMl).

Conservation status. Lower Risk (LR).

Comments. The species was reported from western Pomerania (historical Pommern) as common, so no single localities were listed in URBAHN & URBAHN (1939). So did authors of other historical works, and in result the list of records in Poland is underestimated.

2. *Abraxas sylvata* (SCOPOLI, 1763)

Phalaena sylvata SCOPOLI, 1763: 220, fig.546, Italy, Carnia.
Calospilos sylvata (LINNAEUS, 1759).

Adults: colour pl. I: fig. ♂ 2; ♀ 2.

Genitalia: ♂ - pl. 1: figs. 2, 2a-2c; ♀- pl. 40: 2.

Description. Wingspan 32-40 mm. Head dark brown with a smooth-scaled frons. Antennae light brown, ciliate in the male, filiform in the female. Thorax rufous, dusted white on the dorsal surface and patagia, and small brown spots on the tegulae. Wing ground colour white; the pattern consists of ash-grey spots and rufous-brown blotches. The ash-grey spots form incomplete lines. There are rufous-brown patches with a silvery sheen due to the opalescent scales in the forewing basal area and in the anal angle (tornus) of both wings. Near the forewing termen there is an elongated, irregularly-shaped, ash-grey or brown patch joined to the marginal spots; 2-3 patches of the same colour on the hindwing. Discal spot large, brown, ringed grey, usually touching the adjacent spot on the costal margin. Forewing fringe ash-grey, hindwing fringe variable in colour, from white-ash-grey/brown to patchy ash-grey. Abdomen orange with irregular rows of black spots on the dorsal and lateral surfaces.

Life history and habitat. Flight season: one generation from late May to late July. LHPs: various trees and shrubs, e.g. *Prunus padus* L., *Euonymus* spp., *Ulmus* spp., *Rhamnus frangula* L. and *Corylus* spp. Caterpillar forages in summer and autumn; pupates in a flimsy cocoon among the leaf litter, where it overwinters. Occurs in damp deciduous woodland, mostly riparian forest, alder swamps, and secondarily in parks and gardens.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean Basin to the Arctic Circle. Widely distributed throughout Poland and common in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Ligdia GUENÉE, 1857

3. *Ligdia adustata* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra adustata DENIS & SCHIFFERMÜLLER, 1775: 114, Austria, Vienna district.
Abraxas adustata (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. I: fig. ♂ 3; ♀ 3.

Genitalia: ♂ - pl. 1: figs. 3, 3a-3c; ♀- pl. 40: 3.

Description. Wingspan 25-30 mm. Head dark brown with a smooth-scaled frons. Antennae light brown, ciliate in the male, filiform in the female. Wing ground colour yellowish-white. Forewing basal area blackish-brown, glossy. In the terminal area there is a broad dark-brown band with a wavy outer margin, sometimes opalescing bluish. The pale median area is strongly constricted in the centre. Discal spot grey, faint. Hindwing with a broad brown, often faint, band with a wavy outer margin; discal spot greyish-brown, blurred; delicate streaking and spotting along the inner margin. Forewing fringe with variable brown spotting; hindwing fringe the same hue as the ground colour, with a wavy marginal line along the inside. Abdomen greyish with a brown ring at the base.

Life history and habitat. Flight season: two generations, from late April to early July and mid-July to early September. LHPs: various *Euonymus* spp. Overwinters as a larva in the leaf litter. Pupates in a loose cocoon among the leaves on the ground. Inhabits moist deciduous, mainly riparian, woodland, copses and strips of scrub, and secondarily in parks and gardens.

Distribution. Western Palaearctic. From the Iberian Peninsula to central Asia, and from the Mediterranean Basin to the Arctic Circle. Widely distributed throughout Poland and common in suitable habitats; occasionally found up to ca 600 m in the uplands.

Conservation status. Not threatened.

Lomaspilis Hübner, 1825

4. *Lomaspilis marginata* (Linnaeus, 1758)

Phalaena (*Geometra*) *marginata* Linnaeus, 1758: 527.
Abraxas marginata (Linnaeus, 1759).

Adults: colour pl. I: fig. ♂ 4; ♀ 4a, 4b.

Genitalia: ♂ - pl. 2: figs. 4, 4a, 4b; ♀- pl. 41: 4.

Description. Wingspan 22-26 mm. Head dark brown with a smooth-scaled frons. Antennae dark grey, ciliate-fasciculate in the male, filiform in the female. Wing ground colour white, sometimes yellowish, especially near the costal margin. The pattern consists of a series of black marks very variable in shape. Lines and discal spot absent. Basal spot trapezoidal or rectangular, elongate rather than wide. Medial band often broken up into 2-3 spots, which may be more or less prominent or absent altogether. Central second spot relatively narrow. Terminal band medial concavity not very deep and obtuse-angled (unlike *L. opis*). Hindwing medial band usually reduced to 1-4 small spots or missing altogether. Terminal band often constricted or reduced to different degrees. Fringes black, like the wing pattern.

Life history and habitat. Flight season: two generations, from early May to late June and from early July to mid-August. LHPs: *Salix* spp., *Populus* spp., exceptionally on *Quercus* spp., *Fagus sylvatica* L., *Corylus avellana* L. and *Betula* spp. Overwinters

as a pupa in the soil. Found in deciduous and mixed woodland, scrub, parks and gardens. Generally common in different habitats except higher mountain areas.

Distribution. Palaearctic. From western Europe to eastern Siberia and Japan, and from the Mediterranean Sea (except the islands) to the Arctic Circle. Common in all parts of Poland; in the mountains up to altitudes of ca 700 m.

Conservation status. Not threatened.

Comments. See *L. opis* (BUTLER, 1878)

5. *Lomaspilis opis* (BUTLER, 1878)

Lomaspilis opis opis (BUTLER, 1878): 442, Japan, Yokohama.
Lomaspilis opis nigrita HEYDEMANN, 1944: 510, fig., Finland, Mikkeli.

Adults: colour pl. I: fig. ♂ 5a, 5b; ♀ 5.
Genitalia: ♂ - pl. 2: figs. 5, 5a, 5b; ♀- pl. 41: 5.

4. Distribution of *Lomaspilis opis* BUTLER, 1878 in Poland

Description. Wingspan 20-25 mm. Head dark brown with a smooth-scaled frons. Antennae dark grey, ciliate-fasciculate in the male, filiform in the female. Wing ground colour white, sometimes yellowish, especially near the costal margin. The pattern consists of a series of very variably shaped black marks. Lines and discal spot absent. Basal spot semicircular, fairly broad. Medial band broken down into two contiguous spots. Central second spot relatively broad, often as broad as the contiguous costal spot. Terminal band medial concavity deep and more or less right-angled (unlike *L. marginata*). Hindwing medial band usually reduced to 3 partially or completely separate spots. Terminal band invariable. Fringes black, like the wing pattern.

Life history and habitat. Flight season: one generation, from early June to early July. LHPs: *Betula* spp. Overwinters as a pupa in the soil. Inhabits damp deciduous and mixed woodland, especially in swampy forests with large stands of birch *Betula* spp. Generally rare; not yet found in mountain areas.

Distribution. Palaearctic. From western Europe to eastern Siberia (River Amur) and Japan. In Europe known from Finland, Russia, Estonia, Latvia, Lithuania, Poland and Slovakia. In Poland found in the forests in the north-east of the country and in a few localities in the Małopolska and Kielce/Świętokrzyskie region. There is wide disjunction between these areas. In Poland reaches western limit of distribution area.

Localities in Poland: Czerwony Dwór (EE79) (Buszko & Bengtsson 1992); Płaska (FE47), Mikaszówka (FE48) (A. Malkiewicz leg., coll. AM); Gruszki (FE57), Rygol (FE57) (A. Kokot leg., coll. AM); Giby (FE58), Kozi Rynek res. (FE46), Grzędy, Biebrzański N.P. (FE14) (J. Gelbrecht leg., coll. JG); Skieblewo (FE56) (A. Malkiewicz leg., coll. AM); Stare Masiewo (FD95), Białowieża-Gródek (FD94) (Buszko et al. 1996a); Topiło (FD94) (Sosiński 2002); Janów Lubelski (EB91) (Sosiński 1995); Mostki ad Staszów (EB10) (K. Pałka leg., coll. AM); Klonów ad Miechów (DA47) (E. Świderski leg., coll. MiIZ PAN); Krzesławice ad Kraków (DA34) (M. Bielewicz leg., coll. USMB); Skała (DA16), Minoga (DA26), Puszcza Niepołomicka (DA54), Stanisławice (DA53), Gamerki Wielkie (DE46) (W. Zajda leg., coll. WZ); Głogów Małopolski (EA65) (P. Czudec phot.) (www. lepidoptera.pl) ; Brzeźnica ad Gowarczów (DB68) (E. Myśków leg. et coll.).

Conservation status. Data deficient (DD).

Comments. This species may be confused with *L. marginata* (L.), which has a narrower second (central) spot in the medial area and a shallowly indented terminal band on the forewing. It is also somewhat larger and more variable than *L. opis*. Both species also differ slightly in the genitalia of both sexes: the shape of the vesica, the number of cornuti and the form of the antrum in females (Gelbrecht et al. 2004).

Stegania Guenée, 1845

6. *Stegania cararia* (Hübner, 1790)

Phalaena (*Geometra*) *cararia* Hübner, 1790: 77, pl. 3(4), fig. X.
Lomographa cararia (Hübner, 1792).

Adults: colour pl. I: fig. ♂ 6; ♀ 6.

Genitalia: ♂ - pl. 2: figs. 6, 6a, 6b; ♀- pl. 41: 6.

Description. Wingspan 20-23 mm. Head brown; antennae yellow-ochre, ciliate in the male, filiform in the female. Thorax yellow with a sprinkling of brown scales. Wing ground colour yellow-ochre, with extensive brown speckling on both wings, which is strongest near the costal margin, but less heavy in the forewing terminal area. Discal spot conspicuous, brown, comma-shaped. No antemedial line; postmedial line almost completely reduced to comma-like streaks on the veins. The prominent subterminal lines on both wings have two sharp projections reaching the termen at the medial and cubital veins. Termen of both wings bordered by a continuous line; fringes with obvious spotting.

Life history and habitat. Flight season: one generation, from early June to late July. LHPs: various species of poplar, including hybrids of Canadian poplar *Populus x canadensis*. Overwinters as a pupa. The principal habitats are riparian forests (class *Salicetea purpureae*) and thickets along mountain streams (from the *Alno-Ulmion*

5. Distribution of *Stegania cararia* (HÜBNER, 1790) in Poland

alliance) as well as damp meadows with single poplar and willow trees or scrub. In Germany, these moths were observed during the day in the vicinity of willows (*Salix alba* L.) but no caterpillars were found there (EBERT et al. 2003).

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Baltic Sea. Distributed locally across Europe, absent from the British Isles, Fennoscandia and the Balkan peninsula. Occasionally recorded throughout Poland in suitable habitats; up to ca 500 m in the mountains. More frequent in eastern part and absent in north-western regions. In Poland reaches north-western limit of distribution area.

Localities in Poland: Lędziny (BB81), Bierdzany (BB93), Winna Góra (YS04) (BLAIK 2004); Dębowa Góra ad Kołaczów (XS22) (MALKIEWICZ & SZPOR 1996); Poznań (XU30), Zaniemyśl (XT48) (ROMANISZYN 1929); Sanka ad Kraków (DA04), Kraków – Las Wolski (DA24) (RAZOWSKI & PALIK 1969); Uherce Tunel (FV08), Rudawka (FE67), Zalesie Górne (EC06), Sobolów (DA52), Kąty Borucza (ED40) (W. ZAJDA leg., coll. WZ); Pasmo Łysogórskie (EB03) (ŚLIWIŃSKI et al. 1991); Mostki ad Staszów (EB10) (K. PAŁKA leg., coll. AM); Warszawa (EC08); Sandomierz (EB51) (ROMANISZYN 1929); Borowiec ad Pruchnik (FA03) (W. SOŁTYS leg., coll. SF); Radawa (FA25) (J. MAZEPA leg., coll. AM); Mikaszówka (FE57) (A. MALKIEWICZ leg., coll. AM); Białowieża (FD94); Czerlonka (FD84) (BUSZKO et al. 1996a); Leszczawa Dolna (FA00), Zatwarnica (FV15), Jabłonki (EV95), Baligród (EV96) (BIELEWICZ 1973); Przejazd (EC20), Winiary (DA78), Nowica (EV18), Szymbark (EV09), Wapienne (EV29), Leśniówka (EV49), Okólny Ług res. (EB39), Cztery Kopce (forestry) (EC31), Brzanka (EA02), Gorlice (EA10) (R. ZAMORSKI leg., coll. RZ); Częstochowa (CB63) (P. SENN phot.); Dołżyca (EV95), Kalwaria Pacławska (FV29), Mołowiste (FE47), Majdan Stuleński (FB89) (Ł. MATUSZEWSKI leg., coll. ŁM); Puszcza Bolimowska (DC46) (SOBCZAK et al. 2012); Annopol (DC74) (T. BINKIEWICZ obs.); Pociecha (DC89) (D. Marczak leg.); Jawornik Polski (EA92) (J. BURY leg., coll. JBu); Gruszowa (FA20) (J. MAZEPA leg.); Budy Głogowskie (EA65) (P. CZUDEC leg.); Stare Stulno (FB89), Kosyń (FB79), Macoszyn (FB79), Zawadówka res. (FB66), Orchówek (FC71) (M. HOŁOWIŃSKI leg., coll. MH) (www.lepidoptera.pl); Borowiec (FA03), Zarzecze (FA13), Hołubla (EC99), Jabłonki (EV95) (R. SZPOR leg., coll. RSz).

Conservation status. Not threatened.

7. *Stegania dilectaria* (HÜBNER, 1790)

Phalaena (Geometra) dilectaria HÜBNER, 1790: 76, pl. (3)4, fig. W.
Lomographa dilectaria (HÜBNER, 1792).

Adults: colour pl. I: fig. ♂ 7; ♀ 7.
Genitalia: ♂ - pl. 3: figs. 7, 7a, 7b; ♀ - pl. 41: 7.

Description. Wingspan 20-22 mm. Head pale yellow, antennae yellow ochre, narrowly pectinate in the male, filiform in the female. Thorax yellow with a sprinkling of brown scales. Wing ground colour pale yellow, with irregular brown speckling on both wings. Veins highlighted brown. Discal spot distinct, comma-shaped, brown. Antemedial

and postmedial lines distinct; the latter is jagged, does not reach the termen. The blurred subterminal line on the forewing broadens twice into blotches extending to the termen; on the hindwing this line is scarcely discernible. Termen of both wings bordered by an unbroken line; fringes with irregular dark spotting towards the anal angles.

Life history and habitat. Flight season: June and July: normally one generation, but two in southern Europe and Asia Minor. LHPs: various species of poplar, mainly *Populus nigra* L. Occurs in warm, sunny poplar scrub, e.g. around the edges of damp meadows (EBERT et al. 2003). Overwinters as a pupa.

Distribution. Ponto-Mediterranean. Recorded from western Germany (old data) to Uzbekistan. Distributed locally throughout south-eastern Europe – most frequently found in the Balkan Peninsula and on the Pannonian Plain. In Poland, admittedly recorded only once at the village of Ligota Tworkowska, near Racibórz, in the upper Odra valley (5 VI 1961, leg. A. DROZDA, (in coll. MGB). A second record from the Bieszczady Mts. is questionable for lack of evidence – SCHRAMM's collection was completely destroyed by fire (BIELEWICZ 1973). In Poland reaches northern limit of distribution area or occurs only sporadically.

6. Distribution of *Stegania dilectaria* (HÜBNER, 1790) in Poland

Localities in Poland: Ligota Tworkowska (CA04) (DROZDA 1962); ?Olchowa ad Lesko (EV97) (SCHRAMM 1948).

Conservation status. Data deficient (DD).

Comments. Could be confused with *S. trimaculata* (DE VILL.), but usually has more strongly jagged postmedial lines, a distinct subterminal line near the anal angle (tornus) spreading into a broad brown blotch, but no spots along the forewing costa. In addition, the genitalia, mostly male, of both species are clearly different.

7A. *Stegania trimaculata* (DE VILLERS, 1789)

Phalaena (*Geometra*) *trimaculata* DE VILLERS, 1789: 384, Gallia [France].
Lomographa trimaculata (DE VILLERS, 1789).

Adults: colour pl. I: fig. ♂ 7Aa, 7Ac; ♀ 7Ab.

Description. Wingspan 18-22 mm. Head pale yellow; antennae yellow ochre or brown, narrowly pectinate in the male, filiform in the female. Thorax yellow with a sprinkling of brown scales. Wing ground colour pale yellow, with irregular brown speckling on both wings. Veins highlighted brown. Discal spot a faint streak, occasionally curved. Antemedial and postmedial lines distinct. Three conspicuous spots along the costal margin. Postmedial line angled near the costa. No distinct subterminal line. Hindwing medial line gently curved. Fringes the same hue as the ground colour, dusted greyish-brown, especially in females. This species is more variable than *S. dilectaria*.

Life history and habitat. Flight season: from early May to late July and from early August to late September in two somewhat overlapping generations; in warm summers there may well be three generations: May-June, July-August and September (GELBRECHT 2006). LHPs: various species of poplar, including hybrids of the Canadian poplar *Populus x canadensis*. The main habitats are riparian woodland and scrub (class *Salicetea purpureae*), also with single trees and scrub of *Populus* spp. and *Salix* spp. Secondarily may colonize various anthropogenic habitats, including towns. Has been seen to nectar on flowering lime trees in western Germany (EBERT et al. 2003).

Distribution. Probably Atlanto-Mediterranean. Recorded from North Africa to Uzbekistan, but not in the whole of eastern Europe, including the Balkan countries. Mostly distributed locally throughout south-western Europe, being most commonly found in the Iberian Peninsula and southern France. Recently discovered in the British Isles, the Benelux countries and Denmark (HENDRIKSEN & KARSHOLT 2004). The species is known to be expanding rapidly in eastern Germany (GELBRECHT 2000, 2006), where it was first discovered in Berlin in 1987 (THEIMER 1990). Not yet recorded in Poland, but TOP-JENSEN & FIBIGER (2009) have listed it among the countries of updated occurrence in Europe, although they give no specific data. The likelihood of the species colonizing western Poland is high, given that it was recently recorded near Frankfurt/Oder and that suitable habitats are plentiful on the Polish side of the river Oder/Odra (GELBRECHT 2006).

Conservation status. Data deficient (DD).

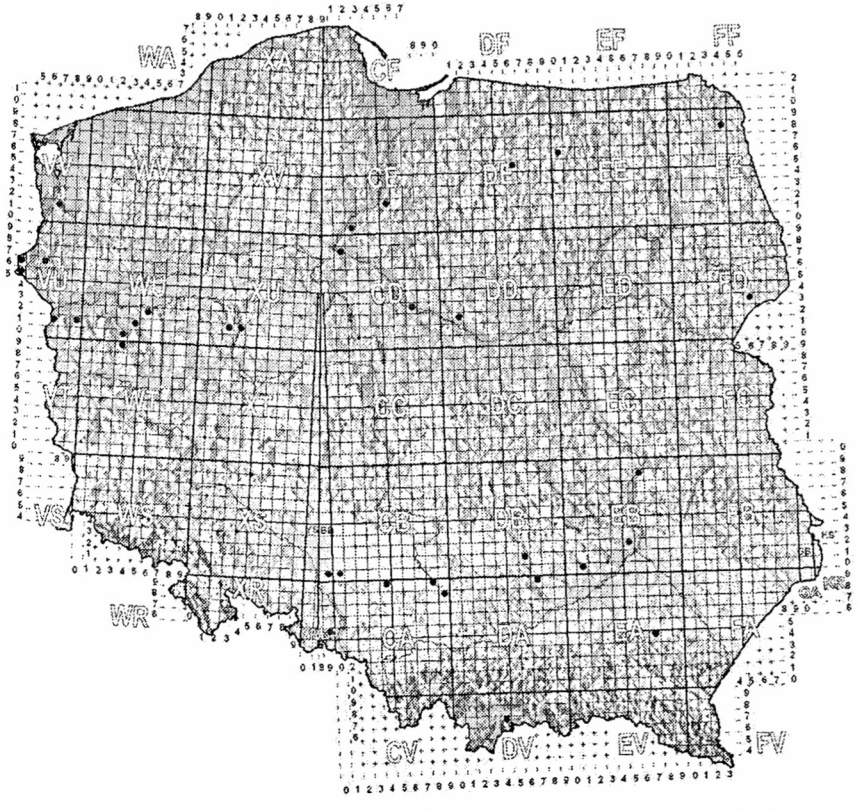
Heliomata Grote & Robinson, 1866

8. *Heliomata glarearia* (Denis & Schiffermüller, 1775)

Geometra glarearia Denis & Schiffermüller, 1775: 106, Austria, Vienna district.
Semiothisa glarearia (Denis & Schiffermüller, 1775).

Adults: colour pl. I: fig. ♂ 8; ♀ 8.
Genitalia: ♂ - pl. 3: figs. 8, 8a, 8b; ♀- pl. 42: 8.

Description. Wingspan 20-23 mm. Head yellow, spotted brown, with a smooth-scaled frons. Antennae dentate-ciliate in the male; filiform, banded brown and yellow in the female. Wing ground colour pale yellow with coarse brown freckling. Forewing with three irregularly-edged, often indistinct, brown bands. Hindwing with two bands, often broken or blurred. Discal spot usually absent, but very occasionally visible on hindwing. Silvery opalescent scales scattered over medial and basal areas. Fringes on termen of both wings yellow with regularly spaced spots. Band shape variable, especially on hindwing.



7. Distribution of *Heliomata glarearia* (Denis & Schiffermüller, 1775) in Poland

Life history and habitats. Flight season: two generations, from early May to late June, and from mid-July to mid-August. LHPs: *Medicago* spp., *Trifolium* spp., *Lathyrus* spp., and in captivity other plants from the family *Fabaceae*. Overwinters as a pupa. Occurs in xerothermic environments with calcareous or sandy soils, and very locally in the edge habitats of large river valleys.

Distribution. Western Palaearctic – southern part. From southern France to central Asia and Kazakhstan. Reaches as far north as northern Germany, Poland and Estonia. In Poland recorded from the Chełmno and Toruń areas, and from near Cedynia and Bielinka nad Odrą; formerly also from Szczecin (URBAHN & URBAHN 1939). More frequent in the south of the country, but only on alkaline soils in xerothermic habitats, mainly in the south-east, including the foothills up to altitudes of 700 m. The species with insular pattern of distribution in Poland.

Localities in Poland: Szczecin - Dąbie (VV71) (URBAHN & URBAHN 1939); Rzeszów (EA74) (ROMANISZYN 1929); Niedzica Biała Skała (DV47) (BŁESZYŃSKI et al. 1965); Sobków (DB61), Poznań – Strzeszyn (XU21), Miękowo (XU31), Muchocin (WU52) (Ł. MATUSZEWSKI leg., coll. ŁM); Nowy Dworek (WT39), Nietoperek (WU30) (M. MATRAJ leg., coll. MM); Owczary (VU71), Żółwin (WU41) (M. MLECZAK leg., coll. MMl); Ośno Lubuskie (VU91) (W. ZAJDA leg., coll. WZ); Chojna (VU66) (R. SZPOR leg., coll. RSz); Bielinek (VU46), Cedynia (VU45) (A. MALKIEWICZ leg., coll. AM); Sorkwity (EE06), Grudziądz (CE52) (SPEISER 1903); Zbocza Płutowskie res. (CE20), Czarnowo ad Toruń (CD18) (PRÜFFER & SOŁTYS 1974); Kulin (CD73), Płock (DD12) (J. BUSZKO leg., coll. AM); Centuria (CA98) (W. NOWAKOWSKI leg.); Kamień Śląski (BB90), Szymiszów (CB00) (BLAIK 2004); Zawiercie (CA89) (MASŁOWSKI & MASŁOWSKI 1936); Tarnowskie Góry (CA49), Racibórz (BA95) (RAEBEL & TOLL 1962); Olsztyn, Bartążek (DE65) (T. NIEDŹWIEDZKI obs.); Witowo (FD63) (BUSZKO et al. 1996a); Tobołowo (FE48) (T. BLAIK leg., coll. TB); „Grabowiec" res. (DA79) (KOSTROWICKI 1953); Mostki ad Staszów (EB10), Panieńska Góra res. (EB52) (K. PAŁKA leg., coll. AM); Dobre (EB68) (BUSZKO et al. 1996b); Kazimierz Dolny (EB68) (Ł. DAWIDOWICZ obs.) (www. lepidoptera.pl);

Conservation status. Lower Risk (LR).

Macaria CURTIS, 1826

9. *Macaria notata* (LINNAEUS, 1758)

Phalaena (*Geometra*) *notata* LINNAEUS, 1758: 523, Europe.
Semiothisa notata (LINNAEUS, 1758).

Adults: colour pl. I: fig. ♂ 9; ♀ 9.

Genitalia: ♂ - pl. 3: figs. 9, 9a, 9b; ♀- pl. 42: 9, 9a, 9b.

Description. Wingspan 26-30 mm. Head brown. Antennae grey, ciliate-fasciculate in the male, filiform in the female. Thorax grey with brown patagium. Wing ground colour greyish-white with a yellow tint, speckled grey all over. On the forewing costal margin three small brown spots that may extend into thin, faint lines. Nearer the apex

a larger brown patch, and below it, midway across the wing, a black patch crossed by pale veins ('paw-print mark'). A slight concavity, edged brown, on the forewing termen below the apex. Hindwing with a wedge-shaped projection halfway along the termen; lines tend to fade away; discal spot distinct.

Life history and habitat. Flight season: two generations, from early May to early July and from mid-July to early September. LHPs: various deciduous trees and shrubs, like *Betula* spp., *Salix* spp., *Alnus* spp., *Corylus avellana* L. and *Prunus spinosa* L. Overwinters as a larva. Inhabits various types of scrub, as well as deciduous and mixed woodland in both the lowlands and in mountains. May also occur in parks and gardens.

Distribution. Palaearctic. From the Iberian Peninsula to Siberia, and from the Mediterranean Basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened.

Comments. Confusion with *M. alternata* possible, but the brown-fringed concavity on the forewing termen below the apex in *M. notata* is less pronounced.

10. *Macaria alternata* (Denis & Schiffermüller, 1775)

Geometra alternata Denis & Schiffermüller, 1775: Vienna district.
Macaria alternaria (Hübner, 1809).
Semiothisa alternata (Denis & Schiffermüller, 1775).

Adults: colour pl. I: fig. ♂ 10; ♀ 10.

Genitalia: ♂ - pl. 4: figs. 10, 10a, 10b; ♀- pl. 42: 10, 10a.

Description. Wingspan 24-27 mm. Head brown. Antennae grey, ciliate-fasciculate in the male, filiform in the female. Thorax grey with brown patagium. Wing ground colour grey with brown or darker grey speckling. Pattern similar to that of *M. notata,* but with a wider and more prominent grey line running from the large blotch in the terminal area; the dark brown patch ('paw-print mark') on this line may be faint; the concavity on the forewing termen below the apex, edged dark brown, is more pronounced. Midway across the hindwing a broad greyish-brown band, sometimes merging with the thick speckling in the terminal area.

Life history and habitat. Flight season: two generations, from early May to late June and from early July to late August. LHPs: various deciduous trees and shrubs such as *Betula* spp., *Salix* spp., *Quercus* spp., *Padus* spp., *Prunus spinosa* L., also *Frangula alnus* Mill. and *Rhamnus cathartica* L. (Ebert et al. 2003). Overwinters as a larva. Inhabits various types of scrub and deciduous and mixed woodland in both the lowlands and the mountains. May also occur in parks and gardens.

Distribution. Palaearctic. From the Iberian Peninsula to eastern Siberia, and from the Mediterranean Basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 900 m in the mountains.

Conservation status. Not threatened.

Comments. May be confused with *M. notata,* but the blackish-brown-edged concavity in the forewing termen below the apex is more pronounced. Wing ground colour is grey with brown or darker grey speckling, coarser than in *M. notata*. The genitalia of both species, mostly male, differ slightly in shape – in this case, the plate of sternum A8.

11. *Macaria signaria* (HÜBNER, 1809)

Geometra signaria HÜBNER, 1809: pl. 61, fig. 313, Europe.
Semiothisa signaria (HÜBNER, 1809).

Adults: colour pl. I: fig. ♂ 11; ♀ 11a, 11b.
Genitalia: ♂ - pl. 4: figs. 11, 11a, 11b; ♀- pl. 42: 11, 11a.

Description. Wingspan 24-30 mm. Head grey. Antennae grey, ciliate-setose in the male, filiform in the female. Thorax grey with a darker patagium. Wing ground colour pale grey with thick, brown speckling, darker than in *M. notata*. Wing pattern similar to that of *M. notata,* but the dark brown patch on the postmedial line is less clearly divided by veins. Lines thin, more distinct near the forewing costal margin. Concavity on forewing termen below the apex less pronounced than in *M. alternata* and *M. notata*; the fringe here is the same colour as the remainder. Hindwing with a wedge-shaped projection midway along the termen and two indistinct brown lines. Lines tend to fade away. Discal spot indistinct.

Life history and habitat. Flight season: one generation, from mid-May to early August. Inhabits damp, shady coniferous woodland (especially spruce) and mixed woodland with *Picea abies* KARST, *Abies alba* L. and *Larix* spp., which are the principal LHPs. The older literature also cites *Pinus* spp. as a host plant, but this is probably erroneous (PATOČKA 1960; PATOČKA & TURČANI 2005). Overwinters as a pupa.

Distribution. Holarctic. In Europe from the Iberian Peninsula to the Urals and the Caucasus, and from the Mediterranean Basin to the Arctic Circle. Locally common throughout Poland in the ranges of its hostplants and in suitable habitats; up to ca 1300 m in the mountains.

Conservation status. Not threatened.

Comments. The concavity of the forewing termen below the apex is less pronounced than in *M. alternata* and *M. notata*, and the wing speckling is browner and thicker than in either of these two species. The plate of sternum A8, gnathos and aedeagus in the males of all these species differ slightly in form.

12. *Macaria liturata* (CLERCK, 1759)

Phalaena liturata CLERCK, 1759: pl. 6, fig. 6, Sweden.
Semiothisa liturata (CLERCK, 1759).

Adults: colour pl. I: fig. ♂ 12a, 12b; ♀ 12.
Genitalia: ♂ - pl. 4: figs. 12, 12a, 12b; ♀- pl. 42: 12.

Description. Wingspan 26-30 mm. Head rufous, frons smooth-scaled. Antennae brown, ciliate-setose in the male, filiform with a tuft of protruding scales on each segment in the female. Thorax grey with a rufous patagium. Wing ground colour greyish-violet to darker grey. Forewing termen slightly concave below the apex. Lines thin, dark brown, somewhat darker at the costal margin, often reduced to dark spots. A broad rufous band runs from the yellow-brown spot on the termen, bordered on the inside by the postmedial line. This pattern extends onto the hindwing. There is a slight wedge-shaped projection about halfway along the hindwing termen. Fringes the same hue as the ground colour, but often darker near the forewing convexity. Wing ground colour variable, especially in the terminal area, likewise the line shapes. Melanic forms occur, with a dark brown ground colour and an orange band in the terminal area.

Life history and habitat. Flight season: one protracted generation, from early May to mid-August. Inhabits various types of coniferous forest (especially of spruce and pine) as well as mixed woodland, also parks and urban green areas. LHPs: various coniferous trees, particularly *Picea abies* KARST, *Pinus* spp. including *P. mughus* SCOP., *P. strobus* L. and *P. cembra* L., *Abies alba* L., *Larix* spp., and probably *Taxus baccata* L. The older literature also mentions *Juniperus* spp. (EBERT et al. 2003). Caterpillars eat the needles without leaving any species-specific traces of foraging. Overwinters as a pupa. In Poland found principally in woodland habitats with pine or spruce, but prefers tree stands dominated by pine, including monocultures, where on poor sandy soils it may occur in pest proportions.

Distribution. Palaearctic. In Europe from the Iberian Peninsula to the Urals and the Caucasus, and from the Mediterranean Basin to the Arctic Circle. Very common throughout Poland in the range of its hostplants and in suitable habitats; up to ca 1200 m in the mountains.

Conservation status. Not threatened.

13. *Macaria wauaria* (LINNAEUS, 1758)

Phalaena (*Geometra*) *wauaria* LINNAEUS, 1758: 522.
Itame wauaria (LINNAEUS, 1758).
Itama wauaria (LINNAEUS, 1758).

Adults: colour pl. I: fig. ♂ 13; ♀ 13.

Genitalia: ♂ - pl. 5: figs. 13, 13a, 13b; ♀- pl. 43: 13.

Description. Wingspan 25-29 mm. Head pale grey. Antennae brown, shortly bipectinate in the male, filiform with a tuft of protruding scales on every segment in the female. Thorax pale grey. Wing ground colour grey of varying intensity, finely freckled black all over. Freckling replaced by brown shading in the forewing terminal area. Discal spot indistinct, dark brown, often V-shaped and incorporated into the medial line. Antemedial and postmedial lines often reduced to comma-like marks near the costal margin, but sometimes extend into a thin, broken line. Near the apex an additional, rectangular brown blotch. Hindwing with reduced lines. Fringe the same hue as the ground colour, with fine white streaks on the forewing.

Life history and habitat. Flight season: one generation, from early June to late July. LHPs: various *Ribes* spp., including *Ribes uva-crispa* L. and cultivated varieties. Overwinters as an egg. Inhabits damp deciduous woodland, including alder swamps and riparian woods, parks, gardens, and currant and gooseberry plantations.

Distribution. Holarctic. In the Palaearctic from the Iberian Peninsula to Kamchatka, and from the Mediterranean Basin to the Arctic Circle. Locally common throughout Poland in the ranges of its hostplants and in suitable habitats; up to ca 800 m in the mountains.

Conservation status. Not threatened.

14. *Macaria artesiaria* (Denis et Schiffermüller, 1775)

Geometra artesiaria Denis et Schiffermüller, 1775: 102, Central Europe, Caucasus.
Semiothisa artesiaria (Denis et Schiffermüller, 1775).
Diastictis artesiaria (Denis et Schiffermüller, 1775).

8. Distribution of *Macaria artesiaria* (Denis & Schiffermüller, 1775) in Poland

Adults: colour pl. I: fig. ♂ 14; ♀ 14.

Genitalia: ♂ - pl. 5: figs. 14, 14a, 14b; ♀- pl. 43: 14, 14a.

Description. Wingspan 24-28 mm. Head pale grey with a smooth-scaled frons. Antennae brown, narrowly pectinate in the male, filiform in the female. Thorax pale grey. Forewing termen near apex slightly concave in the male, scalloped in the female. Wing ground colour various shades of greyish-brown; delicate black freckling over the whole area of both wings. A brown terminal band on forewing. Discal spot often faint, merging into the medial line. The black and white post-medial line is the most prominent line, cut half way along by a wedge-shaped orange patch. Veins speckled yellow. Hindwing with a faint, pale line. Termen scalloped, especially in the female. Fringes the same hue as the ground colour.

Life history and habitat. Flight season: two generations from early June to late July and mid-August to mid-September. LHPs: various *Salix* spp., particularly smooth-leaved species, e.g. *Salix viminalis* L., *Salix purpurea* L., *S. alba* L. and *S. repens* auct. (Köhler 2004; Skou 1986). Overwinters as an egg. Prefers riparian and marshland habitats, e.g. with willows and poplars (*Salicetea purpureae* and *Populetum albae*). Has been found in anthropogenic environments like parks and gardens (Buszko 2000), but probably only in the neighbourhood of the appropriate biotopes. Does not stray from its breeding habitats – only there does it regularly come to light and bait (Ebert et al. 2003).

Distribution. Palaearctic. From the Iberian Peninsula to Mongolia and the River Amur; in Europe from the northern Mediterranean countries to southern Sweden, south-eastern Finland and the Baltic countries. The species was rarely recorded from southern and central Poland, but absent in the north.

Localities in Poland: Białowieża – Grudek (FD94) (Buszko et al. 1996a); Mierzwice (FD30), Mielnik (FD30), Woźniki (FC28) (D. Łupiński leg., coll. DŁ); Las Piwnicki res. ad Toruń (CD38) (Buszko 1991); Toruń (CD37), Stronno (CE00), Zawiszyn (CD17) (Prüffer & Sołtys 1974); Koło (CC38), Puszczykowo (XT29) (J. Nowacki leg., coll. AM); Poznań (XU30), Jeżewo (XT55), Rawicz (XT22), Warszawa (EC08), Podkowa Leśna (DC87), Częstochowa (CB62), Ziemia Sandomierska (UTM?), Rytro (DV78), Nowy Sącz (DV79) (Romaniszyn 1929); Jabłonki (EV95) (Bielewicz 1984); Kraków (DA24), Ojców (DA16) (Razowski & Palik 1969); "Grabowiec" res. (DA79) (Kostrowicki 1953); Zawiercie (CA89) (Masłowski & Maslowski 1936); Lubasz ad Szczucin (EA07) (Niesiołowski & Wojtusiak 1950); Czorsztyn (DV57), Niedzica (DV57), Krościenko n. Dunajcem (DV57) (Błeszyński et al. 1965); Brzezie n. Odrą (CA05), Ligota Tworkowska (CA04) (Drozda 1962); Łabędy (CA38), Gliwice (CA37), Przyszowice (CA36), Oświęcim (CA74), Ustroń (CA40), Wrocław (XS46), Brzeg (XS73), Głogów (WT72) (Raebel & Toll 1962); Chobienia (XT01), Stara Oleszna (WS49), Sobibór (FC80) (A. Malkiewicz leg., coll. AM); Kosyń (FB79), Macoszyn (FB79), Serniawy (FB69), Majdan Stuleński (FB89), Orchówek - PKP (FC70) (M. Hołowiński leg., coll. MH); Gródek (GB03) (Buszko et al. 1996b); Bielinek (VU46); Wołów (XS18) (R. Szpor leg., coll. RSz).

Conservation status. Lower Risk (LR).

15. *Macaria brunneata* (THUNBERG, 1784)

Geometra brunneata THUNBERG, 1784: 9, Sweden, Uppsala.
Itame brunneata (THUNBERG, 1784).
Itame fulvaria (DE VILLERS, 1789).
Itama brunneata (THUNBERG, 1784).

Adults: colour pl. I: fig. ♂ 15; ♀ 15.
Genitalia: ♂ - pl. 5: figs. 15, 15a-15d; ♀- pl. 43: 15, 15a.

Description. Wingspan 22-25 mm. Head pale brown. Antennae brown, shortly pectinate in the male, filiform with a tuft of protruding scales on every segment in the female. Thorax pale brown. Wing ground colour rufous brown with conspicuous dark brown freckling. Three-four lines on the forewing, usually darker and more distinct near the costal margin. Two lines on the hindwing. Pattern darker, more obvious in the female. Discal spot indistinct, dark brown, usually fused with the medial line. Fringe with obvious spotting.

Life history and habitat. Flight season: one generation, from early June to early August. LHPs: various *Vaccinium* spp. and *Salix* spp. Also recorded as having fed on *Ledum palustre* L. and *Arctostaphylos uva-ursi* L. (in Canada). Found in open-canopied pine and montane woodland, on bilberry stands and raised bogs, in clearings and woodland glades. Frequent, may reach large numbers. On alpine pastures on bilberry stands and peatbogs up to 1200 m. Often active by day, when seen on flowers of umbelliferous plants (*Apiaceae*) (EBERT at al. 2003). At rest holds the wings in the veliform position.

Distribution. Holarctic. In Europe from the Iberian Peninsula to the Urals and the Caucasus, and from the Mediterranean Basin to the Arctic Circle. Locally common throughout Poland in the ranges of its hostplants and in suitable habitats; up to ca 1200 m in the mountains.

Conservation status. Not threatened.

Comments. The species was recently classified in different genera (*Itame* HBN., *Speranza* CURT.), but there is now general agreement that it should be placed in the genus *Macaria* CURT. (SCOBLE & KRUGER 2002).

Chiasmia HÜBNER, 1823

16. *Chiasmia clathrata* (LINNAEUS, 1758)

Phalaena (Geometra) clathrata LINNAEUS, 1758: 524, Europe.
Phasiane clathrata (LINNAEUS, 1758).
Semiothisa clathrata (LINNAEUS, 1758).
Chiasma clathrata (LINNAEUS, 1758).

Adults: colour pl. II: fig. ♂ 16a, 16b; ♀ 16.
Genitalia: ♂ - pl. 6: figs. 16, 16a-16d; ♀- pl. 43: 16.

Description. Wingspan 18-21 mm. Head black with a smooth-scaled, yellow-dotted frons. Antennae filiform with yellow bands in both male and female. Wing ground colour white or pale yellow with black freckling in the basal and terminal areas. Lines and veins form a characteristic dark brown lattice pattern, sometimes much reduced, especially in females. Discal spot absent. Fringes of both wings with dark brown spotting. The colour of the wing undersides resembles that of the uppersides.

Life history and habitat. Flight season: two generations, from late April to mid-June and from late June to late August. LHPs: *Medicago* spp., *Trifolium* spp., *Vicia* spp. and many other plants from the family *Fabaceae*. Common in meadows and on pastures, fallow land, roadsides etc., both in the lowlands and in the mountains except at the highest altitudes. Tolerant of a wide range of environments. Active during the daytime in sunny weather; occasionally comes to light at night. Perches with wings raised high above the body, so the undersides are well visible.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Comments. The characteristic lattice pattern of the wings prevents confusion with any other European species of butterfly or moth.

Narraga Walker, 1861

17. *Narraga fasciolaria* (Hufnagel, 1767)

Phalaena fasciolaria Hufnagel, 1767: 516, Germany, Berlin region.
Fidonia fasciolaria (Hufnagel, 1767).

Adults: colour pl. II: fig. ♂ 17a, 17b; ♀ 17.

Genitalia: ♂ - pl. 6: figs. 17, 17a, 17b; ♀- pl. 44: 17.

Description. Wingspan 18-21 mm. Head dark brown with a smooth-scaled frons. Antennae pectinate in the male, filiform in the female. Wing ground colour pale yellow with a pattern of thick brown lines, which may merge, especially in males. In extreme cases wings may be almost completely brown with the ground colour showing through only near the forewing costa. The colour of the hindwing upperside the same as the forewing; the underside has creamy-white spots arranged in 2-3 lines against an olive-yellow background. Fringe yellow with brown spotting.

Life history and habitat. Flight season: two generations, from early May to late June and from early July to mid-August. LHP: *Artemisia campestris* L. Overwinters as a pupa. Occurs in sandy environments like grassland, dry meadows, pastures and fallow land, and in anthropogenic habits like military training grounds, airports and gravel pits. Usually active by day; in the evenings comes to light in small numbers. Perches with wings raised above the thorax, cryptically concealed among LHP flowers.

Distribution. From central and southern Europe through Asia Minor and Central Asia to northern China and eastern Siberia. In Poland known from a small number of

localities scattered all over the country. The highest known altitude for a Polish record is the Gubałówka hill above Zakopane (1100 m) (WOJTUSIAK 1966; BATKOWSKI et al. 1972), but this was just a single specimen, probably blown there from far away, because that is not its usual habitat.

Localities in Poland: Bielinek (VU46), Wołów (XS18) (R. SZPOR leg., coll. RSz); Brzezia Łąka (XS56), Naroczyce (WT90) (A. MALKIEWICZ leg., coll. AM); Głogów (WT72), Głuchołazy (XR67) (RAEBEL & TOLL 1962); Toruń (CD37) (PRÜFFER & SOŁTYS 1974); Toruń-Glinki (CD37) (W. ZAJDA leg., coll. WZ); Gubałówka (DV26) (WOJTUSIAK 1966); Gdańsk (CF42), Świbno (CF62), Stogi (CE69), Poznań (XU30), Zaniemyśl (XT48), Leszno (XT04), Włocławek (CD63), Warszawa (EC08), Słowik ad Kielce (DB63), Kopszywnica (EB40) (ROMANISZYN 1929); Kamieniec (VV60), Daleszewo (VV60), Szczecin (VV71), Śmierdnica (VV80), Stargard Szczeciński (WV00), Koszalin (WA70), Szczecinek (XV15), Jastrowie (XV22), dolina Gwdy ad Lotyń (XV24), Pilchowo (VV62), Stary Chwalim (WV95), Drawsko Pomorskie (WV53) (URBAHN & URBAHN 1939); Siemiatycze (FD21), Płaska (FE47), Lipa (EB71)

9. Distribution of *Narraga fasciolaria* (HUFNAGEL, 1767) in Poland

(A. MALKIEWICZ leg., coll. AM); Wieluń (CB27) (I. Szeląg leg., coll. ISz); Piaski (DF02), Świnoujście (VV57), Dąbrowice (CC28) (J. NOWACKI leg., coll. AM); Piwnice (CD38) (BUSZKO 1991); Białowieża (FD94), Czerlonka (FD84), Hajnówka (FD74) (BUSZKO et al. 1996a); Międzywodzie (VV78) (J. SOSIŃSKI leg., coll. JS); Bukowiny (CE35) (SENN & ŁUCZKOWSKI 2012); Poznań-Strzeszyn (XU21), Turek (CC26), Mołowiste (FE47), Dworczysko (FE57) (Ł. MATUSZEWSKI leg., coll. ŁM); Dźwiżyno (WA20) (A. LARYSZ leg., phot. AL.); Orchówek (FC71), Majdan Stuleński (FB89), Szaniec (DA79) (M. HOŁOWIŃSKI leg., coll. MH); Krzyżanowice (DA68) (KOSTROWICKI 1953); Gościkowo (WT39), Glińsk (WT39) (M. MLECZAK leg., coll. MMl); Jantar (CF72), Dolina Chłapowska res. (CF37), Strzegocin (CC88), Rudawka (FE67), Sarbia (VT96) (W. ZAJDA leg., coll. WZ).

Conservation status. Lower Risk (LR).

Comments. A species come across rather rarely, considering that it is active by both day and night. This is probably due to its small size and its cryptic resting pose. Could be confused (especially the dark forms) with *Isturgia carbonaria* (CL.), from which it differs in the browner wing pattern, wing shape and absence of pale abdominal rings.

Isturgia HÜBNER, 1823

18. *Isturgia roraria* (FABRICIUS, 1776)

Phalaena roraria FABRICIUS, 1776: 285, Europe.
Isturgia limbaria (FABRICIUS, 1775).
Fidonia roraria (FABRICIUS, 1776).

Adults: colour pl. II: fig. ♂ 18a, 18b; ♀ 18.

Genitalia: ♂ - pl. 6: figs. 18, 18a, 18b; ♀- pl. 44: 18.

Description. Wingspan 23-27 mm. Head orange-yellow with a sprinkling of black scales. Antennae pectinate in the male, dentate in the female. Wing ground colour orange-yellow with fine black streaking. In the terminal area the streaking usually becomes thicker, forming a 2-3.5 mm wide uniformly brown band, especially in males of the typical form. In females this area is usually only thickly transversely speckled. Although this feature is subject to considerable variation, both geographical and individual, it is one of the main diagnostic features of the species, distinguishing it from *I. limbaria,* its western vicariant, with which it has been confused (in Poland as well). There are no white streaks on the hindwing underside, which also distinguishes this species from *I. limbaria.* Discal spots absent. Fringe light brown, paler on the outside.

Life history and habitat. Flight season: two generations, from late April to mid-June and from mid-July to late August. LHPs: various *Cytisus* spp. (mainly *C. scoparius* L.) and *Genista* spp. (e.g. *G. tinctoria* L.). Overwinters as a pupa. Prefers xerothermic swards (on limestones and serpentinites), dry meadows, balks and sunny woodland edges, and especially broom stands in their vicinity (BLAIK 2011). Localities are often situated in sheltered spots in the immediate vicinity of active or abandoned quarries

(BIELEWICZ 1966; BLAIK 2003). Usually active by day; in the evenings comes to light in small numbers.

Distribution. Known from scattered localities in central and southern Europe; also recorded in western Ukraine and Armenia. The occurrence of the species in France is questionable, because of suspected confusion with *Isturgia limbaria* ssp. *delimbaria* STAUDINGER, 1892. In Poland it occurs very locally in upland areas, as well as in the foothills and at lower altitudes in the mountains from the Sudeten Foothills to the Bieszczady Mts. The record from Józefów (FA49) in the Roztocze highland turned out to be the result of erroneous localization (BLAIK 2003; BLAIK 2011 - after comm. MALKIEWICZ). In Poland reaches northern limit of distribution area.

Localities in Poland: Książnica ad Dzierżoniów (XS13), Ligota Dolna ad Gogolin (BA99), Płaza ad Chrzanów (CA85), Zawiercie, Giebło (CA89, CA99), Kraków vicinity (UTM?), Wrzosy ad Rybna (DA04), Będkowska Valley (DA15), Kielce vicinity (DB73?), Pokrzywianka River Valley near Chełmowa Mt. (EB03), Kasinka Mała ad Mszana Dolna (DA30), Biesnik ad Gorlice (EA00), Zyndranowa (EV57), Baligród (EV96), Głuchołazy (XR67), Pokrzywna, Jarnołtówek (XR77), Dębowiec ad Prud-

10. Distribution of *Isturgia roraria* (FABRICIUS, 1776) in Poland

nik (XR87) (BLAIK 2003); Krasne Pole (XR85), Opawica (XR86), Mokre-Kolonia (XR95) (BLAIK 2011); Wołosate (FV23) (W. ZAJDA leg., coll. WZ); Józefów (EA30) (K. SUROWIAK leg., coll. JBu); 'Skamieniałe Miasto' res. (DA91) (TOMEK 1949); Bielanka (pow. Gorlicki) (EV09), Wapienne ad Gorlice (EV29) (R. ZAMORSKI leg., coll. RZ) (www. lepidoptera.pl).

Conservation status. Endangered (EN)

Comments. The biology and morphology of immatures was described in detail by BLAIK (2003) and BLAIK & MALKIEWICZ (2003). In the past, *Isturgia roraria* was often confused with *Isturgia limbaria*, because of their similarity in external appearance and genitalia. The same mistake was made by Polish authors, who in the 20th century reported *I. limbaria* from the vicinity of Zawiercie (NIESIOŁOWSKI 1928; MASŁOWSKI & MASŁOWSKI 1930; ROMANISZYN 1929; BŁESZYŃSKI 1966). Those records are now regarded as misidentifications of *Isturgia roraria* specimens; the most recent papers on the geometrid moths of Poland have definitively excluded the possibility of the past occurrence of *I. limbaria* in the country (MALKIEWICZ & SOSIŃSKI 1999; BUSZKO & NOWACKI 2000; BLAIK 2003, 2011).

19. *Isturgia carbonaria* (CLERCK, 1759) stat. rev.

Phalaena carbonaria CLERCK, 1759: pl. 1, fig.11, Europe, Sweden.
Fidonia carbonaria (CLERCK, 1759).
Isturgia carbonaria (CLERCK, 1759).
Macaria carbonaria (CLERCK, 1759).
Semiothisa carbonaria (CLERCK, 1759).

Adults: colour pl. II: fig. ♂ 19; ♀ 19.

Genitalia: ♂ - pl. 7: figs. 19, 19a-19d; ♀- pl. 44: 19.

Description. Wingspan 20-22 mm. Head black with a smooth-scaled frons. Antennae pectinate in the male, filiform in the female. Wing ground colour white with a bold black pattern in the form of three bands interspersed with freckling. Bands may merge with freckling, especially in males. In extreme cases wings are almost uniformly black with just traces of ground colour showing through. Hindwing colour and pattern similar to that of the forewing, with two bands and a visible discal spot. Fringes with black spotting.

Life history and habitat. Flight season: one generation, from late April to late May; in northern Europe and in the Alps from late May to late June. LHP: *Arctostaphylos uva-ursi* L.; earlier literature stated the acceptance of *Salix* spp.; *Vaccinium* spp. and *Betula* spp. in captivity, but this seems doubtful (PORTER 1997). Also reported recently as foodplants are other *Ericaceae* and *Empetrum* spp. (SCOBLE 1999), but this remains questionable. Caterpillars nocturnal. Moths active by day in sunny weather, found near clumps of LHP, where they take nectar from the flowers of various plants. The species overwinters as a pupa. Inhabits environments with a sandy substrate, heathlands, inland dunes, the edges of raised bogs, as well as military training areas and sunny waysides. Alpine habitats insufficiently studied.

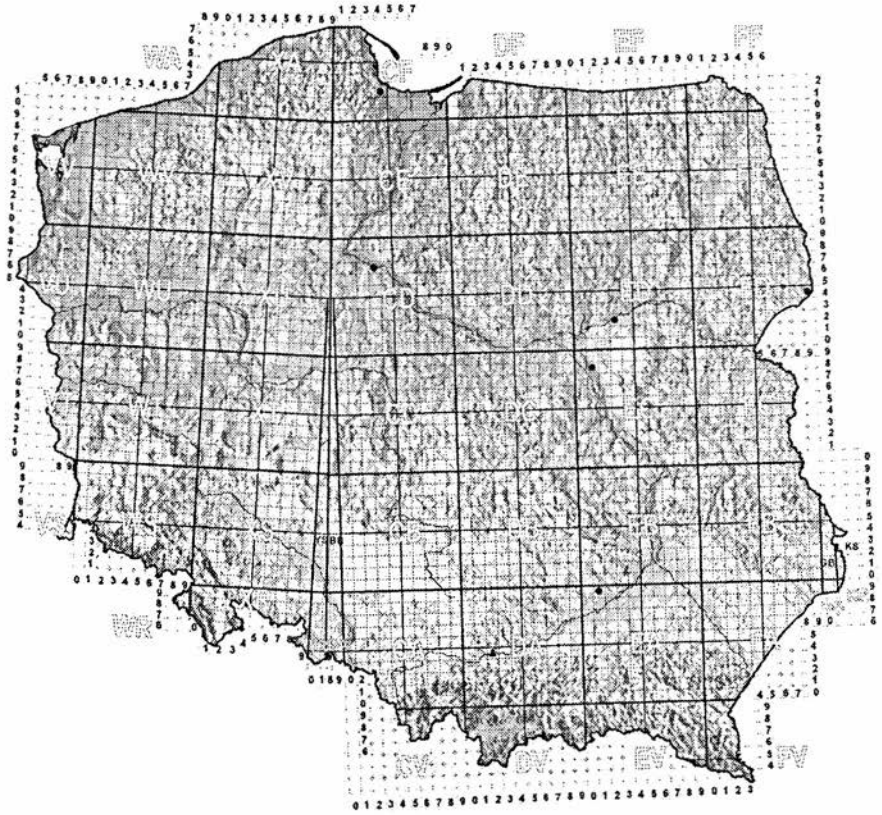
Distribution. Northern, and locally, central Europe; the southern Alps. In Poland historical localities (before 1950) near Gdańsk, Warsaw and Staszów (BŁESZYŃSKI 1966,

KREMKY 1930, WARNECKE 1939). Also recorded in the 19th century from Kraków and the Pieniny Mountains (ROMANISZYN 1929), but these data are unreliable – the flight season given there is incorrect. At present found only in the Białowieża Forest, near Toruń and near Wyszków (BUSZKO 2000, MALKIEWICZ 2004d).

Localities in Poland: Wola Grzybowska ad Sulejówek (EC18) (S. Adamczewski leg., coll. ISEZ); Warszawa (UTM?) (WARNECKE 1939); Gdańsk (CF42) (SPEISER 1903); Staszów (EA19) (KARPOWICZ 1928); ?Kraków (DA24), ?Szczawnica (DV67), ?Pieniny (DV67) (ROMANISZYN 1929); Mostówka ad Wyszków (ED32) (A. MALKIEWICZ leg., coll. AM); Toruń (CD37) (PRÜFFER & SOŁTYS 1974; BUSZKO 2000); Puszcza Białowieska (FD78) (BUSZKO et al. 1996a).

Conservation status. Endangered (EN) (BUSZKO & NOWACKI 2002; MALKIEWICZ 2004d)

Comments. Could be confused with females of *Ematurga atomaria* (L.) but has a blacker wing pattern and pale abdominal rings, and is smaller in size. In accordance with the concept of PROUT (1912-16), I have restored *carbonaria* (CLERCK, 1759) to the genus *Isturgia*. In the male genitalia the uncus horns are absent and the gnathos has a



11. Distribution of *Isturgia carbonaria* (CLERCK, 1759) in Poland

characteristic shape, different from that typical of Macaria. The day-flying behaviour also resembles that of other *Isturgia* species.

20. *Isturgia murinaria* (Denis & Schiffermüller, 1775)

Geometra murinaria Denis & Schiffermüller, 1775: 105, Austria, Vienna district.
Tephrina murinaria (Denis & Schiffermüller, 1775).
Eubolia murinaria (Denis & Schiffermüller, 1775).

Adults: colour pl. II: fig. ♂ 20; ♀ 20
Genitalia: ♂ - pl. 7: figs. 20, 20a-20c; ♀- pl. 44: 20, 20a

Description. Wingspan 22-27 mm. Head brown. Antennae yellow-ochre, shortly pectinate in the male, dentate in the female. Thorax grey. Wing ground colour grey to pale grey, coarsely speckled brown. Medial line faint, often reduced. Forewing discal spot fairly distinct, greyish-brown, situated on the inside of the medial line. The brown basal and terminal lines are more distinct than the medial one; a single dark spot in the terminal area lies adjacent to the terminal line. Hindwing colour much the same with a

12. Distribution of *Isturgia murinaria* (Denis & Schiffermüller, 1775) in Poland

conspicuous discal spot and a wavy postmedial line. Termen of both wings with dark streaks and uniformly grey, thinly spotted fringes.

Life history and habitat. Flight season: two generations, from late April to mid-June and from mid-July to mid-August. LHPs: *Medicago* spp., *Trifolium* spp. and *Onobrychis* spp. Natural occurrence on *Vicia* spp. not confirmed. Overwinters as a pupa. Found in various xerothermic habitats, including psammophilous and steppe swards, and heathlands; secondarily, in thermophilous scrub, e.g. military training areas, railway tracksides, from where it is easily be displaced as the shrub succession proceeds. In southern Poland prefers calcareous substrates.

Distribution. Western Palaearctic – southern part. From the Iberian Peninsula to central Asia and southern Siberia. In Europe reaches as far north as central Germany and Estonia. In Poland recorded from the Grudziądz Basin, Chełmno and Toruń areas, and in the south from the Nida Basin, Kazimierz Dolny and the Pieniny Mountains. Not found in the last mentioned locality for a very long time. The species with insular pattern of distribution in Poland.

Localities in Poland: Niedzica Kosarzyska (DV47) (Błeszyński et al. 1965); Grabowiec, Bogucice (DA79), Skowronno (DA69), Krzyżanowice (DA68), Wola Zagojska (DA78) (Kostrowicki 1953); Stara Zagość (DA78), Sobków (DB61) (Ł. Matuszewski leg., coll. ŁM); Galów (DA79), Szaniec (DA79) (M. Hołowiński leg., coll. MH); Toruń-Glinki (CD31), Winiary (DA78), Grabowiec res., Szaniec (DA79) (W. Zajda leg., coll. WZ); Winiary, Skotniki Górne (DA78) (R. Zamorski leg., coll. RZ); Kazimierz Dolny (EB68) (Ł. Dawidowicz obs.); Grudziądz (CE52), Łążek (CE14), Tuchola (XV84) (Speiser 1903); Płutowo (CE20), Toruń (CD37) (Prüffer & Sołtys 1974); Toruń – Glinki (CD37) (J. Buszko leg., coll. AM); Krzyżanowice (DA68) (R. Szpor leg., coll. RSz).

Conservation status. Vulnerable (VU). Previously – Near Threatened (NT) (Buszko & Nowacki 2002).

Comments. Similar to *Isturgia arenacearia,* but wings not so yellowish-grey and without the streak or blurred dark spots in the forewing terminal area, as in the summer generation of that species. In addition, the terminal line in *I. murinaria* is very wavy. Both species also clearly differ in their Genitalia: the forms of the valva and vesica in the aedeagus, and sternum A8 in males; the shape of the antrum and ductus bursae in females.

21. *Isturgia arenacearia* (Denis & Schiffermüller, 1775)

Geometra arenacearia Denis & Schiffermüller, 1775: 102, Austria, Vienna district.
Tephrina arenacearia (Denis & Schiffermüller, 1775).
Eubolia arenacearia (Denis & Schiffermüller, 1775).

Adults: colour pl. II: fig. ♂ 21a, 21b; ♀ 21c, 21d.
Genitalia: ♂ - pl. 7: figs. 21, 21a, 21b; ♀- pl. 45: 21, 21a.

Description. Wingspan 24-27 mm. Head orange with a smooth-scaled frons. Antennae yellow ochre, pectinate in the male, dentate in the female. Thorax grey. Wing

ground colour yellowish-grey to yellow (summer generation), with occasional brown freckling, and a rather faint medial line. Forewing discal spot conspicuous, greyish-brown, on the inside of the medial line. The brown basal and terminal lines more distinct than the medial one; the terminal line lies adjacent to a dark streak or row of dark spots in the terminal area, more distinct in the summer generation. Hindwing colour much the same, with a distinct discal spot and terminal line. Termen of both wings with dark streaks and uniformly grey fringes.

Life history and habitat. Flight season: two generations, from early May to late June, and from mid-July to mid-August. LHPs: *Coronilla* spp. Overwinters as a larva. Found in various xerothermic habitats, including sandy and rocky swards (steppe-type), and secondarily on dry fallow land and in thermophilous scrub.

Distribution. Palaearctic. From Japan and Korea to the north Mediterranean region and Switzerland. In eastern Europe as far as Poland and Latvia. In Poland locally only in the south, from the Sudeten Mts. (in the 1930s) to the Polesie and Podlasie regions. Rarely recorded, possibly a sporadic migrant to north-eastern Europe.

13. Distribution of *Isturgia arenacearia* (Denis & Schiffermüller, 1775) in Poland

Localities in Poland: Duszniki Zdrój (WR98) coll. in MPUŁ (MALKIEWICZ & KOKOT 2001); Ligota Tworkowska (CA04) (DROZDA 1962); Ustroń (CA40) (H. BRZEZINA leg., coll. HB); Imielin (CA95) (LARYSZ 2008); Baligród (EV96), Leszczawa Dln. (FA00) (BIELEWICZ 1973); Przeworsk (FA04) (J. BURY leg., coll. JBu); Rzeczanów [Życzanów] (DV78) (ROMANISZYN 1929); Kraków – Podgórki (DA24) (RAZOWSKI & PALIK 1969); Nędzówka (DV15), Gubałówka (DV26) (BATKOWSKI & al. 1972); Kazimierz Dolny (EB68) (Ł. DAWIDOWICZ leg.); Woźniki (FC28), Sadowne Węgrowskie (ED52), Podskalnia Góra – Pieniny Mts (DV57) (D. ŁUPIŃSKI leg., coll. DŁ); Przeworsk (FA04) (J. BURY leg., coll. JBu); Stare Stulno (FB89), Dubnik (FC80), Podlaski (FC70), Kosyń (FB79) (M. HOŁOWIŃSKI leg., coll. MH) (www.lepidoptera.pl).

Conservation status. Probably a migrant (M).

Comments. See under *Isturgia murinaria* (DEN. & SCHIFF.)

Cepphis HÜBNER, 1823

22. *Cepphis advenaria* (HÜBNER, 1790)

Phalaena (Geometra) advenaria HÜBNER, 1790: 70, Ukraine; Germany, Leipzig.

Adults: colour pl. II: fig. ♂ 22; ♀ 22.

Genitalia: ♂ - pl. 8: figs. 22, 22a, 22b; ♀- pl. 45: 22.

Description. Wingspan 26-29 mm. Head yellowish-orange with a smooth-scaled frons. Antennae brown, finely banded, bipectinate in the male, filiform in the female. Thorax brown. Wing ground colour yellowish-grey with dense, dark brown freckling. Forewing medial area bordered by narrow, brown lines, somewhat darker than the rest of the wing. Outer part of medial area often all brown. Antemedial line very obviously kinked at veins M2-M3. Discal spot indistinct. Wing apex somewhat pointed. Hindwing with a tiny black discal spot and one thin brown line. Hindwing termen with an obvious concavity. Fringes of both wings brown/white with irregular brown banding at the vein extensions.

Life history and habitat. Flight season: one generation, from mid-May to mid-July. LHPs: *Vaccinium myrtillus* L., *Salix* spp., *Actaea spicata* L. Reports of larvae occurring on trees (*Betula* spp., *Fagus* spp.) seem unreliable (EBERT et al. 2003). Overwinters as a pupa. Inhabits deciduous and mixed woodland, in moist and marshy pine forest, and on raised bogs (BUSZKO 2000). Does not occur in montane pine forests or bilberry stands in the western Sudeten Mts. (MALKIEWICZ 2001, BOROWIAK & CHRZANOWSKI 2007), but is quite common in the Bieszczady and Beskidy Mts. (BIELEWICZ 1973; www.lepidoptera.pl). According to EBERT et al. (2003), it is found at altitudes up to 900 m in Baden-Württemberg.

Distribution. Palaearctic. From western Europe to eastern Asia, and from the Mediterranean Basin to southern Scandinavia. Common in all parts of Poland; in the montane mixed forest zone up to ca 500 m.

Conservation status. Not threatened.

Petrophora Hübner, 1811

23. *Petrophora chlorosata* (Scopoli, 1763)

Phalaena chlorosata Scopoli, 1763: 222, fig 551, Italy, Carnia.
Phasiane petraria (Hübner, 1799).
Lithina chlorosata (Scopoli, 1763).

Adults: colour pl. II: fig. ♂ 23; ♀ 23.
Genitalia: ♂ - pl. 8: figs. 23, 23a, 23b; ♀- pl. 45: 23.

Description. Wingspan 28-30 mm. Head pale beige. Antennae beige, shortly ciliate in the male, filiform in the female. Thorax from pale beige to coffee-coloured. Forewing fairly broad with a pointed apex. Forewing ground colour greyish yellow in both sexes. The colouring effect of the wings depends on the density of the brown freckling and the angle of the incident light (scales very shiny). Discal spots on the forewing distinct, oval; on the hindwing inconspicuous, comma-shaped. Forewing medial area bordered by two creamy white lines: a curved antemedial one and an almost straight postmedial one, the latter edged on the outside with a brown line of variable width. Hindwing paler, less darkly freckled, with an incomplete postmedial line visible only in the rear half of the wing. A thin dark line along the termens of both wings. Fringes uniform, the same hue as the ground colour.

Life history and habitat. Flight season: one generation, from late April to early July. LHPs: bracken *Pteridium aquilinum* L., but other ferns also mentioned, e.g. *Dryopteris filix-mas* (L.) Schott (Leraut 2009). Inhabits mainly woodland edges, roadsides, railway tracksides, dry scrub and clearings. In upland areas only in the foothills.

Distribution. Palaearctic. From the Iberian Peninsula to Kamchatka and the River Amur, and from the Mediterranean Basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 500 m in the mountains.

Conservation status. Not threatened.

Plagodis Hübner, 1823

24. *Plagodis pulveraria* (Linnaeus, 1758)

Phalaena (Geometra) pulveraria Linnaeus, 1758: 521, Europe.
Anagoga pulveraria (Linnaeus, 1758).
Numeria pulveraria (Linnaeus, 1758).

Adults: colour pl. II: fig. ♂ 24; ♀ 24.
Genitalia: ♂ - pl. 8: figs. 24, 24a, 24b; ♀- pl. 46: 24.

Description. Wingspan 30-35 mm. Head pale brown with a smooth-scaled frons. Antennae yellow ochre, bipectinate in the male, delicately serrate in the female. Thorax pale brown. Wing ground colour pale yellow or with faint brown freckling. On both wings this takes the form of short streaks of variable density. Discal spots absent. Medial area brown with darker borderlines. Postmedial line distinctly jagged. Hindwing

paler than the forewing with traces of a brown line near the inner margin. Fringes of both wings more uniform than in *P. dolabraria* and are the same hue as the adjacent ground colour.

Life history and habitat. Flight season: one generation, from mid-May to mid-July. LHPs: various species of deciduous trees and shrubs, e.g. *Corylus avellana* L., *Sorbus aucuparia* L., *Salix* spp., *Betula* spp., *Alnus* spp., *Quercus* spp., *Vaccinium* spp. (EBERT et al. 2003). Overwinters as a pupa. Inhabits various types of deciduous and mixed woodland, including the montane mixed forest zone (up to ca 700 m), where it is more often found than *P. dolabraria.*

Distribution. Palaearctic. From the Iberian Peninsula and the British Isles to Japan, and from the islands of the Mediterranean to northern Scandinavia. In Poland widespread in both the lowlands and upland areas up to 700 m.

Conservation status. Not threatened.

25. *Plagodis dolabraria* (LINNAEUS, 1767)

Phalaena (Geometra) dolabraria LINNAEUS, 1767: 861, Germany.
Eurymene dolabraria (LINNAEUS, 1767).

Adults: colour pl. II: fig. ♂ 25; ♀ 25.

Genitalia: ♂ - pl. 9: figs. 25, 25a-25d; ♀- pl. 46: 25.

Description. Wingspan 26-35 mm. Head purple with a smooth-scaled frons. Antennae brown, darker at the base, broadly bipectinate in the male, serrate in the female. Thorax pale brown with purple patagia. Wing ground colour pale yellow with prominent, dense, brown streaking, thinning out only in the forewing basal and apical areas. Discal spots absent. In the anal angles (tornus) of both wings a purple-brown blotch (darkened) merging with the brown streaks. Forewing termen distinctly notched above the tornus. Fringe variable, but usually of the same hue as the ground colour. Tip of abdomen purple.

Life history and habitat. Flight season: two generations, from late April to early June and from mid-July to late August. LHPs: various broad-leaved trees and shrubs, e.g. *Quercus* spp., *Fagus sylvatica* L., *Tilia* spp., *Ulmus* spp., *Prunus spinosa* L., *Lonicera* spp., *Sorbus aucuparia* L. Overwinters as a pupa. Inhabits woodland, both deciduous (including oak-hornbeam and beech woods) and mixed, as well as parks and gardens in urban areas.

Distribution. Palaearctic. From the Iberian Peninsula and the British Isles to the Far East, and from the Mediterranean islands to southern Scandinavia. In Poland widespread in the lowlands and in the uplands to altitudes of ca 700 m.

Conservation status. Not threatened.

Pachycnemia STEPHENS, 1829

26. *Pachycnemia hippocastanaria* (HÜBNER, 1799)

Geometra hippocastanaria HÜBNER, 1799: pl. 36, fig.186, Europe.

Adults: colour pl. II: fig. ♂ 26; ♀ 26.

Genitalia: ♂ - pl. 9: figs. 26, 26a-26c; ♀- pl. 46: 26, 26a, 26b.

Description. Wingspan 25-31 mm. Head grey with a smooth-scaled frons; antennae grey, shortly ciliate in the male, filiform in the female. Thorax dark ash grey with lighter patches at the tops of the tegulae. Forewing relatively narrow and elongate. Forewing ground colour dark ash grey in both sexes. Longitudinal veins highlighted dark. Lines and discal spot often indistinct, sometimes with paler grey shading. Antemedial and postmedial lines jagged with dark spots at the ends of the projections. A row of tiny dark dots along the forewing termen. Hindwing pale brown with a dot for a discal spot and a scarcely visible pale postmedial line. Fringes uniform, paler than the ground colour, greyish-brown.

Life history and habitats. Flight season: two or three generations, from late-April to early June and from early July to early September. LHP: *Calluna vulgaris* L. Inhabits mainly open heathland, but also roadsides, woodland rides and heather-covered ground under power-lines. Crepuscular and nocturnal, but can be flushed out during the day, especially in very hot weather. At rest the wings overlap one another

14. Distribution of *Pachycnemia hippocastanaria* (Hübner, 1799) in Poland

in a manner unusual for most geometrids, recalling the appearance of members of the Alsophilinae subfamily.

Distribution. European. Inhabits almost all of western and central Europe and Asia Minor. Also known from Morocco and Algeria. Absent from the north-east of the continent. In Poland local in the west, and formerly in central-southern areas. A species with an eminently disjunct population, particularly at the eastern edges of its range. Not found in the mountains.

Localities in Poland: Sopot (CF43), Poznań (XU30), Żwir ad Warszawa (EC18), Zawiercie (CA89), Staszów (EA19) (ROMANISZYN 1929); Dulowa (CA95) (RAZOWSKI & PALIK 1969); Kosztowy – Mysłowice (CA66) (RAEBEL & TOLL 1962); Borne Sulinowo (XV03) (Ł. MATUSZEWSKI leg., coll. ŁM); Ruszów (WS19), Ławszowa (WS29) (MALKIEWICZ & KOKOT 2004); Cedyńskie Wzgórza res. (VU45) (A. MALKIEWICZ leg., coll. AM); Trzebnica (XS48) (R. SZPOR leg., coll. RSz); Tursko ad Połaniec (EA28) (KARPOWICZ 1930); Chłopy (WA61), Szczecinek (XV15), Stary Chwalim (WV95), Lębork (XA74), Kwisno (XV39), Łeba (XA66), Królewo (XA04), Wicko Morskie (XA04), Międzyzdroje (VV67) (URBAHN & URBAHN 1939).

Conservation status. Vulnerable (VU) (BUSZKO & NOWACKI 2002).

Opisthograptis HÜBNER, 1823

27. *Opisthograptis luteolata* (LINNAEUS, 1758).

Phalaena (Geometra) luteolata LINNAEUS, 1758: 525.

Adults: colour pl. II: fig. ♂ 27; ♀ 27.

Genitalia: ♂ - pl. 9: figs. 27, 27a-27c; ♀- pl. 47: 27.

Description. Wingspan 32-35 mm. Head lemon yellow, with a smooth-scaled, brown frons. Antennae brown for the first 1/3 of their length, then white; bipectinate in the male, filiform in the female. Thorax lemon yellow. Wing ground colour bright yellow. 4-5 brown marks along the forewing costal margin, the largest, triangular one at the wing apex. Lines thin, brown, broken, often faint. Discal spot large, crescent- or crown-shaped, white, outlined brown. Hindwing discal spot small, round, likewise with a white eyespot. Fringes yellow with 3-4 brown spots. Hindwing termen with a small, wedge-shaped projection. Wing undersides the same colour as the uppersides.

Life history and habitats. Flight season: one generation, from early May to mid-July. LHPs: numerous shrubs, e.g. *Lonicera* spp., *Rosa* spp., *Prunus spinosa* L., *Sorbus* spp., *Crataegus* spp., less often trees such as *Acer* spp. and *Tilia* spp. or decorative shrubs like *Cotoneaster horizontalis* and *Pyracantha coccinea*. Pupation takes place in a loose cocoon threaded with leaf fragments suspended between host plant branches. Inhabits open-canopied broad-leaved woodland, scrub and gardens, often in towns. Nocturnal. In Germany has been observed on the flowers of *Buddleia davidii* and on *Berberis* spp. (EBERT et al. 2003). Overwinters as a pupa in a strong, brown cocoon in the leaf debris below the host plant.

Distribution. Palaearctic. From western Europe to eastern Siberia (River Amur), and from the Mediterranean Basin to the Arctic Circle. Common in all parts of Poland; in the montane mixed forest zone up to ca 700 m.

Conservation status. Not threatened.

Epione Duponchel, 1829

28. *Epione repandaria* (Hufnagel, 1767)

Phalaena repandaria Hufnagel, 1767: 508, Germany, Berlin region.
Epione apiciaria (Denis & Schiffermüller, 1775).

Adults: colour pl. II: fig. ♂ 28; ♀ 28.

Genitalia: ♂ - pl. 10: figs. 28, 28a, 28b; ♀- pl. 47: 28.

Description. Wingspan 25-30 mm. Head yellowish-orange, with a smooth-scaled frons. Antennae brown at the base; bipectinate in the male, filiform in the female. Thorax yellow or yellow ochre, patagia dark brown. Wing ground colour yellowish-orange with a dense freckling of transverse, rufous-orange dashes. Terminal area of both wings brownish-violet, dusted ash grey, tapering towards the apex in both sexes. Forewing apex sharply pointed. The black, opalescing bluish, postmedial line reaches the apex. Antemedial line bent at an acute angle in the middle of the wing. Small but clearly visible discal spots on both wings. Veins highlighted brown. Forewing termen slightly concave below the apex, hindwing termen distinctly wavy. Fringes the same hue as the terminal area, sometimes somewhat darker (dark brown).

Life history and habitat. Flight season: from mid-June to late July and from early August to early October in two partially overlapping generations. LHPs: *Salix* spp., *Populus* spp. (Buszko 2000), also *Lonicera xylosteum* L. (Ebert et al. 2003). Overwinters as an egg. Found mainly in riparian woodland and scrub, in waterlogged, open-canopied forest and woodland scrub, marshes and fens. May occur secondarily in damp parks and gardens.

Distribution. Palaearctic. From western Europe to eastern Siberia (River Amur), and from the Mediterranean to the Arctic Circle. Common in all parts of Poland; up to ca 700 m in the montane mixed forest zone.

Conservation status. Not threatened.

Comments. See under *Epione vespertaria* (Linnaeus, 1767)

29. *Epione vespertaria* (Linnaeus, 1767)

Phalaena (Geometra) vespertaria Linnaeus, 1767: 864, Lusitania, Portugal.
Epione paralellaria (Denis & Schiffermüller, 1775).

Adults: colour pl. II: fig. ♂ 29; ♀ 29.

Genitalia: ♂ - pl. 10: figs. 29, 29a; ♀- pl. 47: 29.

Description. Wingspan 25-30 mm. Head yellowish-orange, with a smooth-scaled frons. Antennae brown, bipectinate in the male, filiform in the female. Thorax yellow

or yellow-ochre; patagia brownish-violet. Wing ground colour pale yellow to yellowish-orange with a dense (male) freckling of transverse, rufous-orange, opalescent dashes. Terminal areas of both wings brownish-violet, equally broad throughout their length in the male, tapering towards the apex in the female. Forewing apex rounded, postmedial line runs to the costa, antemedial line rounded. Forewing termen slightly concave below the apex, hindwing termen scalloped. Fringes spotted in the female, the same hue as the terminal area in the male. Obvious sexual dimorphism in wing ground colour, degree of freckling, course of postmedial line, and shape of hindwing termen, which is more strongly indented in the female.

Life history and habitat. Flight season: one generation, from late June to late July. LHPs: deciduous trees and shrubs, including *Populus tremula* L., *Salix* spp. and *Corylus avellana* L. Inhabits damp localities, often marshy ones like peatbogs and riparian woodland; more common in the foothills than in the mountains or the lowlands. Found rather rarely, so habitat preferences not well known. Overwinters as an egg. Larva May-early July. Pupates on the foodplant or in the leaf debris below it (URBAHN & URBAHN 1939).

15. Distribution of *Epione vespertaria* (LINNAEUS, 1767) in Poland

Distribution. Palaearctic. From western Europe to eastern Siberia (River Amur). Not found in Portugal, Greece or the Balkans. Known from scattered localities throughout Poland, mainly in the foothills and mountains (up to ca 800 m); less common in the north (first half of 20th cent.) and north-east (19th cent.) (URBAHN & URBAHN 1939; SPEISER 1903).

Localities in Poland: Białowieża – Grudek (FD94), Czerlonka (FD84) (BUSZKO et al. 1996a); Pytowice (CB97) (MARCINIAK & ŚLIWIŃSKI 1988); Gdańsk (CF42), Sopot (CF43), Poznań (XU30), Zaniemyśl (XT48), Wąsowo (WU80), Jeżewo (XT55), Warszawa (EC08), Słowik ad Kielce (DB63), Zawiercie (CA89) (ROMANISZYN 1929); Smoleń (DA08) (MASŁOWSKI & MASŁOWSKI 1936); Ojców (DA16), Kraków (DA24), Sanka (DA04), Zalas (DA04) (RAZOWSKI & PALIK 1969); Stary Sącz (DV79) (ROMANISZYN 1929); Kętrzyn (EE29), Malbork (CE78) (SPEISER 1903); Czerwony Dwór (EE79) (J. BUSZKO leg., coll. AM); Wapienne ad Gorlice (EV29) (A. MALKIEWICZ leg., coll. AM); Kojszówka (DA00), Sucha Beskidzka (CA91) (W. ZAJDA leg., coll. WZ); Borowiec ad Pruchnik (FA03) (W. SOŁTYS leg., coll. RSz); Baligród (EV96), Dołżyca, Jabłonki (EV95), Zatwarnica (FV15) (BIELEWICZ 1973); Czorsztyn (DV57), Krościenko n. Dunajcem (DV57) (BŁESZYŃSKI et al. 1965); Święty Krzyż (EB03) (ŚLIWIŃSKI et al. 1991); Grabowiec (DA69) (KOSTROWICKI 1953); Maciejów ad Zabrze (CA47), Katowice – Muchowiec (CA57), Brynek (CA39), Cisownica (CA31) (RAEBEL & TOLL 1962); res. Las Piwnicki ad Toruń (CD38) (BUSZKO 1991); Duszniki Zdrój (WR98) (STEPHAN 1925); Wójtowice (XR17) (GUDER 1932); Paszków (XR08) (KOKOT 2007); Kletno (XR36) (A. MALKIEWICZ leg., coll. AM); Jagniątków (WS42); Górzyniec (WS43) (MALKIEWICZ 2001); Karkonoski Park Narodowy (WS32, WS33) (BOROWIAK & CHRZANOWSKI 2007); Odyniec (XS17), Rabe (FV27) (R. SZPOR leg., coll. RSz); Giby (FE58) (J. GELBRECHT leg., coll. JG); Świnoujście (VV57), Międzyzdroje (VV67), Szczecin (VV71), Dygowo (WV49), Koszalin (WA70), Sławno (WV66), Kwisno (XV39), Zaleskie (XA14) (URBAHN & URBAHN 1939); Stare Stulno (FB89), Macoszyn (FB79), Zawadówka (FB66), Brzeźno (FB87) (M. HOŁOWIŃSKI leg., coll. MH); Wisła-Malinka (CA50) (H. BRZEZINA leg., coll. HB); Smerek (FV04) (M. MATRAJ leg., coll. MM); Budy Głogowskie (EA65) (P. CZUDEC leg.); Wapienne (EV29), Wołowiec (EV28) (R. ZAMORSKI leg., coll. RZ) (www. lepidoptera.pl).

Conservation status. Lower Risk (LR).

Comments. Could be confused with *E. repandaria* (HUFN.); most easily distinguished by the different course of the postmedial line, which in this species runs to the costal margin and not to the forewing apex as in *E. repandaria*.

Therapis HÜBNER, 1823

30. *Therapis flavicaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra flavicaria DENIS & SCHIFFERMÜLLER, 1775: 104, Hungary.
Caustoloma flavicaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. II: fig. ♂ 30; ♀ 30.
Genitalia: ♂ - pl. 10: figs. 30, 30a-30c; ♀- pl. 47: 30.

Description. Wingspan 27-30 mm. Head yellow, labial palps yellowish-brown. Antennae brown at the base, from about 1/5 of their length dotted brownish-yellow, broadly bipectinate in the male, slightly more narrowly so in the female. Thorax yellow with brown sides. Wing ground colour pale yellow to deep yellow, like *P. macularia*. Forewing termen below the apex strongly concave – here the termen and fringe are brown. Five brown spots along the costal margin. Antemedial and postmedial lines rather faint. A large brown spot at the posterior end (dorsum) of the postmedial line and a brown dot in the middle of the terminal area. The hindwing pattern resembles that of the forewing, but with a smaller spot at the end of the line and a similar dot in the terminal area; there is a conspicuous concavity halfway along the termen. Fringes pale yellow with brown spotting.

Life history and habitat. Flight season: two generations, from late April to early June and from mid-July to early September. LHPs: *Lamium album* L., *Galeopsis* spp. and other *Lamiaceae* species. Inhabits thermophilous scrub on sunny slopes. Regularly comes to light.

16. Distribution of *Therapis flavicaria* (Denis & Schiffermüller, 1775) in Poland

Distribution. From east-central Europe, across the Balkan Peninsula and Asia Minor to Iran. In Poland known from the Dynów area (ROMANISZYN 1929); present-day records are from Przemyśl, where it is very occasionally come across (BUSZKO 2000; BURY 2010). In Poland reaches north-western limit of distribution area.

Localities in Poland: Nozdrzec ad Dynów (EA81) (ROMANISZYN 1929); Przemyśl (FA21) (J. BURY leg., coll. JBu).

Conservation status. Data deficient (DD).

Comments. Somewhat similar to *Pseudopanthera macularia*, but confusion may arise only with worn and faded (to yellow) individuals of *P. macularia*. The difference is evident from the number of brown spots on both wings and in the type of antennae, which in *Pseudopanthera macularia* are much narrower in both sexes.

Pseudopanthera HÜBNER, 1823

31. *Pseudopanthera macularia* (LINNAEUS, 1758)

Phalaena (Geometra) macularia LINNAEUS, 1758: 521, Germany.
Venilia macularia (LINNAEUS, 1758).

Adults: colour pl. III: fig. ♂ 31; ♀ 31.

Genitalia: ♂ - pl. 11: figs. 31, 31a-31c; ♀- pl. 48: 31.

Description. Wingspan 28-31 mm. Head orange and black, antennae banded black and yellow, narrowly ciliate in the male, filiform in the female. Thorax orange and black. Wing ground colour in both sexes deep yellow to pale yellow, freckled black in the basal area. The pattern on both wings consists of black spots of varying size and distribution, often merging with the terminal spots covering most of the fringes. Discal spots often fused with adjacent spots; may be reduced to tiny dots on the hindwing. Forewing spots with opalescent orange scales lending them a bronze sheen; hindwing spots pure black.

Life history and habitat. Flight season: one generation, from mid-May to early July. LHPs: *Stachys sylvatica* L., *Lamium* spp., *Mentha* spp., *Teucrium* spp. and probably other *Lamiaceae* species. Occurs in clearings, glades and waysides in open-canopied deciduous and mixed woodland, in the mountains up to ca 1000 m. Active during the day in both sunny and slightly overcast weather. Feeds on nectar from the flowers of very many different herbaceous plant species (EBERT et al. 2003), sometimes on liquids from puddles, vertebrate excreta and sweat. Occasionally comes to light.

Distribution. Western Palaearctic. From the Iberian Peninsula to central Asia and southern Siberia. In Europe as far north as southern Scandinavia and Estonia. In Poland recorded all over the country, but in the north more local and less often recorded than in the south and the mountains. The best habitats are sheltered mountain valleys, where during the height of the flight season hundreds of individuals can be found on flowers and on the banks of streams.

Conservation status. Not threatened.

Comments. Somewhat similar to *Therapis flavicaria*, but with which only worn and faded (to yellow) specimens might be confused. The difference is visible in the number of brown spots on both pairs of wings and in the type of antennae, which in *T. flavicaria* are bipectinate in both sexes.

Hypoxystis Prout, 1915

32. *Hypoxystis pluviaria* (Fabricius, 1787)

Phalaena pluviaria Fabricius, 1787: 192, Germany, Saxony, Halle.
Hypoplectis adspersaria (Hübner, 1792).
Hypoxystis inspersaria (Hübner, 1823).
Hypoxystis jacobaearia Borkhausen, 1794.

Adults: colour pl. III: fig. ♂ 32a, 32c; ♀ 32b, 32d.
Genitalia: ♂ - pl. 11: figs. 32, 32a, 32b; ♀- pl. 48: 32, 32a.

Description. Wingspan 26-37 mm. Head sandy yellow. Antennae the same colour with brown speckling, bipectinate with the branches broadening towards the tips in the male, filiform in the female. Thorax beige-yellow, not contrasting with wings. Wing ground colour pale yellow to beige-yellow. Forewing termen slightly concave or straight, giving the impression of a sharper apex; here termen and fringe are dark brown. Both wings irregularly freckled brown. Discal spot indistinct on forewing, a small dot on hindwing. The shape and extent of reduction of forewing antemedial and postmedial lines and hindwing postmedial line are variable. In the spring generation the lines are just a row of blurred spots or are absent altogether. Hindwing termen outlined darkly, in summer generation usually as a broken line. In males of the second generation, a dark streak with a different scale structure between the forewing base and discal spot. Fringes narrow, the same hue as the ground colour.

Life history and habitat. Flight season: two generations, from late April to early June and early July to early August. LHPs: *Cytisus scoparius* L., other *Cytisus* spp., *Genista* spp.; *Galium* spp., *Filipendula ulmaria* L. and *Senecio* spp. also reported. During the 2012 population explosion, caterpillars were recorded on *Lotus corniculatus* L., *Lathyrus pratensis* L. and *Artemisia vulgaris* L. (J. Bury pers. comm.). Overwinters as a larva. After a short foraging period in the spring, pupates in pink cocoons. In captivity caterpillars will also accept *Lupinus* spp. and *Vicia* sp., but these are certainly not among the species' natural host-plants. Occurs in dry, scrubby meadows in the foothills and also in damp, marshy meadows and low bog margins in eastern Poland. In 2011-2012 the species expanded in south-eastern Poland and, surprisingly, was recorded in various open habitats. The moths are active both by day and by night. Caterpillars nocturnal. Studies of food and habitat preferences are continuing (Malkiewicz et al. in prep.).

Distribution. Palaearctic. From Mongolia to the north Mediterranean region and France. In eastern Europe up to Sweden and Finland. In Poland nowadays in the south-east, from the Beskid Niski Mountains, Bieszczady Mts, Przemyśl and Dynów Foothills, Roztocze to the Polesie region. In 2012 discovered in the "Góra Tuł" res. near Cieszyn

(Ł. SKOCZYLAS leg.). Formerly also known from Olsztyn (Masurian Lakeland) and the Białowieża Forest (BUSZKO et al. 1996a). Rarely recorded, though locally encountered more often recently (LARYSZ 2001; MALKIEWICZ et al. in prep.) (www. lepidoptera.pl). In Poland probably reaches north-western limit of distribution area.

Localities in Poland: Olsztyn (?DE65) (ROMANISZYN 1929); Czerlonka (FD84) (BUSZKO et al. 1996a); Chełm Wolwinów (FB76), Gotówka (FB77), Brzeźno (FB87), Stare Stulno (FB89) (M. HOŁOWIŃSKI leg., coll. MH); "Roskosz" res. (FB86), Barbarówka (FB96), Siedliszcze (FB95), Uchańka (GB06), Krynica (GB05), Matcze (GB04), Raciborowice (FB94), Prehoryłe (KS91), Magdalenka (FA98), Kornie (FA87), Lipowiec (FA39), Zamch (FA47), Tyce (FA56), Podemszczyzna (FA66), Budomierz (FA65), Majdan Lipowiecki (FA54), Korczowa (FA43), Zagrebla (FA42), "Szachownica" res. (FA31), Mokre Łęgi (FA15), Ujezna (FA14), Rez. Brodoszurki (EA91), Skopów (FA01), Krzywcza (FA11) (K. PAŁKA leg. and obs.); Huta Szumy (Rebizanty) (FA58) (J. BURY leg., coll. JBu); Nowa Grobla ad Lubaczów (FA44) (ŚLIWIŃSKI – unpubl.); Wapienne (EV29), Klimkówka (EV08), Rymanów Zdrój (EV68) (A. MALKIEWICZ leg., coll. AM);

17. Distribution of *Hypoxystis pluviaria* (FABRICIUS, 1787) in Poland

Józefów (EA30) (K. Surowiak leg., coll. AM); Wrocanka (EA40), Tarnowiec (EA41), Umieszcz (EA30) (K. Mazur leg.); Wysoka (EV17), Folusz (EV29), Siary (EV19), Gorlice-Zawodzie (EV19), Wołowiec (EV28), Barwinek (EV57), Rzepedź (EV86), Brzanka (EA02), Jedlicze (EA40), Gorlice (EA10), Szymbark (EV09), Pagorzyna (EA20) (R. Zamorski leg., coll. RZ); Radawa (FA25) (J. Mazepa leg. coll. JBu); Majdan-Sieniawski (FA27), Różaniec (FA37), Pruchnik, Kramarzówka (FA02), Łętownia (FA21), Dobra (FA26), Wylewa (FA16) (J. Bury leg., coll. JBu); Łapajówka (FA03) (W. Wacnik leg.); Wola Mołodycka (FA35) (P. Babula leg.), Markowa (EA94), Dylągówka (EA82), Hadle Szklarskie (EA92), Jawornik Polski (EA92), Bachórz (EA92), Lipnik (EA93), Sietesz (EA93), Sufczyna (FA01), Leszczawa Dolna (FA00), Kuźmina (FV09), Wojtkowa (FV19), Wojtkówka (FV19), Listkowate (FV18), Krościenko (FV28), Ustrzyki Dolne (FV17), Czarna Góra (FV26), Lutowiska (FV25), Stuposiany (FV24) (J. Bury leg., coll. JBu); Żubracze (EV95) (D. Łupiński leg., coll. DŁ); Wetlina (FV04) (R. Słodzinka leg.); Krosno (EA50), Olchowiec (EV48), Leśniówka (EV49), Daliowa (EV57), Nowa Wieś (EV58), Trzciana (pow. Krośnieński) (EV58), Puławy (EV68) (W. Guzik obs.); Krempna (EV38) (J. Wenta phot.); „Góra Tuł" res. (CA30) (Ł. Skoczylas leg.) (www.lepidoptera.pl); Baligród (EV96), Kalnica ad Wetlina (FV05) (Larysz 2001).

Conservation status. Not threatened.

Comments. In the past, the distribution may have been more continuous, from the Baltic countries through eastern Poland and western Ukraine to Romania. The information about the species' occurrence at Skwierzyna (Lubuskie province) was based on a misinterpretation of the place name Schwerin (Romaniszyn 1929).

Apeira Gistl, 1848

33. *Apeira syringaria* (Linnaeus, 1758)

Phalaena (Geometra) syringaria Linnaeus, 1758: 520.
Hygrochroa syringaria (Linnaeus, 1758).

Adults: colour pl. III: fig. ♂ 33; ♀ 33a, 33b.

Genitalia: ♂ - pl. 11: figs. 33, 33a, 33b; ♀- pl. 48: 33.

Description. Wingspan 31-44 mm. Head beige-yellow with a smooth-scaled frons. Antennae yellow ochre, bipectinate to the end in the male, dentate in the female. Thorax beige to pink. Wing ground colour beige-yellow through greyish-yellow to olive greenish. Discal spot absent. Forewing antemedial and postmedial lines are bicoloured brown and pink; medial line is brown but reddish in its central section. A large oval yellow blotch in the terminal area. Hindwing postmedial line is pinkish with brownish-black spots on the veins and a darker area along the dorsum; medial line as on the forewing. The termen of both wings is creased along the trunk of the radial veins and the hindwing along the anal vein.

Life history and habitat. Flight season: two generations between early June and late August. The second generation, a partial one, has probably begun to appear only in the last two decades. Inhabits scrub, clumps of deciduous trees (particularly riparian

woodland) up to the foothills, also parks and gardens. LHPs: *Lonicera* spp., *Fraxinus* spp., *Ligustrum* spp. (privet hedges), *Syringa vulgaris* L. and *Symphoricarpos albus* (L.) BLAZE. Overwinters as a small larva, which ceases feeding in May. Pupation takes place on a branch of the host plant in a loose, transparent cocoon.

Distribution. Eurosiberian. From Western Europe to Japan, and from the Mediterranean basin to southern Scandinavia. In Poland occurs locally all over the country in the appropriate habitats; in the mountains up to ca 700 m. More widespread in the western and southern parts of the country.

Localities in Poland: Bielinek nad Odrą (VU46) (R. SZPOR leg., coll. RSz, AM); Jedliny (UTM?), Goleniów (VV83), Międzyzdroje (VV67), Wisełka (VV78), Mścięcino (VV73), Podjuchy (VV70), Drawsko Pomorskie (WV53), Stary Chwalim (WV95), Koszalin (WA70), Sławno (XA02), Zaleskie (XA14) (URBAHN & URBAHN 1939); Białowieża – Grudek (FD94), Czerlonka (FD84) (BUSZKO et al. 1996a); Mielnik (FD30), Woźniki (FC28) (D. ŁUPIŃSKI leg., coll. DŁ); Gdynia-Chwarzno (CF34) (P. SENN phot.); Gdańsk (CF42), Poznań (XU30), Mosina (XT29), Śrem (XT37), Buk (XU00), Wąsowo (WU80), Warszawa (EC08), Tarnowskie Góry (CA49), Ojców (DA16) (ROMANISZYN

18. Distribution of *Apeira syringaria* (LINNAEUS, 1758) in Poland

1929); Czorsztyn, Macelowa Góra (DV57); Zielone Skałki (DV47) (Błeszyński et al. 1965); Kojszówka (DA00) (W. Zajda leg., coll. AM); Kryg (EA10), Gorlice-Zawodzie (EV19), Jedlicze (EA40), Winiary ad Pińczów (DA78) (R. Zamorski leg., coll. RZ); Krosno (EA50) (P. Guzik obs.); Baligród (EV96), Dołżyca, Jabłonki (EV95), Bircza (FA00) (Bielewicz 1973); Stronno (CE00), Zawiszyn (CD17) (Prüffer & Sołtys 1974); res. Las Piwnicki ad Toruń (CD38), Łódź – Polesie (CC93) (Buszko 1991); Puszcza Bolimowska (DC46) (Sobczak et al. 2012); Famułki Królewskie (DC59) (K. Jonko obs.); Dzięgielów (CA31), Lubsza (XS74), Strzelniki (XS73), Racibórz (BA95) (Raebel & Toll 1962); Lędziny (BB91), Krasiejów (CB01), Winna Góra (YS04), Ligota Dolna (BA99), Szymiszów (CB00) (Blaik 2004); Paszków (XR08) (Kokot 2007); Ustroń (CA40) (H. Brzezina leg.); Górzyniec (WS43) (Malkiewicz 2001); Jagniątków (WS42) (Borowiak & Chrzanowski 2006); Gorzanowice (WS74), Lwówek Śląski (WS46), Ruszów (WS19) (R. Szpor leg., coll. RSz), Tomisław (WS28) (A. Hyjek leg., coll. AM); Ruda Milicka (XT61), Kunice Legnickie (WS87) (K. Kosiorowska leg., coll. AM); Odyniec ad Środa Śląska (XS17), Uliczno ad Dzierżoniów (XS23) (R. Szpor leg., coll. RSz); Oborniki Śląskie (XS38), Trzebnica (XS48) (coll. MPUWr); Ligota Wielka (XS22), Gałów ad Wrocław (XS26) (A. Malkiewicz leg, coll. AM); Wrocław-Śródmieście (XS46) (X. Dobrzański leg., coll. XD); Świdnica (XS03) (J. Masłowski leg., coll. JM); Kamionki ad Pieszyce (XS01), Nieszkowice (XS19), Wołów (XS18) (M. Matraj leg., coll. MM); Komorniki ad Poznań (XU20) (W. Kubasik leg., coll. AM); Poznań – Strzeszyn (XU21), Mielenko Drawskie (WV52), Ziemsko (WV42) (Ł. Matuszewski leg., coll. ŁM); Pietrzyków (VT92) (Kokot 2000); Glińsk (WT39) (M. Mleczak leg., coll. MMl); Koło (CC38) (J. Nowacki leg., coll. AM); Mostki ad Staszów (EB10) (K. Pałka leg., coll. AM); Chełmowa Góra (EB03) (Śliwiński et al. 1991); Kraków-Nowa Huta (DA34), Kajszówka (DA00), Winiary (DA78), Zalesie Górne (EC06), Kąty Borucza (ED40), Strzegocin (CC88), Ostrówek Węgrowski (ED52) (W. Zajda leg., coll. WZ); Wierzbiny (EE66), Markowa (EA94), Husów (EA93) (J. Bury leg., coll. JBu); Rzeszów (EA74) (P. Babula obs.); Rybnik (CA25) (J. Maroń obs.); Kosyń (FB79), Zawadówka res. (FB66) (M. Hołowiński leg., coll. MH); Ustroń (CA40) (H. Brzezina leg., coll. HB); Legionowo (DD90) (P. Sroka obs.); Jarosław (FA24) (J. Mazepa lobs.) (www. lepidoptera.pl).

Conservation status. Data deficient (DD).

Ennomos Treitschke, 1825

34. *Ennomos autumnaria* (Werneburg, 1859)

Eugonia autumnaria Werneburg, 1859: 361, Europe.
Deuteronomos autumnaria (Werneburg, 1859).

Adults: colour pl. III: fig. ♂ 34; ♀ 34.

Genitalia: ♂ - pl. 12: figs. 34, 34a, 34b; ♀- pl. 48: 34.

Description. Wingspan 42-54 mm. Head from sandy yellow to orange-yellow. Antennae the same colour, bipectinate with a pale flagellum in the male, filiform in

the female. Thorax beige-yellow, in the male somewhat darker at the head end. Wing ground colour pale yellow to beige-yellow, with irregular brown blotching. Termen of both wings with tooth-like projections at the vein ends; projections small and flat in the male, larger and more convex in the female. Discal spot oval with a pale centre, faintly outlined by the surrounding dots. Antemedial and postmedial lines consist of a series of patches, usually reduced in the female. Apex of terminal area darker. Fringe beige-yellow with dark brown spots on the projections. Hindleg tibia with two pairs of spurs.

Life history and habitat. Flight season: one generation, from mid-August to late October. LHPs: various deciduous trees and shrubs, e.g. *Tilia* spp., *Betula* spp., *Quercus* spp., *Alnus* spp., *Salix* spp. and *Crataegus* spp. Dwarf shrubs like *Vaccinium myrtillus* L. also reported (BERGMANN 1955). Found in deciduous and mixed woodland, as well as parks, avenues, gardens etc.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to Scandinavia. Common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Comments. Undersized males may be confused with females of *E. alniaria*, but differ from them in the broken lines and the less intensive yellow colour of the thorax.

35. *Ennomos quercinaria* (HUFNAGEL, 1767)

Phalaena quercinaria HUFNAGEL, 1767: 520, Germany, Berlin region.
Deuteronomos quercinaria (HUFNAGEL, 1767).

Adults: colour pl. III: fig. ♂ 35; ♀ 35.
Genitalia: ♂ - pl. 12: figs. 35, 35a, 35b; ♀- pl. 49: 35.

Description. Wingspan 32-41 mm. Head creamy yellow. Antennae the same colour, bipectinate in the male, ciliate-bidentate in the female. Thorax beige-yellow, often sandy yellow in the female. Wing ground colour bright yellow to brownish-yellow, without brown blotches but with fine brown freckling in places. Termen highlighted in brown with darker spots at the vein ends. Projections on the termen only slightly convex. Discal spots indistinct, a dash on the forewing and a spot on the hindwing. Lines continuous, usually bent or kinked near the costa. Basal and terminal areas often completely brown. Hindwing line strongly curved, fading away towards the costa. Hindleg tibia with two pairs of spurs.

Life history and habitat. Flight season: one generation from late June to mid-September. LHPs: various deciduous trees and shrubs, e.g. *Quercus* spp., *Tilia* spp., *Betula* spp. Occurs in deciduous and mixed woodland, parks, avenues, gardens etc. In many regions most commonly found in oak-hornbeam, oak and beech forests.

Distribution. Western Palaearctic. From the Iberian Peninsula to Russia and Turkmenistan, and from the Mediterranean basin to southern Scandinavia. Locally common throughout Poland in suitable habitats; up to ca 900 m in the mountains.

Conservation status. Not threatened.

Comments. May be confused with *E. alniaria* and *E. erosaria*, but differs from these in the colour of the thorax and the shapes of the antemedial and postmedial lines, and hence in the shape of the medial area. In addition, the hindleg tibia carry two pairs of spurs.

36. *Ennomos alniaria* (Linnaeus, 1758)

Phalaena (Geometra) alniaria Linnaeus, 1758: 519, Europe.

Adults: colour pl. III: fig. ♂ 36; ♀ 36.

Genitalia: ♂ - pl. 12: figs. 36, 36a, 36b; ♀- pl. 49: 36.

Description. Wingspan 34-40 mm. Head lemon yellow. Antennae beige-yellow, bipectinate with a pale flagellum in the male, ciliate-bidentate in the female. Thorax lemon yellow, somewhat paler towards the rear. Wing ground colour bright yellow with distinct brown freckling in the basal and terminal areas. Lines strongly curved, not kinked near the costa. Discal spots comma-shaped on both wings, more distinct on the underside. Hindwing terminal area more thickly freckled or (in the female) even tinted brown. Termen with a projection at vein M3, the same shape in both male and female. Fringes conspicuously spotted. Tibia of hindlegs with one pair of spurs.

Life history and habitat. Flight season: one generation, late July to early October. LHPs: deciduous trees and shrubs, e.g. *Alnus* spp., *Tilia* spp., *Betula* spp., *Salix* spp. Occurs in damp deciduous and mixed woodland (including the *Alno-Ulmion* and *Alnion glutinosae* alliances), parks and ponds surrounded by thickets.

Distribution. Western Palaearctic. From the Iberian Peninsula to Russia and Turkmenistan, and from the Mediterranean basin to central Scandinavia. Generally common throughout Poland in suitable habitats; up to ca 800 m in the mountains.

Conservation status. Not threatened.

Comments. Confusion species: *E. erosaria* and *E. quercinaria*. Distinguished from the former by the colour of the thorax, and from both by the different shapes of the antemedial and postmedial lines, and hence by the different shape of the medial area.

37. *Ennomos fuscantaria* (Haworth, 1809)

Geometra fuscantaria Haworth, 1809: 295, United Kingdom.

Adults: colour pl. III: fig. ♂ 37a, 37b; ♀ 37.

Genitalia: ♂ - pl. 13: figs. 37, 37a, 37b; ♀- pl. 49: 37.

Description. Wingspan 36-42 mm. Head lemon yellow. Antennae beige-yellow, bipectinate with a pale flagellum in the male, ciliate-bidentate in the female. Thorax beige-yellow. Wing ground colour yellow ochre to brownish-yellow with a distinct brown tint to the terminal area. Lines strongly curved, not kinked near the costa, almost convergent near the dorsum. Inconspicuous comma-shaped discal spot on both

wings. Termen of both wings with a projection at vein M3. Fringes indistinctly spotted. Hindleg tibia with one pair of spurs.

Life history and habitat. Flight season: one generation from late July to late September. LHPs: *Fraxinus excelsior* L. and *Ligustrum vulgare* L. Occurs in damp deciduous woodland, especially the *Alno-Ulmion* alliance, parks, avenues and gardens, and on ponds surrounded by thickets.

Distribution. Western Palaearctic. From the Iberian Peninsula to Russia and Central Asia, and from the Mediterranean basin to southern Fennoscandia. Generally common throughout Poland in suitable habitats; up to ca 800 m in the mountains.

Conservation status. Not threatened.

Comments. Confusion species: *E. alniaria* and *E. quercinaria*. Differs from the former in thorax colour, and from both in the colour of the terminal area of both wings, which is browner.

38. *Ennomos erosaria* (Denis & Schiffermüller, 1775)

Geometra erosaria Denis & Schiffermüller, 1775: 103, Austria, Vienna district.

Adults: colour pl. IV: fig. ♂ 38a-38c; ♀ 38.

Genitalia: ♂ - pl. 13: figs. 38, 38a, 38b; ♀- pl. 50: 38, 38a.

Description. Wingspan 30-40 mm. Head sandy yellow. Antennae the same colour, bipectinate with a pale flagellum in the male, ciliate-bidentate in the female. Thorax beige-yellow, in some individuals slightly darker than the head. Ground colour of the wings pale yellow to brownish-yellow, darkening slightly towards the hindwing dorsum. Sometimes some scarcely discernible freckling in the forewing terminal area. Termen of both wings with a projection at vein M3, more convex in the female. Discal spots distinct only on the wing undersides. Terminal area of forewing conspicuously broader than the medial area, especially towards the dorsum. Antemedial line strongly curved near the costa. Postmedial line only slightly curved. Fringes faintly spotted. Hindleg tibia with one pair of spurs.

Life history and habitat. Flight season: one generation from late June to late September; this is the earliest of the *Ennomos* species to appear. LHPs: various deciduous trees and shrubs, e.g. *Tilia* spp., *Quercus* spp., *Betula* spp. Occurs in deciduous and mixed woodland, parks, avenues, gardens etc.

Distribution. Western Palaearctic. From the Iberian Peninsula to Russia and Turkmenistan, and from the Mediterranean basin to central Scandinavia. Generally common throughout Poland in suitable habitats; up to ca 800 m in the mountains.

Conservation status. Not threatened.

Comments. Confusion species: *E. alniaria* and *E. quercinaria*. Distinguished from the former by the colour of the thorax, from the latter by the different shapes of the antemedial and postmedial lines, hence by the different shape of the medial area and one pair of tibial spurs.

Selenia HÜBNER, 1823

39. *Selenia dentaria* (FABRICIUS, 1775)

Phalaena dentaria FABRICIUS, 1775: 623, England.
Selenia bilunaria (ESPER, 1801).

Adults: colour pl. IV: fig. ♂ 39; ♀ 39a-39c.

Genitalia: ♂ - pl. 13: figs. 39, 39a-39c; ♀- pl. 50: 39, 39a.

Description. Wingspan 38-43 mm (1st gen.), 31-36 mm (2nd gen.). Head grey, frons rough-scaled. Antennae brown, bipectinate in the male, ciliate-bidentate in the female. Thorax beige to brown, somewhat paler at the rear. Wing ground colour pale yellow to yellowish-grey with more or less distinct brown speckling. Upperside discal spot faint, sometimes visible against the medial line. Underside discal spot much more prominent, white, crescent-shaped. On the forewing, brown antemedial and postmedial lines, also a medial line, and a crescent-shaped rufous patch at the apex. On the hindwing only a double medial line, sometimes reduced. Termen of both wings irregularly scalloped with brown spotting. Evident seasonal dimorphism: moths of the summer generation are smaller and more brightly coloured than those of the spring generation. Melanic forms with uniformly dark brown coloration and a single pale postmedial line are known from industrial regions.

Life history and habitat. Flight season: two generations, from early April to early June and from early July to late August. In the mountains, one generation from mid-June to early September. LHPs: various broad-leaved trees and shrubs, e.g. *Betula* spp., *Alnus* spp., *Tilia* spp., *Salix* spp. and *Crataegus* spp. Overwinters as a pupa. Nocturnal; comes frequently to light. At rest usually holds its wings in the veliform position.

Distribution. Palaearctic. From the Iberian Peninsula to Kamchatka and the River Amur, and from the Mediterranean Basin to the Arctic Circle. East of the Urals – ssp. *alpestris* (WEHRLI, 1940). Common throughout Poland in suitable habitats; up to ca 1300 m in the mountains.

Conservation status. Not threatened.

Comments. Could be confused with *Selenia lunularia,* from which it is distinguished by the less obvious discal spot, the less scalloped outer wing margins and the different shape of the forewing medial area.

40. *Selenia tetralunaria* (HUFNAGEL, 1767)

Phalaena tetralunaria HUFNAGEL, 1767: 506, Germany, Berlin region.

Adults: colour pl. IV: fig. ♂ 40a, 40b; ♀ 40.

Genitalia: ♂ - pl. 14: figs. 40, 40a-40d; ♀- pl. 50: 40, 40a.

Description. Wingspan 32-46 mm. Head dark grey to brown, frons rough-scaled. Antennae brown, bipectinate in the male, ciliate-bidentate in the female. Thorax various shades of brown. Wing ground colour pale greyish (spring generation) to pinkish beige

(summer generation). Medial and basal areas except the costal margin, wholly dark brown (spring generation) or olive green (summer generation). In the terminal area of both wings a round, dark brown spot (more conspicuous in the summer generation) and a crescent-shaped mark below the forewing apex. Large upper wing discal spot distinct, crescent-shaped, transparent. Postmedial line wavy. On the hindwing two black lines lying close together, in the spring generation fused into a brown-shaded band. Hindwing termen strongly scalloped, especially in the females; scalloping in forewing scarcely discernible. Narrow fringes brown or with brown spotting.

Life history and habitat. Flight season: two generations, from early April to early June and from early July to mid-August. In the mountains, one generation from mid-June to early September. LHPs: various broad-leaved trees and shrubs, e.g. *Salix* spp., *Betula* spp., *Alnus* spp., *Quercus* spp. and *Corylus avellana* L. Overwinters as a pupa. Nocturnal; frequently comes to light. At rest usually holds its wings vertically above the body or in a half-open position. Found in various woodland habitats and parks with a preponderance of deciduous trees, e.g. oak-hornbeam and riparian woodland.

Distribution. Palaearctic. From the Iberian Peninsula to Japan, and from the Mediterranean Basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened.

Comments. Confusion possible with *Selenia lunularia,* from which it is distinguished by the darker wing ground colour and the curved forewing terminal line.

41. *Selenia lunularia* (Hübner, 1788)

Phalaena (Geometra) lunularia Hübner, 1788: 27, pl. (3)3, figs T 1, 2, Germany, Augsburg.
Selenia lunaria (Denis & Schiffermüller, 1775).

Adults: colour pl. IV: fig. ♂ 41a, 41b; ♀ 41.

Genitalia: ♂ - pl. 14: figs. 41, 41a-41c; ♀- pl. 50: 41, 41a.

Description. Wingspan 30-46 mm. Head grey to pinkish, frons rough-scaled. Antennae brown, bipectinate in the male, ciliate-bidentate in the female. Thorax beige to brown. Wing ground colour pale yellow to yellowish-grey with more or less distinct brown speckling. In the summer generation the medial area near the discal spot is a much darker brown. There is a darker area of the same colour near the forewing apex in both generations. Upper wing discal spots distinct, crescent-shaped, transparent. Postmedial line practically straight. On the hindwing 2-3 black lines lying very close to one another. Termen of both wings strongly scalloped. Cream fringes very narrow.

Life history and habitat. Flight season: one generation, from early May to mid-June; in the mountains from mid-May to late June. To the south of Poland there is a second generation of smaller individuals in July. LHPs: various deciduous trees and shrubs, e.g. *Quercus* spp., *Fagus sylvatica* L., *Tilia* spp. and *Prunus spinosa* L. Overwinters as a pupa. Nocturnal; occasionally comes to light. At rest usually holds its wings vertically above the body or in a half-open position. Occurs in open-canopied woodland habitats and thermophilous scrub dominated by broad-leaved trees and shrubs, e.g. in

the oak- and beechwoods of the Sudeten and Bieszczady foothills, or the xerothermic rock scrub in the Pieniny Mts.

Distribution. Western Palaearctic. From the Iberian Peninsula to the Urals and central Asia (ssp. *kuldjana* WEHRLI, 1940), and from the Mediterranean Basin to the Arctic Circle. Rare throughout Poland in suitable habitats; up to ca 900 m in the mountains. In the north only few scattered localities.

Localities in Poland: Duszniki Zdrój (WR98), Karłów (WR99), Wójtowice (XR17), Huta (XR17) (STEPHAN 1925); Sokolec (XS01), Paszków (XR08) (KOKOT 2007); Mały Bukowiec (CE27) (S. ŁUCZKOWSKI leg., coll. SŁ); Mołowiste (FE47) (Ł. MATUSZEWSKI leg., coll. ŁM); Krzyżtoporzyce [Krzysztoforzyce] (DA35), Rytwiany (EA19), Rzeszów (EA74), Pieniny (DV67), Rytro (DV78), Buk ad Poznań (XU00), Gdańsk (CF42) (ROMANISZYN 1929); Ojców (DA16) (RAZOWSKI & PALIK 1969); Bielsko Biała (CA52) (RAEBEL & TOLL 1962); Szklarska Poręba Dolna (WS33), Hala Szrenicka (WS32) (BOROWIAK & CHRZANOWSKI 2007); Górzyniec (WS43) (MALKIEWICZ 2001); Zieleniec (XR07) (M. MATRAJ leg., coll. MM); Pogorzała (WS93) (J. MASŁOWSKI leg., coll. JM); Jabłonki (EV95), Muczne (FV24) (LARYSZ 2010b).

19. Distribution of *Selenia lunularia* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

Conservation status. Lower Risk (LR).

Comments. May be confused with *Selenia tetralunaria* (especially the summer generation) and *S. dentaria*. Differs from the former in the paler ground colour and the almost straight forewing postmedial line, from the latter in the more conspicuous discal spot and the more strongly scalloped outer margins of the wings.

Artiora MEYRICK, 1892

42. *Artiora evonymaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra evonymaria DENIS & SCHIFFERMÜLLER, 1775: 103, Austria, Vienna district.
Therapis evonymaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. V: fig. ♂ 42; ♀ 42.
Genitalia: ♂ - pl. 14: figs. 42, 42a, 42b; ♀- pl. 51: 42.

20. Distribution of *Artiora evonymaria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

Description. Wingspan 32-38 mm. Head pale yellow with a smooth-scaled frons. Antennae banded brown, bipectinate in the male, serrate in the female. Thorax beige to brown, patagia dark brown. Wing ground colour beige-yellow to pale brown with more or less prominent brown speckling. Discal spot absent. All three lines on the forewing more strongly marked at the costal margin. The postmedial line is a row of sometimes faint, dark dots on the veins. Termen of both wings scalloped; a deep, darkly bordered concavity on the forewing below the apex. Females and some males have a chocolate brown ground colour with a darker terminal area.

Life history and habitat. Flight season: from late July to early September. Inhabits damp deciduous and mixed woodland, particularly riparian forest (*Alno-Ulmion* alliance), also urban parks and scrub on alluvial soils, e.g. *Rhamno-Prunetea*. Caterpillars feed in April-May on *Euonymus europaea* L., producing characteristic foraging patterns on the young leaves. Overwinters as an egg.

Distribution. Western Palaearctic. In Europe from central Germany to the Black Sea and the European part of Russia, and from Italy, Slovenia, Macedonia and Bulgaria in the south to Lithuania in the north. Does not occur in western Europe. In Poland found locally in the south-west and south-east, also in Upper Silesia and the Poznań area (Baraniak & Sosiński 2000). The only mountain area it has been found in is in the Bieszczady, where single individuals have been caught at altitudes up to 800 m. Found mainly in river valleys. The species with insular pattern of distribution in Poland.

Localities in Poland: Wrocław – Wojnów (XS56), Wrocław – Pilczyce (XS36), Wrocław – Rędzin (XS37), Kątna ad Oleśnica (XS66), Chrząstawa Wielka (XS66), Jodłowice res. (XS28), Koźlice ad Lubin (WT80) (A. Malkiewicz leg. coll. AM); Bagieniec ad Świdnica (XS03) (J. Masłowski leg., coll. AM); Przydroże (WT44), Wołów (XS18), Małowice (XS09) (M. Matraj leg., coll MM); Poznań Dębina (XU20), Poznań Marcelin (XU21), Poznań Kobylepole (XU30), Żabinko (XT28) (Sosiński 2002); Mosina (XT28) (R. Słodzinka leg.); Puszczykowo (XT29) (J. Nowacki leg., coll. AM); Zaborówiec (WT95), Starczanowo (XU33) (Ł. Matuszewski leg., coll. ŁM); Zarzecze ad Rzeszów (EA63), Góra Radunia (XS23), Kołaczów – Dębowa Góra (XS22), Szczepanów (XS17) (R. Szpor leg., coll. RSz); Klimontów ad Staszów (EB31), Tarnowskie Góry (CA49) (Romaniszyn 1929); Smerek (FV04), Jabłonki (EV95), Zatwarnica (FV15), Arłamów (FV29), Bircza (FA00), Leszczawa (FA00) (Bielewicz 1973); Mokre ad Jarosław (UTM?) (W. Sołtys leg., coll. SF); Tarnawka (EA93), Markowa (EA94), Węgierka (FA12), Ostrów (FA23) (J. Bury leg., coll. JBu); Krosno (EA50) (W. Guzik obs.).

Conservation status. Lower Risk (LR).

Comments. The species is well-known for its ephemeral appearances and extremely local occurrence. The spatial structure of its population and the fluctuations in its numbers need to be studied.

Odontopera STEPHENS, 1831

43. *Odontopera bidentata* (CLERCK, 1759)

Phalaena bidentata CLERCK, 1759: pl. 7, fig. 2, Sweden.
Gonodontis bidentata (CLERCK, 1759).

Adults: colour pl. V: fig. ♂ 43a-43b; ♀ 43.

Genitalia: ♂ - pl. 15: figs. 43, 43a-43c; ♀- pl. 51: 43.

Description. Wingspan 38-45 mm. Head grey. Antennae brown, shortly bipectinate (branches 1-1.5 times the width of the flagellum) in the male, ciliate-setose in the female. Thorax greyish-brown to brown. Wing ground colour various shades from greyish-brown to dark brown, in the light forms with brown freckling. Discal spots oval with pale centres. Medial area bordered by darker lines with white dots on the veins, especially on the postmedial line; in melanic forms lines partially or wholly absent. Hindwing: ground colour the same as that of forewing, with a brown medial line. Forewing termen irregularly scalloped, with two more prominent projections below the pointed apex; hindwing termen regularly scalloped.

Life history and habitat. Flight season: one generation from early May to late June. Occurs in many woodland habitats, including parks and copses, up to 1300 m in the mountains. LHPs: various deciduous trees and shrubs, e.g. *Betula* spp., *Salix* spp., *Alnus* spp., *Prunus spinosa* L., and also coniferous ones, such as *Larix* spp. and *Abies* spp. Overwinters as a pupa. Variable melanic forms occur regularly in the mountains and industrial areas (Upper Silesia).

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin (except the islands) to the Arctic Circle. The form *graecaria* Bang-Haas requires special study using alternative methods in order to verify its taxonomic status. Common throughout Poland in suitable habitats; up to ca 1300 m in the mountains.

Conservation status. Not threatened.

Crocallis TREITSCHKE, 1825

44. *Crocallis tusciaria* (BORKHAUSEN, 1793)

Phalaena (*Geometra*) *tusciaria* BORKHAUSEN, 1793: 217, Italy, Toscania.

Adults: colour pl. V: fig. ♂ 44a, 44b; ♀ 44c, 44d.

Genitalia: ♂ - pl. 15: figs. 44, 44a-44c; ♀- pl. 51: 44.

Description. Wingspan 34-40 mm. Head brown. Antennae brown, bipectinate in the male, ciliate in the female. Thorax from dark yellow through coffee-brown to brown. Wing ground colour various shades from yellow to dark brown (like the thorax), sometimes delicately freckled in the basal and terminal areas. Discal spot obvious, oval or round. Antemedial line more or less jagged, but always more so than in *C. elinguaria*.

Postmedial line also curved, often gently kinked half way along. Hindwing line not always conspicuous, often split into two intermingling, irregularly wavy lines. Termen of both wings slightly but regularly scalloped with small dots at the apex Apex sharply pointed, especially in the female. Fringes the same hue as the wing ground colour.

Life history and habitat. One generation, from late August to late October. Found in xerothermic habitats, scrub, thermophilous slopes, rank grassland. Caterpillars feed in May and June on *Prunus spinosa* L., *Rhamnus cathartica* L., *Crataegus* spp., *Berberis* spp. and *Clematis vitalba* L.

Distribution. Southern Palaearctic. From the Iberian Peninsula and Atlas Mountains to central Asia (Turkmenistan and southern Iran). The northernmost range limit passes through central Germany: Thüringen, Hessen, Rheinland-Pfalz (GAEDIKE & HEINICKE 1999). In Poland found in the 19th and early 20th centuries in Wielkopolska (west-central Poland) (ROMANISZYN 1929) and at Biecz in the Beskid Niski Mountains (MALKIEWICZ & KUBASIK 1998); the latter were probably bred specimens of doubtful origin (the date of emergence (?) – July – on the labels is too early). The author of this record is unknown (MGB). In view of these doubts, this locality is marked with a ▲ on the distribution map in Poland.

21. Distribution of *Crocallis tusciaria* (BORKHAUSEN, 1793) in Poland

Localities in Poland: Poznań (XU30) ex larva (SCHUMANN 1902); Leszno vicinity (XT04?) (Vierhub 1915; ROMANISZYN 1929); ?Biecz (EA10) (MALKIEWICZ & KUBASIK 1998).

Conservation status. Probably extinct (EX?).

Comments. Could be confused with *C. elinguaria* (L.), but usually has more sharply angled lines and a yellow ochre to brown rather than a lemon yellow wing ground colour.

45. *Crocallis elinguaria* (LINNAEUS, 1758)

Phalaena (Geometra) elinguaria LINNAEUS, 1758: 520.

Adults: colour pl. V: fig. ♂ 45; ♀ 45; pl. 18, fig. 1.

Genitalia: ♂ - pl. 15: figs. 45, 45a-45c; ♀- pl. 52: 45.

Description. Wingspan 33-38 mm. Head yellow. Antennae pale brown, bipectinate in the male, ciliate in the female. Thorax from yellow through yellow-ochre to pale brown. Wing ground colour various shades of yellow (like the thorax), medial area sometimes a darker brown. Medial area of variable width, usually tapering abruptly towards the anal margin. Discal spot prominent, oval (forewing) or round (hindwing). Antemedial line almost straight, postmedial line S-shaped. Single hindwing line not always distinct. Termen of both wings gently scalloped with some dark freckling near the apex. Apex sharply pointed, especially in the female. Fringes the same hue as the ground colour.

Life history and habitats. Flight season: one generation, from mid-July to late-August. Inhabits deciduous, mixed and coniferous woodland as far up as the montane coniferous forest zone. Often found in forests with *Vaccinium* spp. in the ground cover. Caterpillars polyphagous with a preference for deciduous shrubs and bushes. Overwinters as an egg.

Distribution. Palaearctic. From the Iberian Peninsula to Mongolia and northern China. In Poland widespread, mainly in the lowland and foothills; less common at higher altitudes in the mountains (up to 1200 m).

Conservation status. Not threatened.

Comments. Could be confused with *C. tusciaria* (BORKH.), but usually has more gently curving lines and a lemon-yellow wing ground colour. Also, male and female genitalia are diagnostic.

Ourapteryx LEACH, 1814

46. *Ourapteryx sambucaria* (LINNAEUS, 1758)

Phalaena (Geometra) sambucaria LINNAEUS, 1758: 519, Sweden, Scania.
Urapteryx sambucaria (LINNAEUS, 1758).

Adults: colour pl. V: fig. ♂ 46; ♀ 46; pl. 18, fig. 2.

Genitalia: ♂ - pl. 16: figs. 46, 46a-46c; ♀- pl. 52: 46, 46a.

Description. Wingspan 45-60 mm. Head pale yellow with a beige frons. Antennae beige-yellow, filiform in both sexes but just a little narrower in the female. Thorax pale yellow. Wing ground colour pale yellow with fine grey streaking irregularly distributed on both wings. Discal spot a thin dash, distinct only on the forewing. Antemedial and postmedial lines olive green, sometimes brownish, slightly curved, often asymmetrical. Hindwing with a similar, incomplete line and a pointed tail on the termen. At the base of the tail two black marks, the outer one with a brown centre. The termens and fringes of both wings brown to orange.

Life history and habitat. Flight season: one generation, from mid-June to early August. LHPs: many shrubs and climbers, e.g. *Clematis vitalba* L., *Lonicera* spp., *Rosa* spp., *Prunus spinosa* L., *Hedera helix* L., *Sambucus nigra* L. Overwinters as a small larva concealed in crevices of the host plant. In spring, forages on developing buds; nocturnal. Pupates in a loose cocoon with bits of leaves threaded through it, hanging between the branches of the host plant. Inhabits various types of deciduous woodland, scrub, parks and gardens, often in towns and villages. The moths can be seen flying at dusk along hedgerows and among clumps of bushes in fields.

Distribution. Palaearctic. From the Iberian Peninsula to Kamchatka and the River Amur, and from the Mediterranean Basin (except the islands) to central Scandinavia. Common throughout Poland in suitable habitats; up to ca 600 m in the mountains.

Conservation status. Not threatened.

Colotois Hübner, 1823

47. *Colotois pennaria* (Linnaeus, 1761)

Phalaena (Geometra) pennaria Linnaeus, 1761: 324, Sweden, Vestergötland.

Adults: colour pl. VI: fig. ♂ 47a, 47b; ♀ 47; pl. 18, fig. 3.

Genitalia: ♂ - pl. 16: figs. 47, 47a, 47b; ♀- pl. 52: 47.

Description. Wingspan 40-46 mm. Head pale yellow to golden brown with long, protruding scales on the frons. Antennae yellow ochre to brown, plumose with a white flagellum in the male, filiform in the female. Thorax pale yellow (female) to golden brown (male). Wing ground colour yellowish-brown to rufous, sometimes olive-greenish, very variable. Forewing medial area of variable width, bordered by brown lines. Antemedial line rather blurred, curved; postmedial line almost straight, kinked near the costal margin, sometimes bordered on the inside by a yellow line. Discal spot small but quite plain to see on both wings. A small black-ringed, white spot in the terminal area below the apex. Hindwing slightly paler than forewing, with a brighter basal area. Line not always distinct, often split into two thin ones. Termen of both wings slightly scalloped. Fringes the same hue as the ground colour. Wing ground colour is variable, as is the size of the apical white spot.

Life history and habitat. Flight season: one generation, from mid-September to mid-November. The polyphagous caterpillars live on many trees and shrubs, particularly *Quercus* spp., *Salix* spp., *Acer* spp., *Crataegus* spp., *Prunus spinosa* L. and also fruit

trees. The overwintering stage is the egg. Found in many habitats: woodland, scrub, parks, orchards and gardens.

Distribution. Holarctic. From the Iberian Peninsula to Japan, and from the Mediterranean Basin to the Arctic Circle. Widely distributed throughout Poland and common in suitable habitats; up to ca 800 m in the mountains.

Conservation status. Not threatened.

Angerona Duponchel, 1829

48. *Angerona prunaria* (Linnaeus, 1758)

Phalaena (Geometra) prunaria Linnaeus, 1758: 520.

Adults: colour pl. VI: fig. ♂ 48a-48d; ♀ 48e, 48f.

Genitalia: ♂ - pl. 16: figs. 48, 48a-48c; ♀- pl. 52: 48.

Description. Wingspan 40-48 mm. Head from yellow (female) to orange (male). Antennae banded yellow and brown, bipectinate in the male, ciliate in the female. Thorax from yellow through yellow ochre to dark brown with a yellow patagium. Wing ground colour yellow in the female and orange in the male; various shades of both colours may occur. The pattern consists of short transversal brown flecking of variable density; basal and terminal areas may be wholly brown. Discal spots in the form of variably shaped transverse streaks. Hindwing with the same pattern as on the forewing, variable; can be almost completely brown. Uniformly orange or brown specimens without streaking are very rare. This is one of the most variable of the Polish geometrids.

Life history and habitat. Flight season: one generation, from mid-May to late July. LHPs include *Prunus* spp., *Crataegus* spp., *Salix* spp., *Betula* spp., *Corylus avellana* L. and *Vaccinium* spp. Overwinters as a small larva. Inhabits deciduous, mixed and coniferous woodland at altitudes up to the montane mixed forest zone. Often found near woodland bogs, in marshy and damp coniferous woodland; also parks. Easily disturbed from the ground cover and leaf litter, where it conceals itself during the day. Males much more active.

Distribution. Palaearctic. From the Iberian Peninsula to Kamchatka and the River Amur, and from the Mediterranean Basin (except the islands) to central Scandinavia. Common throughout Poland in suitable habitats; up to ca 600 m in the mountains.

Conservation status. Not threatened.

Apocheima Hübner, 1825

49. *Apocheima hispidaria* (Denis & Schiffermüller, 1775)

Geometra hispidaria Denis & Schiffermüller, 1775: 99, Austria, Vienna district.

Adults: colour pl. VI: fig. ♂ 49a-49c; ♀ 49; pl. 17, fig. 8.

Genitalia: ♂ - pl. 17: figs. 49, 49a, 49b; ♀- pl. 53: 49, 49a.

Description.

Male. Wingspan 29-39 mm. Head grey with a rough-scaled frons. Antennae yellowish-brown, bipectinate. Thorax greyish-brown, massive. Wing ground colour pale grey. Forewing with thick blackish-brown speckling, sometimes masking the rest of the pattern. Lines jagged, often indistinct, especially the antemedial one; highlighted darker on the veins. Hindwing pale grey with a discontinuous brown line. Fringes irregularly spotted brown, uniformly black in melanic forms. Abdomen with brownish-red spines on the dorsal surface.

Female. Length 13-15 mm. Head dark grey; antennae grey, ciliate, with long sensilla as far as the mid-point. Thorax blackish-grey, flecked grey, with very short (> 1 mm) rudimentary wings hidden under a dense covering of long scales. Abdomen covered with brown hairs and vertical rows of black and brown ctenidial spines (fig. 49a). Two rows of black spots down the middle of the dorsal surface, best visible on the first two segments. Legs furry, without white spots.

Life history and habitat. Flight season: one generation from early February to late April. Inhabits deciduous woodland, especially the class *Quercetea robori-petraeae*, as

22. Distribution of *Apocheima hispidaria* (Denis & Schiffermüller, 1775) in Poland

well as mixed and coniferous forest, up to the foothills; also occurs in parks, orchards and gardens. Caterpillar polyphagous with a preference for *Quercus* spp., *Carpinus betulus* L., *Ulmus* spp. and *Corylus avellana* L.

Distribution. Western Palaearctic. From the Iberian Peninsula to Russia, and from the Balkan peninsula (except for Greece) to southern Scandinavia. Common throughout southern Poland in suitable habitats, more local in northern and eastern areas, but underestimated; up to ca 700 m in the mountains.

Localities in Poland: Buk ad Poznań (XU00), Rawicz (XT22), Klecznów ad Staszów (EB41), Tarnowskie Góry (CA49), Katowice (CA57) (Romaniszyn 1929); Warszawa (EC08) (W. Kubasik leg., coll. AM); Gliwice (CA37), (Raebel & Toll 1962); Dziegielów (CA31) (H. Brzezina leg.); Grodziec Śl. (CA41) (Ł. Skoczylas leg.); Wrocław-Wojnów (XS56), Morzęcin Wielki (XS39), Miękinia (XS27) (A. Malkiewicz leg., coll. AM); Borowa Oleśnicka (XS67) (J. Budzik leg.); Prawików (XS07) (A. Kokot leg., coll. AK); Pietrzyków (VT92) (Kokot 2000); Dębno (XS08), Bukowice (XS28), Wołów (XS18), Wrocław-Leśnica (XS36), Skalice (XS41), Budczyce (XS58) (M. Matraj leg.); Jaroszówka (WS68) (J. Józefczuk leg., coll. JJ); Pogorzała (WS93), Jaskulin (WS83), Świebodzice (WS93), Michałkowa (XS02) (J. Masłowski leg., phot. JM); Bircza (FA00), Leszczawa Dolna (FA00) (Bielewicz 1973); Paszków (XR08) (Kokot 2007); Babia Góra (CV99) (Zajda & Przybyłowicz 2003); Piwnice (CD38) (Buszko 1991); Białowieża (FD94) (Buszko et al. 1996a); Stronno (CE00) (Prüffer & Sołtys 1974); Łódź (CC93) (Śliwiński & Marciniak 1991); Puszcza Bolimowska (DC46) (Sobczak et al. 2012); Lędziny (BB81), Kolonowskie (CB11), Zawadzkie (CB21), Winna Góra (YS04), Jaryszów (CA18) (Blaik 2004); Ojców (DA16) (Razowski 1995); Chorzów (CA57); Kraków (DA24) (R. Zamorski leg., coll. RZ); Rybnik (CA25) (J. Maroń leg.); Poznań-Strzeszyn (XU21) (Ł. Matuszewski leg., coll. ŁM); Wrocław-Karłowice (XS46) (X. Dobrzański leg., coll. XD); Wólka Małkowska (FA15); Krosno (EA50) (W. Guzik leg.); Gorlice-Zawodzie (EV19) (M. Wantuch leg.); Sietesz (EA93) (J. Bury leg., coll. JBu); Bachus (FB68) (M. Hołowiński leg., coll. MH) (www. lepidoptera.pl).

Conservation status. Not threatened.

Phigalia Duponchel, 1829

50. *Phigalia pilosaria* (Denis & Schiffermüller, 1775)

Geometra pilosaria Denis & Schiffermüller, 1775: 100, Austria, Vienna district.
Apocheima pilosaria (Denis & Schiffermüller, 1775).
Phigalia pedaria (Fabricius, 1787).

Adults: colour pl. VII: fig. ♂50a, 50b; ♀ 50c, 50d.
Genitalia: ♂ - pl. 17: figs. 50, 50a, 50b; ♀- pl. 53: 50, 50a.

Description.

Male. Wingspan 36-45 mm. Head grey with a rough-scaled frons. Antennae dark brown, bipectinate. Thorax greyish-brown, less massive than in *A. hispidaria*. Wing ground colour pale grey. Forewing with thick greyish-brown or greenish speckling.

Lines rather faint, better emphasized at the costal and anal margins and on the veins. Hindwing paler than forewing, with two blurred lines and a discal spot. Fringes broad, bilayered, rarely spotted. Abdomen without dorsal spines, but with two parallel rows of dark spots.

Female. Length 13-17 mm. Head white or black/white. Antennae dark brown, dotted white, filiform with ciliate tips. Thorax pale grey, flecked grey, with paler patagia and very short (> 1 mm) rudimentary wings masked by a dense covering of long scales. Two parallel rows of dark spots down the middle of the dorsal abdominal surface, most apparent on the first segment. Ctenidial spines present, but much smaller than in *A. hispidaria*. Two rows of black spots along the lateral surfaces. Ventral surface paler than in *A. hispidaria*. Legs spotted white.

Life history and habitat. Flight season: early January to mid-April. Exceptionally, has been recorded during thaws in December. Occurs in broad-leaved, mixed and coniferous woodland, as far up as the foothills; also inhabits parks, orchards and gardens. Caterpillar polyphagous, but with a preference for *Quercus* spp., *Carpinus betulus* L., *Tilia* spp. and *Salix* spp.; also reported from *Larix* spp. Reported to be a serious defoliator together with other geometrids foraging on leaf buds, especially *Operophtera* spp.

Distribution. Western Palaearctic. From the Iberian Peninsula to the Urals, and from the Mediterranean basin to southern Scandinavia. Common throughout Poland in almost all arboreal habitats, more local in northern and eastern areas, but underestimated; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Lycia Hübner, 1825

51. *Lycia hirtaria* (Clerck, 1759)

Phalaena hirtaria Clerck, 1759: pl. 7, fig. 1, Europe, Sweden.
Lycia hanoviensis (Heymons, 1891).
Biston hirtaria (Clerck, 1759).

Adults: colour pl. VII: fig. ♂51a-51d; ♀ 51e, 51f.
Genitalia: ♂ - pl. 17: figs. 51, 51a, 51d; ♀- pl. 53: 51, 51a.

Description. Wingspan 33-45 mm. Head grey, or flecked grey with a rough-scaled frons. Antennae dark brown, bipectinate with ciliate tips in the male, wholly ciliate in the female. Thorax greyish-brown, massive, tops of patagia blackened. Female winged. Wing ground colour variable, from whitish-grey to yellowish. Pattern in the form of lines and blackened veins, variably distinct: in the female it may almost completely disappear, in the male the wings may be almost completely black. Discal spot oval, often faint, masked by the medial line. Antemedial and postmedial lines often broken or merging with other elements of the pattern. The latter are sometimes dark brown on a paler brown or rufous ground colour (*f. hanoviensis* Heym.), but in such cases the wings may well be smaller (fig. 51♂). Fringes with irregular spotting, may be completely brown.

Life history and habitat. Flight season: one generation, from late March to early June. Inhabits broad-leaved, mixed and coniferous woodland, as far up as the foothills. Also occurs in parks, orchards and gardens. Caterpillar polyphagous on trees and shrubs, mainly *Quercus*, spp. *Carpinus betulus* L., *Tilia* spp., *Betula* spp. and *Salix* spp.

Distribution. Palaearctic. From western Europe to Japan. Different subspecies in eastern Europe and Asia: *uralaria* (KRUL.) from the Urals and *parallelaria* Inoue from Japan. Encountered up to 1600 m in the Alps, but not recorded above 1000 m in the Carpathian and Sudeten Mts.

Conservation status. Not threatened.

Comments. The taxon *hanoviensis* (HEYMONS, 1891) was the subject of a long-drawn out controversy regarding its status (TOLL 1947). In earlier Polish check-lists (MALKIEWICZ & SOSIŃSKI 1999; BUSZKO & NOWACKI 2000) it was traditionally treated as a distinct species. But recent studies have revealed a greater variability in external appearance (wings and ground colour) and in genitalia, both male (uncus + gnathos, spinulae of vesica) and female (signum), than was realised earlier. So we now return to the broader concept of one very variable species *hirtaria* (CLERCK) with numerous forms and subspecies.

52. *Lycia zonaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra zonaria DENIS & SCHIFFERMÜLLER, 1775: 100, Austria, Vienna district.
Biston zonaria (DENIS & SCHIFFERMÜLLER, 1775).
Nyssia zonaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. VII: fig. ♂52a, 52b; ♀ 52c, 52d; pl. XVII, fig. 5.
Genitalia: ♂ - pl. 18: figs. 52, 52a, 52b.

Description.

Male. Wingspan 25-29 mm. Head black and white, with a rough-scaled frons. Antennae dark brown, biplumose but with the last three flagellomeres ciliate. Thorax greyish-brown or greyish-black, with two pale bands. Forewing costa straight or concave. Discal spot is a blackening of the crossvein. Wing ground colour from snowy white to pinkish. Pattern in the form of lines and blackening on the veins, rather invariable. Thin white marginal stripes parallel to the termen. Fringe uniformly greyish-brown. Rear edges of abdominal segments yellowish-brown, forming conspicuous rings.

Female. Body 9-10 mm in length, greyish-brown to blackish-brown in colour. Head, thorax, wing stumps and abdomen covered in long grey or pink hairs. Antennae ciliate with long hairs at the base. Rear edges of abdominal segments covered in long scales forming narrow, yellowish-brown rings. Rudimentary wings no longer than 2 mm.

Life history and habitats. Flight period: one generation from early April to mid-May. Inhabits xerothermic swards, dry meadows, fallow land, roadsides, warm mountain slopes, and in the western part of its range also coastal sand-dunes (saltings in Great Britain). Caterpillars feed in May and June on *Achillea millefolium* L., *Plantago* spp., *Salvia* spp., *Cytisus scoparius* L., *Artemisia campestris* L., *Centaurea* spp., *Trifolium* spp. and *Lotus* spp. Males sometimes active by day, but also come to light at night.

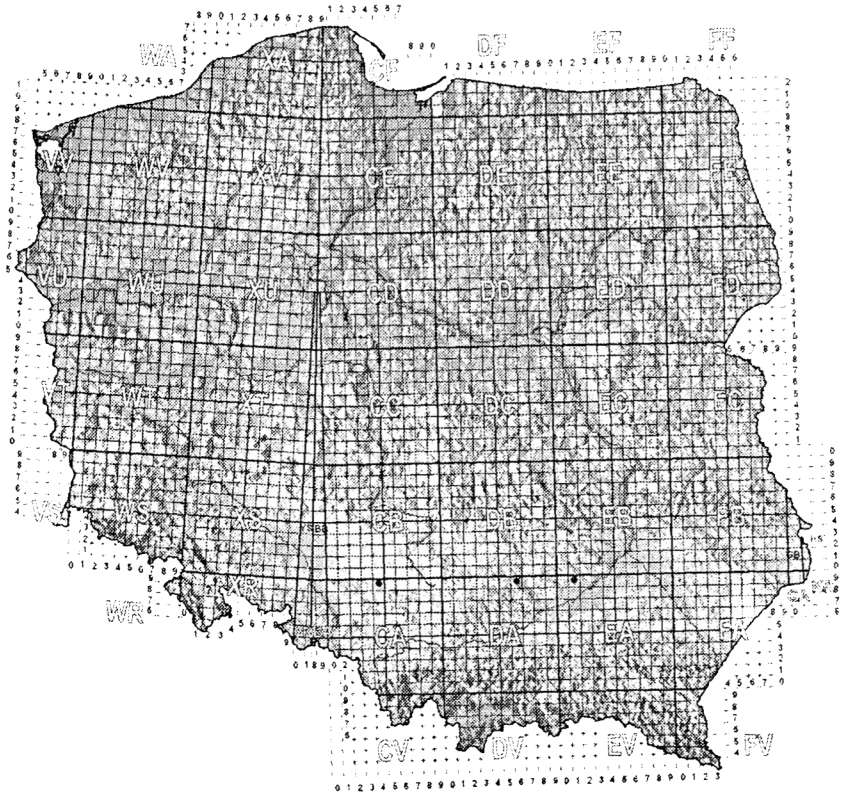
Caterpillars more active after dusk (PORTER 1997). The pupa has been known to remain buried in the ground for up to four years.

Distribution. European. In most western and central European countries east to the Urals and the Caucasus; in the north, known from Scotland, Denmark and southern Sweden. In Poland recorded from the vicinity of Staszów (KARPOWICZ 1928), Pińczów (MYŚKÓW et al. 2012), Tarnowskie Góry and the mountains around Kłodzko ('Glatzer Gebirge', 9 April 1906, coll. S. TOLL in the ISEZ collection) (RAEBEL & TOLL 1962). The species was also recorded on the island of Uznam (Germany/Poland) in the 1920s (URBAHN & URBAHN 1939).

Localities in Poland: Tarnowskie Góry (CA49) (ROMANISZYN 1929; RAEBEL & TOLL 1962); Staszów vicinity (EA19) (KARPOWICZ 1928; ROMANISZYN 1929); 'Skowronno' res. ad Pińczów (DA69) (MYŚKÓW et al. 2012); góry Ziemi Kłodzkiej – 'Glatzer Gebirge' (UTM ?) (RAEBEL & TOLL 1962)

Conservation status. Data deficient (DD).

Comments. Because not many studies of moths were carried out in Western Pomerania between 1945 and 2010, it is quite possible that this species has been overlooked in that region. Efforts should be made to look for it again in the appropriate habitats.



23. Distribution of *Lycia zonaria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

53. *Lycia pomonaria* (HÜBNER, 1790)

Phalaena (Geometra) pomonaria HÜBNER, 1790: 73, pl. (3) 4, figs U, 1-3, Ukraine, Niemirow.
Poecilopsis pomonaria (HÜBNER, 1790).

Adults: colour pl. VII: fig. ♂53; ♀ 53; pl. XVII, fig. 4
Genitalia: ♂ - pl. 18: figs. 53, 53a, 53b; ♀- pl. 54: 53, 53a, 53b

Description.

Male. Wingspan 28-33 mm. Head pale grey with a densely rough-scaled frons. Antennae bipectinate with the end 7-8 flagellomeres free. Thorax black with grey hairs and scattered yellowish-orange scales on the patagia and tegulae. Wings transparent. Forewing pattern: indistinct lines formed from a thin scattering of scales, more prominent only at the termen and dorsum. Discal spot blurred. The white wavy line is usually complete. Hindwing with a more conspicuous discal spot and more evenly distributed scales. Fringes spotted. Abdomen black, flecked with yellow scales on the dorsal surface.

24. Distribution of *Lycia pomonaria* (HÜBNER, 1790) in Poland

Female. Length 11-12 mm. Head, thorax and abdomen covered with long grey hairs, and the whole body flecked with yellowish and white scales. The rudimentary wings are ca 3 mm long. Antennae filiform with cream spotting.

Life history and habitat. Flight season: one generation, from late February to mid-April, but the flight period in any one year is very short. LHPs: various deciduous trees and shrubs, such as *Tilia* spp., *Carpinus betulus* L., *Betula* spp., *Quercus* spp., *Prunus spinosa* L., and fruit trees. Inhabits broad-leaved (particularly oak-hornbeam – the *Carpinion betuli* alliance) and mixed woodland, also parks, avenues, orchards, gardens etc. Regularly found in clumps of old oaks and on their trunks (WEHRLI 1939-1954; Trusch & Rödel 1995).

Distribution. Palaearctic. From France to north-eastern China and the far east of Russia, and from Hungary to northern Scandinavia. Absent from southern Europe. Widespread throughout Poland, mainly southern part; locally numerous in suitable habitats; up to ca 400 m in the uplands but rarely recorded there.

Localities in Poland: Puszcza Borecka (EE79) (J. BUSZKO leg., coll. JB); Białowieski Park Narodowy (FD94) (BUSZKO et al. 1996a); Poznań (XU30), Krotoszyn (XT63), Winna Góra (XT68), Kleczanów ad Sandomierz (EB41) (ROMANISZYN 1929); Kraków (DA24), Ojców (DA16), Zalas (DA04), Sanka (DA04) (RAZOWSKI & PALIK 1969); Stare Repty (CA48), Brynek (CA39) (RAEBEL & TOLL 1962); Wrocław-Wojnów (XS56), Wrocław-Pracze (XS37) (A. MALKIEWICZ leg., coll. AM); Borowa Oleśnicka (XS67) (J. BUDZIK leg.); Wołów (XS18) (M. MATRAJ leg., coll. MM); Skalice (XS41) (X. DOBRZAŃSKI leg., coll. XD); Jaskulin (WS83) (J. MASŁOWSKI leg., coll. JM); Grochotów (WS93) (Z. Stelmaszczyk leg., coll. JM); Chotycze (FC28) (D. ŁUPIŃSKI leg., coll. DŁ); Justynów (DC03) (ŚLIWIŃSKI – unpubl.); Zawadówka Res. (FB66), Bachus (FB68), Podlaski (FC70) (M. HOŁOWIŃSKI leg., coll. MH) (www. lepidoptera.pl); Kraków-Las Wolski (DA14) (W. ZAJDA leg., coll. WZ).

Conservation status. Lower Risk (LR).

Comments. Could be confused with *L. isabellae*, but the male of *pomonaria* has more distinct lines and fringe spotting, and the female's body is flecked with yellow and white rather than orange scales (pl. 17, figs.3-4). The genitalia of both sexes differ slightly in the two species.

54. *Lycia isabellae* (HARRISON, 1914)

Poecilopsis isabellae HARRISON, 1914: 93, Austria, Tyrol.
Poecilopsis isabellae (HARRISON, 1914).
Poecilopsis lapponaria (BOISDUVAL, 1840).

Adults: colour pl. VII: fig. ♂54; ♀ 54; pl.XVII, fig. 3.
Genitalia: ♂ - pl. 18: figs. 54, 54a-54c; ♀- pl. 54: 54, 54a, 54b.

Description.

Male. Wingspan 30-33 mm. Head pale grey; frons with a thick covering of rough scales. Antennae bipectinate with the final 4-5 flagellomeres free. Abdomen black with grey hairs and scattered orange scales on the tegulae. Wings semi-transparent.

Forewing pattern consists of very faint lines produced by thinly scattered scales, more distinct only at the termen and dorsum. Discal spot absent. Wavy line visible only near the costa, if it exists at all. Hindwing very faintly speckled. Fringes uniformly dark. Abdomen black, with a thick line of orange scales along the dorsal surface.

Female. Length ca 11-12 mm. The whole body is speckled orange-red; head, thorax and abdomen covered with long grey hairs. Wing stumps ca 3-4 mm long; antennae filiform, speckled grey.

Life history and habitat. Flight season: one generation, from late February to mid-April. LHP: *Larix decidua* MILL. Occurs in coniferous and mixed woodland in the foothills and the montane mixed forest zone up to altitudes of 1000 m; also in a few lowland localities, where it has probably been introduced. Prefers well-illuminated forest edges and waysides with old larches, on the bark of which mating takes place and where most of the adult life is spent. More information on the species' biology will be found in TOLL (1939), HAASE (1937), SOFFNER (1960) and MALKIEWICZ et al. (2005).

25. Distribution of *Lycia isabellae* (HARRISON, 1914) in Poland

Distribution. European. Recorded from the Alpes-Maritimes, South Tyrol, Swiss Alps, Austrian Alps, the highlands and mountains of Bohemia (Czech Republic) and southern Bavaria, the Sudetens and western Carpathians. In Poland known from many mountain localities in the Sudeten, Carpathian and Świętokrzyskie Mts. and in some lowland localities in the southern part of the country. The isolated site near Grójec (Mazovian Lowland) is probably the result of an introduction (MALKIEWICZ et al. 2004). In Poland reaches northern limit of distribution area.

Localities in Poland: Pogórze Cieszyńskie (CA30), Równica ad Ustroń (CA41) (TOLL 1939); Kluczbork vicinity (CB04-CB14?) (RAEBEL & TOLL 1962); Brzezie, Syrynia (CA04), Racibórz (BA95) (DROZDA 1962); Morów ad Nysa (XR68), Góry Sowie (XS01-XS02?) (RAEBEL & TOLL 1962); Jedlina Zdrój (WS92), Rybnica Leśna (WS91), Unisław Śląski (WS81), Kołaczów (XS22), Antoniów (WS33) (A. MALKIEWICZ leg., coll. AM); Dzikowiec Mt. ad Boguszów-Gorce (WS82), Kuźnice Świdnickie ad Wałbrzych (WS82), Chwaliszów (WS83), Masyw Trójgarbu ad Lubomin (WS83), Świebodzice (WS93) (MALKIEWICZ et al. 2005); Paszków (XR07) (MALKIEWICZ et al. 2005; KOKOT 2007); Stronie Śląskie (XR37) (as *Biston lapponaria* BSD. f. *isabellae*) (STEPHAN 1925); Muszkowice – las (XS31), Wołów (XS18), Lubawka (WS71), Chełmsko Śląskie (WS71), Paczyn (WS62) (M. MATRAJ leg., coll. MM); Skalice (XS41) (A. MALKIEWICZ & X. DOBRZAŃSKI leg., coll AM); Mała Wieś ad Grójec (DC94) (Kinle 1961); Chełmowa Góra (EB74) (ŚLIWIŃSKI et al. 1991); Kraków Las Wolski (DA24), Zalas (DA04), Myślenice (DA22) (RAZOWSKI & PALIK 1969); Ustroń (CA40) (H. BRZEZINA leg., coll. HB) (www. lepidoptera.pl).

Conservation status. Not threatened (apart from isolated inland localities). The current state of the country's population requires further investigation.

Comments. May be confused with *L. pomonaria* (see the comments on *L. pomonaria*).

Biston LEACH, 1815

55. *Biston strataria* (HUFNAGEL, 1767)

Phalaena strataria HUFNAGEL, 1767: 514, Germany, Berlin region.

Adults: colour pl. VII: fig. ♂55a, 55b; ♀ 55.

Genitalia: ♂ - pl. 19: figs. 55, 55a; ♀- pl. 54: 55, 55a.

Description. Wingspan 41-53 mm. Head white or brown and white. Antennae brown with white spotting, broadly bipectinate with no free flagellomeres in the male, ciliate in the female. Thorax variable in colour: brownish-white with black hairs at the top of the patagium or entirely brownish-black. Wing ground colour dirty white to greyish-brown with black speckling. Antemedial and postmedial lines black, jagged, respectively extended into the basal and terminal areas by broad brown bands. Discal spot indistinct, often disappearing into the black speckling. Hindwing with dense black or brown speckling and two dark lines. Fringes with irregular brown spotting, completely brown in melanic forms. Females larger with more contrastive colouring.

Life history and habitat. Flight season: one generation, from mid-March to late April. LHPs: various deciduous trees and shrubs, e.g. *Quercus* spp., *Tilia* spp., *Betula* spp., *Alnus* spp., *Salix* spp., *Populus* spp., *Ulmus* spp., *Ribes* spp.; occasionally fruit trees. Inhabits broad-leaved and mixed woodland, parks, avenues, orchards, gardens etc.

Distribution. Palaearctic. From the Iberian Peninsula to Japan, and from the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

56. *Biston betularia* (Linnaeus, 1758)

Phalaena (Geometra) betularia (Linnaeus, 1758: 521.

Adults: colour pl. VIII: fig. ♂56a-56c; ♀ 56d-56f

Genitalia: ♂ - pl. 19: figs. 56, 56a-56c; ♀- pl. 55: 56

Description. Wingspan 40-56 mm. Head white or black and white. Antennae variable in colour, bipectinate with 10-18 free flagellomeres in the male, ciliate in the female. Thorax variable in colour: black and white with black hairs at the top of the patagium or wholly black. Wing ground colour white with black speckling ('peppering'). Discal spot large, blurred, but often faint. Pattern in the typical form (f. *typica*) consists of indistinct (often broken), black antemedial, medial and postmedial lines, partially fused in intermediate forms (f. *insularia*) or completely so in f. *carbonaria*. In f. *carbonaria* the wings are completely black apart from a white spot at the base of the forewing. Fringes variable in colour: may be irregularly spotted or completely black (in f. *carbonaria*).

Life history and habitat. Flight season: one generation from late May to late July. LHPs: various deciduous trees and shrubs (over 50 species reported), but usually *Salix* spp., *Betula* spp., *Alnus* spp., *Acer* spp., *Rubus* spp. and *Cytisus scoparius* (L.) Wimm. Inhabits broad-leaved and mixed woodland, parks, avenues, orchards, gardens etc. The all-black form (f. *carbonaria*) is prevalent in highly industrialized areas and in conurbations.

Distribution. Holarctic. In Europe from the Iberian Peninsula to the Far East, and from the Mediterranean basin to central Scandinavia; widespread in North America. Very common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened.

Comment. The increase in frequency of the melanic form of *B. betularia* in conjunction with industrial pollution in Great Britain is often cited as a classic example of direct evidence of natural selection: tree trunks blackened by air pollution favoured the survival of the black form, which was supposedly less visible to birds than the typical pale form. Following air quality legislation, the frequency of the black form recently has declined, both in Europe and the industrial northern Great Lakes region in North America (Grant et al. 1998; Grant & Wiseman 2002).

Agriopis Hübner, 1825

57. *Agriopis leucophaearia* (Denis & Schiffermüller, 1775)

Geometra leucophaearia Denis & Schiffermüller, 1775: 101, Japan.
Erannis leucophaearia (Denis & Schiffermüller, 1775).

Adults: colour pl. VIII: fig. ♂57a-57d; ♀ 57; pl. XVII, fig. 1.
Genitalia: ♂ - pl. 19: figs. 57, 57a; ♀- pl. 55: 57.

Description.

Male. Wingspan 27-29 mm. Head grey with smooth-scaled frons. Antennae greyish-brown, narrowly bipectinate. Thorax greyish-brown to black. Wing ground colour pale grey. Forewing with fine brown freckling. Lines distinct, black, often broken (especially postmedial line); medial line often scarcely visible. Discal spot absent. Forms occur with darker basal and terminal areas, also partially or completely melanic forms (not just in industrial areas). Hindwing glossy with brown freckling; lines visible only close to the dorsum. Discal spot indistinct.

Female. Length 9-10 mm. Head grey; antennae grey, filiform. Thorax grey with a few diagonal black spots at the rear. Wing stumps longer than the thorax, dark grey with a paler fringe. Abdomen with two dorsal rows of darks spots.

Life history and habitat. Flight season: one generation, from early February to mid-April. Inhabits deciduous woodland, especially oak and oak-hornbeam (*Capinion betuli*) as far up as the foothill zone. Also found in parks. Caterpillar polyphagous with a preference for *Quercus* spp. Overwinters as a pupa.

Distribution. Western Palaearctic. From the Iberian Peninsula to Kazakhstan and the Caucasus, and from the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable habitats; less frequent in the north and east. Absent from the higher mountains (Tatras, Karkonosze, Śnieżnik) above 600 m.

Conservation status. Not threatened.

58. *Agriopis bajaria* (Denis & Schiffermüller, 1775)

Geometra bajaria Denis & Schiffermüller, 1775: 315, Austria, Vienna district.
Hybernia bajaria (Denis & Schiffermüller, 1775).
Erannis bajaria (Denis & Schiffermüller, 1775).
Cryopega aerugaria (Denis & Schiffermuller 1775).
Cryopega bajaria (Denis & Schiffermüller, 1775).

Adults: colour pl. VIII: fig. ♂58a-58c; ♀ 58.
Genitalia: ♂ - pl. 20: figs. 58, 58a, 58b; ♀- pl. 55: 58, 58a.

Description.

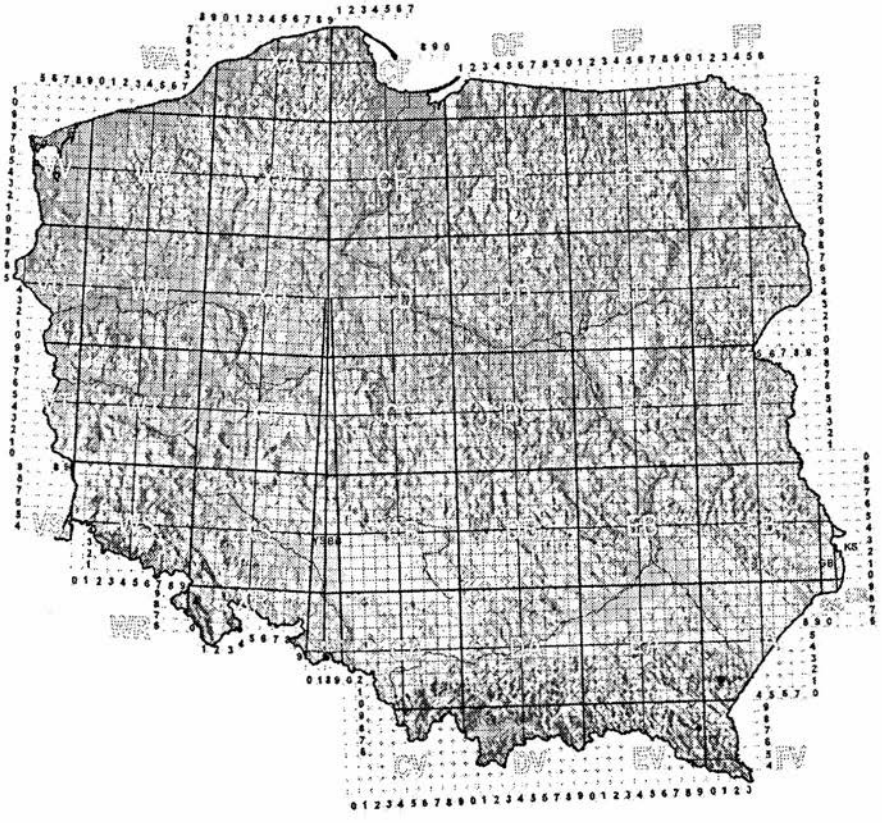
Male. Wingspan 27-34 mm. Head pale grey with a smooth-scaled frons. Antennae greyish-brown, narrowly bipectinate. Thorax brown with long, protruding scales on the tegulae. Wing ground colour dirty grey with rust-red patches. Lines indistinct, black, often broken, discal spot often scarcely visible. A pale wavy marginal line in

the terminal area. Hindwing with an indistinct medial line. Termen slightly scalloped, fringe the same hue as the ground colour.

Female. Length 9-11 mm. Head grey. Antennae grey, filiform, tips ciliate. Thorax grey. Wing stumps no longer than the thorax, pale grey. Abdomen with two dorsal rows of dark spots.

Life history and habitat. Flight season: one generation, from early October to mid-November. Inhabits deciduous and mixed woodland, thermophilous scrub (*Rhamno – Prunetea*), parks and gardens. LHPs: mainly deciduous trees and shrubs: *Prunus spinosa* L., *Ligustrum vulgare* L., *Prunus domestica* L., *Crataegus* spp. and *Rhamnus cathartica* L. Caterpillars feed in the spring from April to June. Overwinters as an egg.

Distribution. The southern part of the Western Palaearctic, from the Iberian Peninsula to central Asia. In central Europe, the recent range boundary crosses southern Germany and the north-east Czech Republic (KRAMPL 1973; EBERT et al. 2003). In Poland recorded in the late 19th century in the Kłodzko region (WUTZDORF 1892) and



26. Distribution of *Agriopis bajaria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

in Lower Silesia (RAEBEL & TOLL 1962). It also figured on SCHRAMM's (1948) checklist of Lepidoptera from Olchowa (near Sanok), but doubt was later cast on this record in view of the improbability of its turning up in that area and the lack of voucher specimens – these were consumed by fire during the fighting in the Bieszczady mountains in 1946 (BIELEWICZ 1973). In Poland reaches northern limit of distribution area or occurs only sporadically.

Localities in Poland: Krzywcza (FA11) (coll. ISEZ); ?Olchowa near Sanok (EV97) (SCHRAMM 1948); Duszniki Zdrój (WR98-XR08?) (WUTZDORF 1892; STEPHAN 1926; RAZOWSKI 1973); Dolny Śląsk (UTM?) (RAEBEL & TOLL 1962).

Conservation status. Data deficient (DD).

Comments. A specimen of a male *A. bajaria* was found recently in the collection of the Institute of Systematics and Evolution of Animals (ISEZ), Polish Academy of Sciences, Kraków (pl. 8, fig. 58c), labelled as follows: Krzywcza, woj.[ewództwo] [province] Przemyśl, 15 X [19]79; the label was hand-written, the handwriting being typical of the labels in the collection of Włodzimierz SOŁTYS. This collector was active in the 1960s and 1970s in the Dynów Foothills, although the results of his studies were never published. It is therefore appropriate to consider this record to be the second authenticated occurrence of this species in Poland.

Taxonomic note. The species was recently transferred to the genus *Cryopega* Dumont on the basis of the simple-structured genitalia and differences in the development of the proboscis and labial palpi (LERAUT 2009).

59. *Agriopis aurantiaria* (HÜBNER, 1799)

Geometra aurantiaria HÜBNER, 1799: pl. 35, fig. 184, Europe.
Erannis aurantiaria (HÜBNER, 1799).
Phigaliohybernia aurantiaria (HÜBNER, 1799).

Adults: colour pl. VIII: fig. ♂59a, 59c, 59e; ♀ 59b, 59d; pl. XVII, fig. 2.
Genitalia: ♂ - pl. 20: figs. 59, 59a, 59b; ♀- pl. 56: 59, 59a.

Description.

Male. Wingspan 32-36 mm. Head yellow with smooth-scaled frons. Antennae yellow, bipectinate. Thorax orange-yellow. Wing ground colour bright yellow to intense orange-yellow. Forewing with more or less dense brown freckling. Lines not very distinct, brown, unbroken, sometimes fading. In the terminal area 3-6 blotches that may fade away or fuse. Discal spot indistinct. Hindwing sparsely freckled, with one strongly curved line and a conspicuous discal spot. Fringes the same hue as the ground colour.

Female. Length 9-12 mm. Head brown. Antennae brown, filiform, tips ciliate. Thorax greenish to grey with a pair of black spots at the rear. Wing stumps narrow, no longer than the width of the thorax, greenish to dark grey, with a pair of black diagonal bands and a brown fringe. Abdomen with two dorsal rows of dark spots and fine white spotting in the middle and the dorso-lateral area.

Life history and habitat. Flight season: one generation from early October to late November. Overwinters as an egg. Caterpillars polyphagous: *Quercus* spp., *Fagus*

sylvatica L., *Carpinus betulus* L., *Acer* spp., *Corylus avellana* L., *Malus* spp., *Sorbus aucuparia* L. and *Betula* spp.; also *Prunus spinosa* L. Initially, they forage on leaf buds, thereafter on young leaves. They pupate in the soil. Adult males and females can be found during the day on the trunks of smooth-barked trees. Crepuscular. Found in deciduous woodland from the class *Quercetea robori-petraeae*, and the alliances *Carpinion betuli* and *Fagion sylvaticae* (especially oak-, beech-, and oak-hornbeam woods), as far up as the foothills; also in parks and gardens. A significant geometrid defoliator in alluvial forests in the lowland courses of large rivers and in the Białowieża Forest.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to Scandinavia. Common throughout Poland in suitable habitats; up to ca 900 m in the mountains.

Conservation status. Not threatened.

Comments. Possible confusion species: *Agriopis marginaria* and *Erannis defoliaria* (but only the males of rare forms – see the comments to these species).

60. *Agriopis marginaria* (Fabricius, 1776)

Phalaena marginaria Fabricius, 1776: 286, Germany, Hamburg.
Erannis marginaria (Fabricius, 1776).
Phigaliohybernia marginaria (Fabricius, 1776).

Adults: colour pl. IX: fig. ♂ 60a, 60f; ♀ 60b-60e.
Genitalia: ♂ - pl. 20: figs. 60, 60a, 60b; ♀- pl. 56: 60.

Description.

Male. Wingspan 32-35 mm. Head beige with a smooth-scaled frons. Antennae beige, bipectinate. Thorax the same hue as the wing ground colour – beige to light brown. Forewing with more or less dense brown freckling. Lines almost always distinct, brown. Postmedial line more angular than in *A. aurantiaria*. Hindwing much paler than forewing with a thin but distinct line and faint discal spot. A row of dark dots along the termen. Fringe the same hue as the ground colour.

Female. Length 12-13 mm. Antennae beige, filiform, tips ciliate. Wing ground colour greyish-brown with two distinct lines enclosing a medial area of variable width. Hindwing visibly longer, with a strongly curved termen. Dorsal surface of abdomen with a pair of dark spots.

Life history and habitat. Flight season: one generation, from late February to late April. Occurs in broad-leaved woodland up to the foothills (700 m). Also inhabits parks and gardens. Caterpillar polyphagous – LHPs: *Quercus* spp., *Fagus sylvatica* L., *Carpinus betulus* L., *Salix* spp., *Acer* spp., *Corylus avellana* L., *Malus* spp., *Sorbus aucuparia* L. and *Betula* spp.; also *Prunus spinosa* L. and *Crataegus* spp. Overwinters as a pupa. Both sexes often rest on tree trunks during the day. Crepuscular.

Distribution. Western Palaearctic. From the Iberian Peninsula to the Ural Mts. and the Caucasus, and from the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable habitats.

Conservation status. Not threatened.

Comments. May be confused with *Agriopis aurantiaria*, but only in collections – rare forms of males without lines. In our climate the two species are phenologically isolated, so impossible to confuse in nature.

Erannis HÜBNER, 1825

61. *Erannis defoliaria* (CLERCK, 1759)

Phalaena defoliaria CLERCK, 1759: pl. 7, fig. 4, Europe, Sweden.

Adults: colour pl. IX: fig. ♂ 61b-61d; ♀ 61a; pl. XVII, fig. 6.
Genitalia: ♂ - pl. 21: figs. 61, 61a-61c; ♀- pl. 56: 61.

Description.

Male. Wingspan 36-42 mm. Head yellow to orange with smooth-scaled frons. Antennae yellow, bipectinate, tips ciliate. Thorax orange-yellow. Wing ground colour pale yellow to deep orange-yellow. Discal spots large, conspicuous. Forewing with more or less dense brown freckling. Lines distinct, brown, in the form of thick bands delimiting the medial area. Postmedial line kinked in several places. Fringe the same hue as the ground colour, with brown spots. There are forms with the forewing uniformly rust-brown, brown with evenly distributed darker spotting, or uniformly blackish-brown. Hindwing greyish, with dark freckling and a yellowish fringe. Discal spot usually distinct.

Female. Length 12-15 mm. Head yellow. Antennae black with yellow spots, filiform, tips ciliate. Thorax yellow with two pairs of black spots. Legs black with yellow spots and bands. Wing stumps very small, no longer than 1 mm. Abdomen yellow with two pairs of dorsal, shiny black spots on each segment, also large single or fused blotches on the sides.

Life history and habitat. Flight season: one generation, from early October to mid-December. Overwinters as an egg. Caterpillars decidedly polyphagous: LHPs include *Populus* spp., *Salix* spp., *Quercus* spp., *Fagus sylvatica* L., *Carpinus betulus* L., *Tilia* spp., *Acer* spp., *Alnus* spp., *Ulmus* spp., *Corylus avellana* L. and *Betula* spp., *Prunus spinosa* L., *Crataegus* spp., other deciduous trees and shrubs, and apple trees (*Malus* spp.) and other fruit trees. The caterpillars forage first on leaf buds, then on young leaves. Pupation takes place in the soil. By day, both male and female imagines can be found on tree trunks, especially those with smooth bark like beech and hornbeam. Becoming active after dusk, the moths occur in broad-leaved woodlands and scrub as far up as the montane mixed forest zone; they also inhabit parks and gardens. A significant geometrid defoliator in oak-hornbeam woodlands in the lowland courses of large river valleys and in the Białowieża Forest (including the Białowieża National Park).

Distribution. Palaearctic. From the Iberian Peninsula to the Far East and from the Mediterranean basin to Scandinavia. Common throughout Poland in almost all habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Comments. There is a possibility of confusion between very yellow, uniformly coloured males of *E. defoliaria* and males of *Agriopis aurantiaria,* but the angle of the forewing apex in the former is slightly smaller.

Synopsia HÜBNER, 1825

62. *Synopsia sociaria* (HÜBNER, 1799)

Geometra sociaria HÜBNER, 1799: pl. 29, fig. 155, Europe.

Adults: colour pl. IX: fig. ♂ 62; ♀ 62.

Genitalia: ♂ - pl. 21: figs. 62, 62a, 62b; ♀- pl. 56: 62.

Description. Wingspan 26-40 mm. Head greyish-brown with smooth-scaled frons. Antennae dark grey, bipectinate with 8-10 free flagellomeres in the male, filiform in the female. Forewing grey, with dense black mottling. Lines distinct, blackish-brown,

27. Distribution of *Synopsia sociaria* (HÜBNER, 1799) in Poland

wavy, sharply kinked near the costa. Discal spot small, rounded, distinct. Medial line evident only in the rear half of the wing. Fringe grey, spotted. Hindwing with a slight notch in the termen, towards which the medial line makes a distinct curve. A small black spot between this curve and the notch. Abdominal segments highlighted by transverse black lines.

Life history and habitat. Flight season: one generation, from early July to late August. Found in grassy habitats, heathland and forest steppe. LHPs: various shrubs and xerophilous herbaceous plants such as *Calluna vulgaris* L., *Cytisus scoparius* L., *Genista* spp., *Hippophaë rhamnoides* L. and *Artemisia* spp.

Distribution. Eurosiberian. Known from the Atlantic to eastern Siberia, but especially from the basins of the Mediterranean, Black and Caspian Seas to central Asia and Iran. Recorded only twice in Poland: at Kraków in the second half of the 19th century (ŻEBRAWSKI 1867) and at Częstochowa (PONGRACZ 1923; ROMANISZYN 1929). In view of the occurrence of the species in the neighbouring countries of that time (Brandenburg, Saxony, Moravia, Lithuania), we can assume those records to be reliable (MALKIEWICZ & SOSIŃSKI 1999; 2000), even though not a single voucher specimen has been preserved in the verified collections in Poland.

Localities in Poland: Kraków (DA24?), Częstochowa (CB62?) (ROMANISZYN 1929); Dolny Śląsk (UTM?) (RAEBEL & TOLL 1962).

Conservation status. Extinct (EX).

Peribatodes WEHRLI, 1943

63. *Peribatodes rhomboidaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra rhomboidaria DENIS & SCHIFFERMÜLLER, 1775: 101, Austria, Vienna district.
Boarmia rhomboidaria (DENIS & SCHIFFERMÜLLER, 1775).
Boarmia gemmaria (BRAHM, 1791).

Adults: colour pl. IX: fig. ♂ 63; ♀ 63.

Genitalia: ♂ - pl. 21: figs. 63, 63a, 63b; ♀- pl. 57: 63, 63a.

Description. Wingspan 30-40 mm. Head greyish-brown with smooth-scaled frons. Top of patagium blackened. Antennae dark grey, bipectinate with ca 15 free flagellomeres in the male, filiform in the female. Forewing greyish-brown with dense black mottling. Lines indistinct, blackish-brown, dotted black on the veins, with a sharp kink near the costa. Discal spot conspicuous – a thick black dash. Medial line distinct, rounding the discal spot on the outside. Hindwing with three lines, the outer one being the white wavy marginal line; discal spot in the from of a dot. Termen scalloped, bordered black, with a grey, bicoloured fringe.

Life history and habitat. Flight season: two generations between early June and mid-September; second generation more numerous in September. Occurs in scrub, ruderal habitats, roadsides, heathland and forest steppe. Common near human habitation, particularly in large cities, where it has become the most numerous species of the Ennominae. LHPs: various bushes, shrubs and herbaceous plants, e.g. *Prunus spinosa*

L., *Rosa* spp., *Cytisus scoparius* L., *Calluna vulgaris* L., *Clematis vitalba* L., to name but a few. In Baden-Württemberg caterpillars reported feeding on more than 20 plant species (EBERT et al. 2003).

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the north of the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable lowland habitats, mainly in the southern and western parts of the country, along river valleys and other corridors. In recent times has probably been expanding north- and eastwards, also invading larger towns and becoming one of the most common moths in late summer (2nd generation).

Localities in Poland: 'Bielinek' res. (VU46) (BLAIK 2010); Poznań (XU30), Środa Wielkopolska (XT58), Mosina (XT29), Rawicz (XT22), Leszno (XT04), Jeżewo (XT55), Warszawa (EC08), Kielce (DB73), Sandomierz (EB51) (ROMANISZYN 1929); Malichy (DC87) (W. KAMOCKI leg.); Gdynia-Chwarzno (CF34) (SENN & ŁUCZKOWSKI 2012), Częstochowa (CB63) (P. SENN phot.); Bydgoszcz-Bartodzieje (CD09) (M. Radziszewski leg.); Puszczykowo (XT29), Poznań-Strzeszyn (XU21), Sobków (DB61), Muchocin (WU52), Zaborówiec (WT85), Miękowo (XU31), Puszcza Solska (FA58),

28. Distribution of *Peribatodes rhomboidaria* (FABRICIUS, 1776) in Poland

Błotkowo (XT05) (Ł. Matuszewski leg., coll. ŁM); Mielnik (FD30) (D. Łupiński leg., coll. DŁ); Białowieża (FD94) (Buszko et al. 1996a); Wrocław-Stabłowice (XS36) (J. Roguski leg.); Wrocław (XS46), Wrocław-Rędzin (XS37), Chrząstawa (XS66), Jodłowice (XS28), Brzeg Dolny (XS18), Pobiel ad Wąsosz (XT21), Solniki Wlk. (XS77), Prawików (XS07) (A. Malkiewicz, A. Kokot leg., coll. AM, AK); Jugowice (WS92), Zagórze (WS92) (J. Masłowski leg., coll. JM); Kraków (DA24), Dolina Będkowska (DA15), Zalas (DA04), Tenczynek (DA05), Ojców (DA16), Dulowa (CA95) (Razowski & Palik 1969); Pasmo Łysogórskie (EB03) (Śliwiński et al. 1991); Niedzica-Zielone Skałki (DV47) (Błeszyński et al. 1965); Knieja (CB02), Ligota Dolna (BA99), Kamień Śląski (BB90), Jaryszów (CA18), Szymiszów (CB00) (Blaik 2004); Zalesie Górne (EC06), Kojszówka (DA00), Przełęcz Krowiarki (CA99), Uherce Tunel (FV08) (W. Zajda leg., coll. WZ); Biadacz (YS02), Wisła-Jawornik (CA40), Ustroń-Lipowiec (CA41) (H. Brzezina leg.); Szklarska Poręba Dolna (WS33) (Borowiak & Chrzanowski 2007); Brynek (CA39), Imielin (CA75) (Larysz 2008, 2010a); Mysłowice-Ćmok (CA66) (A. Larysz leg., coll. AL); Siary (EV19), Szymbark (EV09), Jedlicze (EA40) (R. Zamorski leg., coll. RZ); Strumiany (CC50) (P. Czudec leg.); Markowa (EA94) (J. Bury leg., coll. JBu); Kaczyce Dolne (CA22) (A. Kwiczala leg., coll. AKw); Pleszew (XT95) (P. Żurawlew leg.) (www. lepidoptera.pl)

Conservation status. Not threatened; expanding.

Comments. This species may be confused with *P. secundaria* (see comments to *P. secundaria*).

64. *Peribatodes secundaria* (Denis & Schiffermüller, 1775)

Geometra secundaria Denis & Schiffermüller, 1775: 101, France.
Boarmia secundaria (Hübner, 1799).

Adults: colour pl. IX: fig. ♂ 64; ♀ 64.

Genitalia: ♂ - pl. 22: figs. 64, 64a-64c; ♀- pl. 57: 64, 64a.

Description. Wingspan 30-34 mm. Head light grey with a darker, smooth-scaled frons. Top of patagium blackened. Antennae dark grey, bipectinate with 10 free flagellomeres in the male, filiform in the female. Forewing greyish-brown with coarse black mottling. Lines distinct, blackish-brown, jagged, less obviously kinked near the costal margin. Discal spot conspicuous – a thick black dash. Medial line distinct, passing through the discal spot and adjacent to the postmedial line near the anal margin. A large pale patch in the terminal area. Fringe spotted. Hindwing with three lines, the outer one being the white wavy marginal line, kinked halfway along. Discal spot absent. Termen scalloped, bordered black, with a grey, spotted fringe. A pale grey ring at the base of the abdomen.

Life history and habitat. Flight season: one generation, from mid-July to early September. Occurs in coniferous and mixed woodland, especially with stands of spruce, and up to the montane coniferous forest zone. LHPs: *Picea abies* Karst. and *Abies alba* Mill. Surrogate LHPs in captivity include other conifers, including exotic ones like *Thuja plicata* and *Tsuga heterophyla*.

Distribution. Western Palaearctic. From the Iberian Peninsula to the Urals, and from the north of the Mediterranean basin to southern Fennoscandia. Common throughout Poland in suitable highland/submontane, forest habitats, mainly in the southern and western parts of the country, often in mountain forests. Repeatedly reported in recent years as expanding north- and eastwards in central and northern Europe (MIKKOLA 1997; KOKOT 2000; BUSZKO pers. comm.; RYRHOLM pers. comm.).

Conservation status. Not threatened; expanding.

Comments. This species may be confused with *P. rhomboidaria,* but the male's antennae are broader, the discal spots are less obvious and the pale spot in the subterminal area of the forewing is much bigger. The grey ring at the base of the abdomen in *P. secundaria* is paler. Both species also differ in their genitalia.

65. *Peribatodes ilicaria* (GEYER, 1833)

Geometra ilicaria GEYER, 1833: pl. 111, figs 582, 583, France, Provance.
Peribatodes manuelaria (HERRICH-SCHÄFFER, 1852).

Adults: colour pl. IX: fig. ♂ 65; ♀ 65.

Genitalia: ♂ - pl. 22: figs. 65, 65a; ♀- pl. 57: 65.

Description. Wingspan 30-34 mm. Head greyish-brown with a smooth-scaled frons. Top of patagium blackened. Antennae dark grey, bipectinate with ca 15 flagellomeres in the male, filiform in the female. Forewing greyish-brown with coarse black speckling. Lines blackish-brown, jagged, with a sharp kink near the costa. Discal spot indistinct, masked by the medial line. Postmedial line approaches the medial line near the dorsum, often merging with it to form a black patch. Hindwing ground colour same as forewing, with two parallel lines. Medial line strongly curved. A dark patch in the middle of the terminal area near the termen. Fringe bicoloured, spotted.

Life history and habitat. Flight season: one generation, from early July to late August. Favoured habit: xerothermic scrub on slopes and forest steppe; has occurred in gardens. LHPs: *Quercus* spp., *Prunus spinosa* L., *Ligustrum* spp., occasionally other trees and shrubs.

Distribution. Mediterranean. Found mostly in south-west Europe and north Africa. In central Europe caught sporadically between 1850 and 1950 in Belgium, western Germany and Denmark. In Poland only one specimen ever caught, in 1919, a female at Bydgoszcz (TOLL 1953; WARNECKE 1954), to where the species may have been brought; it became acclimated for a time (TOLL 1957). This is still the north-easternmost locality of the species in Europe.

Conservation status. Data deficient (DD). Probably introduced by accident.

Comments. This species may be confused with *P. secundaria*, but the medial line on the hindwing is more strongly curved. The pale patch in the terminal area of the forewing is less obvious than in *P. secundaria* or quite small, or absent altogether. Both species also differ in genitalia.

Selidosema HÜBNER, 1823

66. *Selidosema brunnearia* (VILLERS, 1789)

Phalaena (Geometra) brunnearia VILLERS, 1789: 325, Europe.
Selidosema ericetaria (VILLERS, 1789).
Selidosema plumaria (Denis et Schiffermüller, 1775).

Adults: colour pl. IX: fig. ♂ 66; ♀ 66.

Genitalia: ♂ - pl. 22: figs. 66, 66a, 66b; ♀- pl. 57: 66.

Description. Wingspan ♂31-39, ♀31-35 mm. Head pale brown. Antennae bipectinate with 7 free flagellomeres in the male, filiform in the female. Ground colour of wing upperside from light yellowish-brown to greyish-brown with a violet tint. The whole wing surface covered with sparse or dense groups of dark brown scales. Discal spots small, often hardly visible, especially on the forewing, in contrast to *Selidosema plumaria (*Den. et Schiff.), where they are frequently prominent, dark brown. Forewing lines brown; basal and postmedial lines dark brown, conspicuous only near the costal margin; medial line more or less visible for the whole of its length. In the terminal area a broad brown band parallel to the termen, usually with irregularly spaced dark brown spots, which are less prominent and less sharply edged than in *S. plumaria* (colour pl. 9: fig. 66A ♂, ♀)

Life history. Flight season: one generation, from late July to late August. LHPs: various herbaceous plants and shrubs, mainly Fabaceae – *Genista* spp., *Cytisus* spp., *Vicia* spp., *Lathyrus* spp., *Coronilla* spp., *Lotus corniculatus* L., but also other families, e.g. Ericaceae – (*Erica* spp., *Calluna vulgaris* L.), Rubiaceae – *Galium mollugo* L. and Rosaceae – *Sanguisorba minor* Scop. (EBERT et al. 2003). The main habitats in Poland are heathlands on coastal and inland dunes, open-canopied pine forests, e.g. *Empetro nigri-Pinetum* Wojt. 1964 in the Baltic coastal dune belt and subatlantic inland areas/ plant communities e.g. *Genistion pilosae* DUV. 1942 emend. SCHUB., often in former military training areas (GELBRECHT et al. 1997; MALKIEWICZ & KOKOT 2004). Another group of habitats includes xerothermic grasslands on rocky slopes, but there is no reliable record of the species from them in Poland. The central European records of these habitats come from the Czech Republic (KRAMPL & MAREK 1981) and Germany: Thüringen (BERGMANN 1955), Baden-Württemberg (EBERT et al. 2003). Overwinters as a larva (L-3, L-4 or L-5 instar), which resumes feeding in the spring. Penultimate and final instars collected on *Cytisus scoparius* L. in the Czech Republic and on *Calluna vulgaris* L. and *C. scoparius* L. in eastern Germany (GELBRECHT et al. 1997).

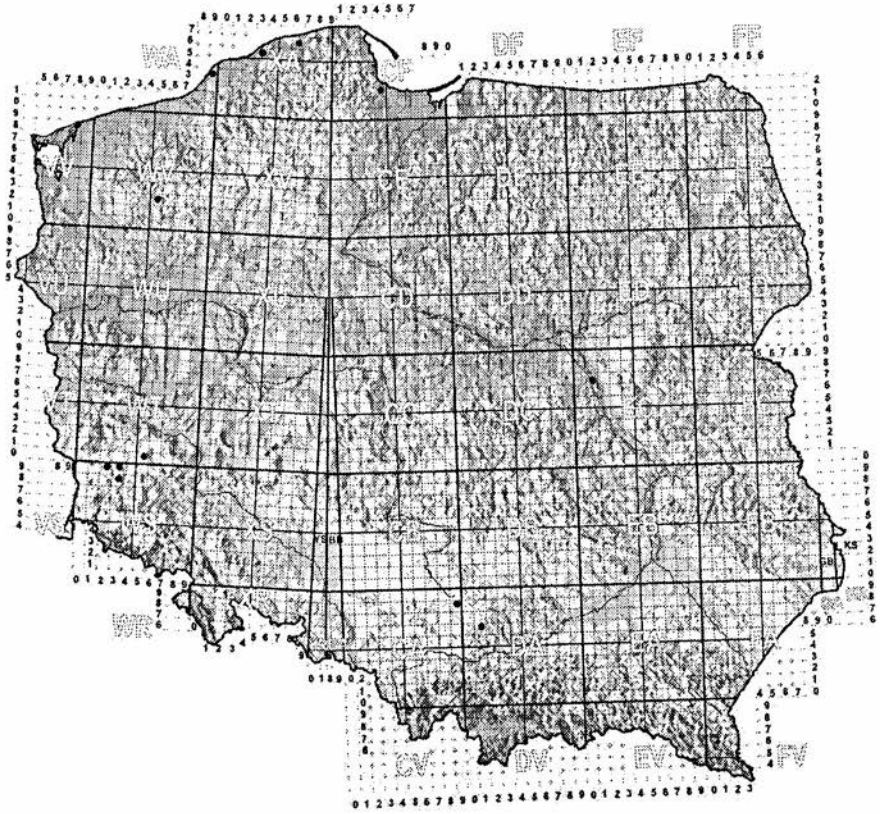
Distribution. European. Known from scattered localities in western, central and southern Europe. Also recorded from southern Fennoscandia, Lithuania, Russia, Ukraine (new data: Ivano-Frankove [Janów] ad L'viv, (1♂ was identified in coll. R. SZPOR, Poland, Dzierżoniów; det. A. MALKIEWICZ – pl. 22, fig. 66a), Poland (Dzierżoniów; det. A. MALKIEWICZ), the Middle East and North Africa. In Poland present along the Baltic Sea coast (Słowiński National Park, Dziwnów) (HAEGER 1928; URBAHN & URBAHN 1939), Lower Silesia (MALKIEWICZ & KOKOT 2004), Zawiercie (MASŁOWSKI & MASŁOWSKI

1936) and probably the Warsaw area (ROMANISZYN 1929). All other literature data are unreliable and misleading (see Comments).

Localities in Poland: Rowy (XA35), Łeba (XA66), Darłówko (WA84), Dziwnów (VV88), Gdańsk (CF42) (URBAHN & URBAHN 1939); Drawsko Pomorskie – military training area (WV52) (Ł. MATUSZEWSKI leg.); ?Kraków vicinity (RAZOWSKI & PALIK 1969); ?Ojców (DA16) (RAZOWSKI 1995); Świder near Warszawa (EC17) (ROMANISZYN 1929); Wilkocin – military training area (WT50), Trzebień Mały (WS39), Małe Golnice – military training area (WS38), Ławszowa – military training area (WS29) (MALKIEWICZ & KOKOT 2004; KOKOT & HYJEK 2011); Józefów (CA98) (MASŁOWSKI & MASŁOWSKI 1936); Racibórz vicinity (RAEBEL & TOLL 1962).

Conservation status. Vulnerable (VU) (BUSZKO & NOWACKI 2002).

Comments. The biology, diagnostics (genitalia) and morphology of immatures are described in detail in KRAMPL & MAREK (1981) and in SIHVONEN & MIKKOLA (2002). The best diagnostic features of the genitalia are: in males, the spiny edge of the valvula (pl. 22: fig. 66, 66a; pl. 23: fig. 66A, 66Aa) and the ventro-lateral projection of the apex



29. Distribution of *Selidosema brunnearia* (DE VILLERS, 1789) in Poland

in the aedeagus (pl. 22: fig. 66b; pl. 23: fig. 66Ab); in females, the form of the lamella postvaginalis (pl. 57: fig. 66).

In the past, *Selidosema brunnearia* was often confused with *Selidosema plumaria* (DEN. & SCHIFF.) because of their similarity in external appearance and genitalia (not examined then), so without voucher specimens it is not possible to verify old records. This error was committed several times by German and Polish authors, who in the 19th and 20th centuries reported *Selidosema* sp. from the vicinity of Racibórz, Kraków and Warsaw (WOCKE 1872; ROMANISZYN 1929; BŁESZYŃSKI 1966; RAZOWSKI 1995) and *Selidosema brunnearia* under the name *S. plumaria* or *S. ericetaria* from Pomerania, Lower Silesia (?Wrocław vicinity) and the Ogrodzieniec (Zawiercie distr.) (URBAHN & URBAHN 1939; RAEBEL & TOLL 1962; MASŁOWSKI & MASŁOWSKI 1936). Most of those records probably referred to *S. brunnearia.* This refers also to the old records of *S. plumaria* 'Janów obok Lwowa' and 'Hołosko pod Lwowem' (ROMANISZYN 1929) what means, the species were misidentified also in Ukraine for the last 150 years.

Both species may well have been present in Poland in the past, because one specimen of *Selidosema plumaria* was found in the collection of the Silesian Museum in Opava, collected in Liptaň (Zlatohorsko, Jeseniky distr.), only a few kilometres from the Polish border (KRAMPL & MAREK 1981).

Cleora CURTIS, 1825

67. *Cleora cinctaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra cinctaria DENIS & SCHIFFERMÜLLER, 1775: 101, Austria, Vienna district.
Boarmia cinctaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. X: fig. ♂ 67; ♀ 67.

Genitalia: ♂ - pl. 23: figs. 67, 67a, 67b; ♀- pl. 58: 67.

Description. Wingspan 30-35 mm. Head pale grey with a smooth-scaled frons. Top of patagium blackened. Antennae dark grey, broadly bipectinate with 16-19 free flagellomeres in the male, filiform in the female. Wing ground colour grey with brown mottling in the basal and terminal areas. Medial area of forewing slightly narrowed near dorsum, bordered by thin, dark, slightly jagged lines. A broad blackish-brown band on basal side of medial area. Postmedial line bordered pale on the outside, not kinked near costa. Discal spot elliptical, faintly ringed, with a pale centre. Hindwing with two dark jagged lines and a pale wavy marginal line. Pale-centred discal spot. A distinct pale grey, then black ring on the dorsal side of the first abdominal segment, and pairs of black spots on the subsequent ones. Bicoloured fringe with indistinct dark spots.

Life history and habitat. Flight season: one generation, from mid-April to early June. Inhabits mixed and broad-leaved woodland, heathland, riparian thickets, parks and gardens. LHPs: various trees, bushes, shrubs and herbaceous plants, e.g. *Betula* spp., *Alnus* spp., *Salix* spp., *Prunus spinosa* L., *Calluna vulgaris* L., *Artemisia* spp., *Thymus* spp., *Hypericum* spp. (EBERT et al. 2003).

Distribution. Eurosiberian. Known from the Atlantic to Japan, and from the Mediterranean Basin and Central Asia to the Arctic Circle. In Poland locally numerous in all suitable habitats; otherwise recorded singly all over the country except at higher altitudes in the mountains.

Conservation status. Not threatened.

Deileptenia Hübner, 1825

68. *Deileptenia ribeata* (Clerck, 1759)

Phalaena ribeata Clerck, 1759: pl. 6, fig. 5, Sweden.
Deileptenia abietaria (Denis & Schiffermüller, 1775).
Boarmia ribeata (Clerck, 1759).

Adults: colour pl. X: fig. ♂ 68; ♀ 68; pl. XVIII, fig. 5.
Genitalia: ♂ - pl. 23: figs. 68, 68a; ♀- pl. 58: 68.

Description. Wingspan: 30-42 mm. Head brownish-grey with a smooth-scaled frons. Top of patagium slightly darkened. Antennae dark grey, bipectinate with 11-14 free flagellomeres in the male, filiform in the female. Wing ground colour brown with intense dark mottling. Forewing lines blackish-brown, thicker near the costal and anal margins. Postmedial line strongly jagged, often broken; antemedial line wavy. Discal spot a distinct black dash. A row of dark brown spots along the marginal wavy line in the terminal area. Hindwing with a blackish-brown jagged medial line and a discal spot of the same colour. The costa is pale. Fringe bases on both wings highlighted by thick black dashes. Fringes on the termen of both wings greyish-brown with indistinct brown spots.

Life history and habitat. Flight season: one generation, from early July to late August. Inhabits coniferous and mixed forests, especially those with stands of *Picea abiea* Karst and *Abies alba* Mill., up to the montane coniferous forest zone (up to 1000 m). LHPs: spruce, fir, less commonly on deciduous trees and shrubs such as *Quercus* spp., *Carpinus betulus* L., *Tilia* spp., *Prunus spinosa* L. and *Prunus avium* L. In the British Isles the principle LHP is said to be *Taxus baccata* L. (Porter 1997).

Distribution. Eurosiberian. Known from the Atlantic to Japan, and from central Asia to the Arctic Circle. In Poland locally numerous in suitable woodland habitats; particularly common in the mixed forest zone of the mountains and their foothills.

Conservation status. Not threatened.

Alcis Curtis, 1826

69. *Alcis bastelbergeri* (Hirschke, 1908)

Boarmia bastelbergeri Hirschke, 1908: 107, pl.1, figs 2,3; pl. 2, figs 2,2a-c, Steiermark [Originally as ssp. of *repandata*].
Alcis maculata bastelbergeri (Hirschke, 1908).
Alcis maculata ssp. *bastelbergeri* (Hirschke, 1908).

Adults: colour pl. X: fig. ♂ 69a-69c; ♀ 69d, 69e; pl. XVIII, fig. 4.

Genitalia: ♂ - pl. 24: figs. 69, 69a, 69b; ♀- pl. 59: 69, 69a.

Description. Wingspan 38-43 mm. Head light brown with a darker, smooth-scaled frons. Top of patagium not blackened. Antennae dark grey, bipectinate with 13-17 free flagellomeres in the male, filiform in the female. Wing ground colour greyish-brown with variable dark freckling. On forewing distinct medial line closely approaches antemedial line (male) or is jagged/blurred (female). Postmedial line fades away near dorsum. Between postmedial line and wavy marginal line, halfway between costa and dorsum, a distinct black spot separated from the postmedial line by a pale streak; this spot stands out more distinctly from the ground colour than in *A. repandata*. Hindwing medial line distinct, basal area slightly or strongly shaded. Discal spot not always clearly visible. Termen strongly scalloped, highlighted by a black line. Bicoloured fringe the same hue as the ground colour.

Life history and habitat. Flight season: one generation, from mid-July to late August. Inhabits deciduous and mixed woodland, up to the mixed forest zone in the mountains. LHPs: deciduous trees and shrubs such as *Acer* spp., *Betula spp.*, *Alnus*

30. Distribution of *Alcis bastelbergeri* (HIRSCHKE, 1908) in Poland

spp., *Vaccinium myrtillus* L., *Calluna vulgaris* L., *Spiraea* spp., *Clematis vitalba* L., *Daphne mesereum* L.and many other herbaceous plants. Overwinters as a larva. In captivity caterpillars reported to feed on *Lonicera* spp. (EBERT et al. 2003).

Distribution. Eurosiberian. Known from the Alps to Sakhalin, and from the Mediterranean Basin to the Baltic countries. In Poland, local in the mountains and foothills in suitable habitats. Up to ca 1000 m in the Tatra Mts and up to ca 700 m in other Polish mountain ranges. Historical data from the Warsaw area (ROMANISZYN 1929) and the Białowieża Forest (BUSZKO et al. 1996a) probably based on the erroneous identification of extremely similar forms of *Alcis repandata* L.

Localities in Poland: Wołowiec (EV28), Siary (EV19), Wysowa (EV17), Nowica (EV18), Wapienne (EV29), Klimkówka (EV08), Radocyna (EV27), Szymbark (EV09) (R. ZAMORSKI leg., coll. RZ); Wisła-Jawornik (CA40), Ustroń (CA40) (H. BRZEZINA leg.); Markowa (EA94) (J. BURY leg., coll. JBu); Krościenko (DV57) (J. ZIĘBA leg.); Rzyki (CA81) (J. ZIELIŃSKI leg. and phot.); Wetlina (FV04) (Ł. MATUSZEWSKI leg., coll. ŁM); Sękowiec (FV15) (J. KANIA leg., coll. JK); Rycerka-Kolonia (CV58) (A. MALKIEWICZ leg., coll. AM); Babia Góra (CV99) (ZAJDA & PRZYBYŁOWICZ 2003); Kojszówka (DA00), Sucha Beskidzka (CA91), Lachowice (CA80) (W. ZAJDA leg., coll. WZ); Pieniny (DV67) (BŁESZYŃSKI et al. 1965); Gubałówka (DV26), Tatra Mts.: Nędzówka (DV25), Łysanki, Roztoka (DV35) (BATKOWSKI et al. 1972); Rytro (DV78), Nozdrzec ad Dynów (EA81), Las Wolski (DA24), ?Żwir ad Warszawa (UTM?) (ROMANISZYN 1929); ?Białowieża (FD94) (BUSZKO et al. 1996a); Kamionki (XS11), Uliczno (XS22), Gorzanowice (WS74), Kiełczyn (XS12) (R. SZPOR leg., coll. RSz); Kletno (XR36), Lubawka (WS71), Wojcieszów (WS64) (A. MALKIEWICZ leg., coll. AM); Karpacz (WS52), Piechowice - Górzyniec (WS43) (MALKIEWICZ 2001); Zagórze (WS92), Jugowice (WS92), Sokołowsko (WS81), Bojanice (XS02), Świdnica (XS03) (J. MASŁOWSKI leg., coll. JM); Jagniątków (WS42), Szklarska Poręba Dolna (WS33) (BOROWIAK & CHRZANOWSKI 2006); Góra Tuł (CA30), Ligota Tworkowska (CA04) (RAEBEL & TOLL 1962).

Conservation status. Not threatened.

Comments. This species may be confused with *A. repandata*, but has a distinct medial line closely approaching the antemedial line (male) or is jagged/blurred in female. The black spot in the subterminal area is more distinct from the ground colour than in *A. repandata*. Both species (mainly males) also differ slightly in their genitalia.

70. *Alcis repandata* (LINNAEUS, 1758)

Phalaena (Geometra) repandata (LINNAEUS, 1758: 524, Europe.
Boarmia repandata (LINNAEUS, 1758).
Boarmia conversaria (HÜBNER, 1799).

Adults: colour pl. X: fig. ♂ 70a; ♀ 70b, 70c.

Genitalia: ♂ - pl. 24: figs. 70, 70a, 70b; ♀ - pl. 58: 70, 70a.

Description. Wingspan 35-44 mm. Head greyish-brown, frons smooth-scaled. Top of patagium not blackened. Antennae dark grey, bipectinate in the male with 13-

14 free flagellomeres, filiform in the female. Wing ground colour greyish-brown with variable dark mottling. Discal spot not very distinct, often obscured by parts of the medial line. Forewing medial line not jagged and does not approach the antemedial line so closely as in *A. bastelbergeri*. Between the post-medial and wavy marginal lines, midway between costa and dorsum, there is often a blurred black spot not separated from the postmedial line by a pale streak. This spot is less distinct from the ground colour than in *A. bastelbergeri*. Hindwing medial line distinct; basal area either not darkened or, in melanistic forms only, completely dark. Discal spot not always clearly visible. Termen strongly scalloped, highlighted by a black line. Bicoloured fringe the same hue as the ground colour. Forms with a very dark medial area exist, as do almost completely black specimens with a white wavy line. One of the most variable species in the Ennominae, with numerous forms more or less constantly present in local populations (DROZDA 1970).

Life history and habitat. Flight season: one generation from early June to late August, exceptionally into October in the warmest parts of the country (Lower Silesia). Found in broad-leaved, coniferous and mixed woodland, up to the montane coniferous forest zone, also parks and gardens. LHPs: deciduous trees and shrubs, e.g. *Betula* spp., *Carpinus betulus* L., *Corylus avellana* L., *Vaccinium* spp., *Ledum palustre* L., *Calluna vulgaris* L., *Cytisus scoparius, Rubus* spp.; coniferous trees: *Picea abies* KARST, *Pinus sylvestris* L., *Larix decidua* MILL.; L. and many herbaceous plants, including poisonous plants like *Gentiana asclepiadea* L.

Distribution. Palaearctic. From the Iberian Peninsula to Kazakhstan, and from the Mediterranean Basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 1300 m in the mountains.

Conservation status. Not threatened.

Comments. See under *A. bastelbergeri* (HIRSCH.)

71. *Alcis jubata* (THUNBERG, 1788)

Phalaena jubata THUNBERG, 1788: 75, figs, Germany.
Boarmia jubata (THUNBERG, 1788).
Boarmia glabraria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. X: fig. ♂ 71; ♀ 71.

Genitalia: ♂ - pl. 24: figs. 71, 71a, 71b; ♀- pl. 59: 71, 71a.

Description. Wingspan 23-28 mm. Head pale grey with smooth black scales on the white frons. Top of patagium blackened. Antennae pale grey, bipectinate with 14-15 free flagellomeres in the male, filiform in the female. Wing ground colour pale grey with a silvery sheen, thinly speckled with dark scales. On the forewing, discal spot large, often extending to the costa. Lines, especially the post-medial one, only faintly discernible, sometimes reduced to discrete spots. Apical streak dark. Wavy line white, quite jagged and usually distinct. Hindwing with a small discal spot and an indistinct medial line. Termen of both wings highlighted by a broken black line. Fringes on both wings darkly spotted. A pair of black spots on the dorsal surface of each abdominal segment.

Life history and habitat. Flight season: one generation from late June to late August. LHPs: fruticose lichens, mainly *Usnea* spp., but also *Pseudevernia* spp., *Jungermannia* spp. and *Alectoria* spp. (EBERT et al. 2003). Overwinters as a young larva. Found in damp coniferous and mixed woodland, especially spruce and mixed forest in the mountains up to 1000 m and a few natural stands of this type in the lowlands.

Distribution. Eurosiberian. Known from the Alps to Kamchatka, and from the Mediterranean Basin to the Arctic Circle. In Poland, local in the mountains and their foothills, and in the north of the country in suitable habitats. Found at altitudes up to ca 1000 m in the Tatra Mts, and up to ca 800 m in other Polish mountain ranges.

Localities in Poland: Stepnica (VV74), Mścięcino (VV73), Międzyzdroje (VV67), Świnoujście (VV57) (URBAHN & URBAHN 1939); Sopot (CF43), Gdańsk (CF42), Gdańsk-Stogi/Heubude (CF52), Rawicz (XT22) (ROMANISZYN 1929); Olsztynek (DE53), Mikołajki (EE36) (SPEISER 1903); Głogów (WT72), Wołów (XS18), Wrocław (XS46), Duszniki Zdrój (WR98), Bielsko-Biała (CA52) (RAEBEL & TOLL 1962); Gubałówka (DV26), Dolina Strążyska (DV25), Nędzówka (DV15), Toporowa Cyrhla (DV26) (BATKOWSKI et al. 1972); Jabłonki (EV95) (BIELEWICZ 1984); Czerlonka

31. Distribution of *Alcis jubata* (THUNBERG, 1788) in Poland

(FD84), Białowieża (FD94), Gródek (FD94) (BUSZKO et al. 1996a); Gubin/Guben (VT85) (HOFFMAN leg., coll. ZFMK) (Międzyrzecz/Meseritz (WU30) (ZELLER [leg.], coll. MNHU); Poznań/Posen (XU30) (coll. ZIN).

Conservation status. Critically endangered (CR) (BUSZKO & NOWACKI 2002; MALKIEWICZ 2004a). Regress attributable to the decline of the lichen host plants due to air pollution and changes in soil drainage in its habitats.

Arichanna MOORE, 1868

72. *Arichanna melanaria* (LINNAEUS, 1758)

Phalaena (Geometra) melanaria LINNAEUS, 1758: 521, Europe, probably Finland.

Adults: colour pl. X: fig. ♂ 72; ♀ 72.

Genitalia: ♂ - pl. 25: figs. 72, 72a; ♀- pl. 59: 72, 72a.

Description. Wingspan 37-40 mm. Head yellowish-orange with a black/orange smooth-scaled frons. Patagia orange, tops of tegulae with grey scales. Antennae dark grey, bipectinate with 7-8 free flagellomeres in the male, filiform in the female. Wing ground colours: forewing creamy white, hindwing dark yellow. The pattern consists of numerous black spots arranged in lines. Discal spots large, black. Fringes the same hues as their respective wings, with black spotting. Density of black spotting on both wings may vary, especially in the basal areas. Abdomen yellowish-orange, with rows of black spots along the dorsal and lateral surfaces, often joined into a thick dorsal streak.

Life history and habitat. Flight season: one generation from mid-June to mid-August. Inhabits marshy coniferous forests (*Vaccinio uliginosi-Pinetum*) and raised bogs, less commonly damp pine woodland. LHPs: *Ledum palustre* L., *Vaccinium uliginosum* L. and *Vaccinium oxycoccos* L.; *Rhododendron* spp. is reported from parks and gardens (LEUTSCH 1983; EBERT et al. 2003; RICHERT 2004).

Distribution. Palaearctic. From western Germany (the Rhine valley) to the Kuril Islands, Sakhalin and Japan. In Poland used to be found locally in appropriate habitats in all regions except the high mountains. Now disappearing from or already extinct in many localities, particularly in the west and south of the country owing to the loss of suitable reproductive habitats. Sometimes found considerable distances from these, possibly as a result of long dispersal flights in search of new biotopes; this is how RICHERT (2004) accounts for this hitherto unexplained phenomenon.

Conservation status. Vulnerable (VU), though not endangered in north-eastern Poland.

Hypomecis HÜBNER, 1821

73. *Hypomecis roboraria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra roboraria DENIS & SCHIFFERMÜLLER, 1775: 101, Austria, Vienna district.
Boarmia roboraria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XI: fig. ♂ 73a, 73b; ♀ 73c.

Genitalia: ♂ - pl. 25: figs. 73, 73a-73c; ♀- pl. 60: 73, 73a.

Description. Wingspan 45-60 mm (the largest European geometrid). Head greyish brown with a smooth-scaled frons. Antennae dark grey, bipectinate with 13-14 free flagellomeres, filiform in the female. Top of patagium blackened. Upper wing ground colour whitish-grey or grey with more or less intense dark brown mottling. Forewing lines blackish-brown, jagged, not very distinct. Postmedial and medial lines converge near the dorsum, often forming a dark blotch. Hindwing with thin blackish-brown lines and a tiny dark-centred discal spot. White marginal line rather faint. Dark, even totally black, specimens occur, with traces of a pale line in the terminal wing area. Underwing ground colour yellowish-grey, apex of forewing pale adjacent to a blackish spot by the costa. Hindwing termen slightly scalloped. Fringe of uniform hue, not contrasting with the ground colour.

Life history and habitat. Flight season: one generation, from late May to early August, exceptionally to September in the warmest parts of the country. Occurs in broad-leaved and mixed woodland, up to the montane mixed forest zone; also urban parks and gardens. LHPs: deciduous trees and shrubs, e.g. *Quercus* spp., *Fagus sylvatica* L., *Betula* spp., *Ulmus* spp. Overwinters as a larva, which resumes foraging in May and June.

Distribution. Palaearctic. From the Iberian Peninsula to Mongolia and northern China. In Poland occurs mostly in the lowlands and foothills, sometimes at lower mountain areas up to 900 m (e.g. in Bieszczady).

Conservation status. Not threatened.

74. *Hypomecis punctinalis* (Scopoli, 1763)

Phalaena punctinalis Scopoli, 1763: 217, fig. 537, Italy, Carnia.
Boarmia punctinalis (Scopoli, 1763).
Boarmia consortaria (Fabricius, 1787).

Adults: colour pl. XI: fig. ♂ 74a-74c; ♀ 74d, 74e.

Genitalia: ♂ - pl. 25: figs. 74, 74a-74c; ♀- pl. 60: 74, 74a.

Description. Wingspan 40-48 mm. Head pale grey with a darker, smooth-scaled frons. Antennae dark grey, bipectinate with 14-20 free flagellomeres in the male, filiform in the female. Top of patagium blackened. Upper wing ground colour whitish-grey or grey with more or less intense dark brown mottling. Forewing lines blackish-brown, more conspicuous on the veins. Antemedial line jagged, approaches the medial line near the dorsum, but not forming a dark blotch with it. Discal spot on both pairs of wings crescent-shaped or a pale-centred oval. In the terminal area a conspicuous, very wavy white line, extending onto the hindwing. Also on the hindwing a jagged antemedial line and a faint medial one. Some specimens have very dark, even completely black, wings with the remnants of a pale wavy marginal line. Underwing ground colour pale grey; the colour of the forewing apical area no different from that of the rest of the wing, the dark spot by the costa indistinct or lacking altogether. Forewing termen

slightly scalloped, hindwing termen strongly so. Fringe the same hue as the wing ground colour, uniform.

Life history and habitat. Flight season: one generation, from early May to late July, exceptionally in September in the warmest parts of the country. Occurs in broad-leaved and mixed woodland, and up to the montane mixed forest zone; also urban parks and gardens. LHPs: deciduous trees and shrubs such as *Quercus* spp., *Fagus sylvatica* L., *Betula* spp., *Ulmus* spp., *Carpinus betulus* L., *Tilia* spp.; coniferous trees and *Vaccinium* spp. also reported (BERGMANN 1951-1955).

Distribution. Western Palaearctic. In Poland present almost everywhere in suitable habitats, also around human habitation and in anthropogenic environments. Up to 900 m in the mountains.

Conservation status. Not threatened.

Fagivorina WEHRLI, 1943

75. *Fagivorina arenaria* (HUFNAGEL, 1767)

Phalaena arenaria HUFNAGEL, 1767: 518, Germany, Berlin region.
Boarmia arenaria (HUFNAGEL, 1767).
Boarmia angularia (THUNBERG, 1792).

Adults: colour pl. XI: fig. ♂ 75; ♀ 75.

Genitalia: ♂ - pl. 26: figs. 75, 75a; ♀- pl. 60: 75, 75a.

Description. Wingspan 26-32 mm. Head white with smooth grey and reddish-brown scales on a white frons. Top of patagium blackened. Antennae pale grey, broadly bipectinate with 8 free flagellomeres in the male, ciliate with dark transverse banding in the female. Wing ground colour white with reddish-brown speckling. Discal spots on both wings distinct, a thick brown dash on the forewing. Forewing lines blackish-brown, somewhat thicker near the costa. Lines sometimes a series of separate spots. Medial line distinct, converging towards postmedial line near the dorsum. Pale brown patches in basal and terminal areas. Hindwing with distinct spots or marginal streaks and three dark spots along the dorsum. Fringe with blackish-brown spotting. Pairs of dorsal black spots at the proximal end of the abdomen.

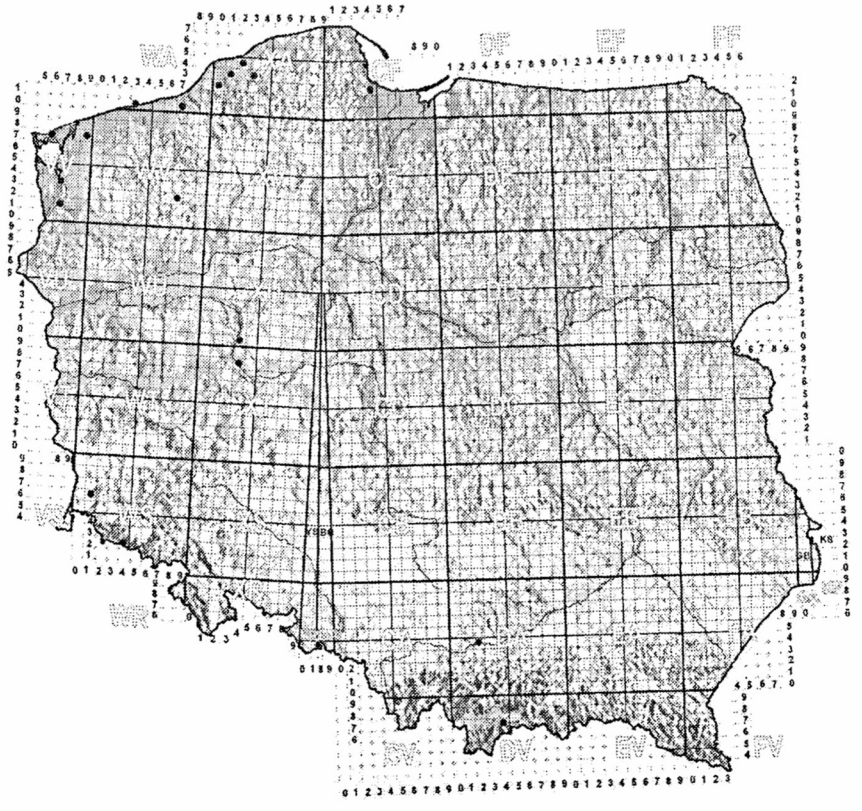
Life history and habitat. Flight season: from early June to late July. Occurs mainly in the woodlands of the montane mixed forest zone and the foothills, with a preference for beech woods and damp mixed woodland. Such forests are quite common in the mountains and in Pomerania, but forest management practices have altered their natural character, distorting the original communities. According to some authors, the LHPs are lichens, others consider that the caterpillars feed on the leaves of beech, oak and other deciduous trees (URBAHN 1941). Active at night, by day they remain camouflaged on tree trunks or are concealed. The overwintering stage is the pupa.

Distribution. Almost the whole of Europe except for the Baltic countries, the Iberian Peninsula and Ireland. Extinct in Great Britain and many regions of Europe. In Poland used to occur in western and central Pomerania (URBAHN & URBAHN 1939),

in the Poznań and Kraków regions (ROMANISZYN 1929), Bielsko-Biała and the Sudeten Mountains (MARSCHNER 1932-34; RAEBEL & TOLL 1962). From 1951 to 1975 recorded in the Pieniny (BŁESZYŃSKI 1965) and Bieszczady Mountains (BIELEWICZ 1973 – locality not pointed). Now only found in the Karkonosze Mountains (Sudetes) (CHRZANOWSKI 2002; BOROWIAK & CHRZANOWSKI 2007).

Localities in Poland: Szczecin (VV71), Mścięcino (VV73), Klęskowo (VV71), Grębowo (VV97), Swołowo (XA13), Charnowo (XA24), Słupsk (XA33), Koszalin (WA70), Kołobrzeg (WA30), Sławno (XA02), Międzyzdroje (VV67), Wierzchowo (WV72) (URBAHN & URBAHN 1939); Gdańsk (CF42), Poznań (XU30), Radzewice (XT38), Kraków vicinity (DA24?) (ROMANISZYN 1929); Jagniątków (WS42) (BOROWIAK & CHRZANOWSKI 2007); Lubań distr. (?WS16) (Izerskie Mts) (Soffner 1927; MALKIEWICZ 2004c); Niedzica-Zielone Skałki (DV47) (BŁESZYŃSKI et al. 1965); Bieszczady (UTM?) (BIELEWICZ 1973).

Conservation status. Critically endangered (CR) (BUSZKO & NOWACKI 2002; MALKIEWICZ 2004c)



32. Distribution of *Fagivorina arenaria* (HUFNAGEL, 1767) in Poland

Comments. A male specimen has recently been found in a private collection from the village of Rygol (Augustów Forest): 9.06.1978, leg. J. RUDNY (now coll. A. MALKIEWICZ), which would alter the picture of this species' distribution in Poland and central Europe. But because the labels of many other specimens in RUDNY's former collection are considered unreliable (NOWACKI & RUDNY 1992; KOKOT 1993), including those of the collections from the Augustów Forest, this locality is marked on the map with a '?' as the highly doubtful record, and not listed above.

Ascotis HÜBNER, 1825

76. *Ascotis selenaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra selenaria DENIS & SCHIFFERMÜLLER, 1775: 101, Austria, Vienna district.
Boarmia selenaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XI: fig. ♂ 76; ♀ 76.
Genitalia: ♂ - pl. 26: figs. 76, 76a, 76b; ♀- pl. 61: 76.

Description. Wingspan 37-48 mm. Head pale grey with some protruding, brown scales on the frons. Antennae dark grey, ciliate in the male (the longest cilia are the same width as the flagellum), filiform in the female. Top of patagium not blackened. Wing ground colour whitish with more or less dense black or brown freckling. Discal spots on both wings large, crescent-shaped, with a pale centre. Postmedial line very jagged. There is a dark mark in the forewing terminal area at veins R5 – M1. Medial line rarely distinct, runs through the discal spot on the forewing, and is contiguous with it on the hindwing. Hindwing postmedial line runs to the outside of the discal spot, often with dark shading. Scalloped termen with black dots or dashes and a fringe the same hue as the ground colour. Density of freckling and pattern variable.

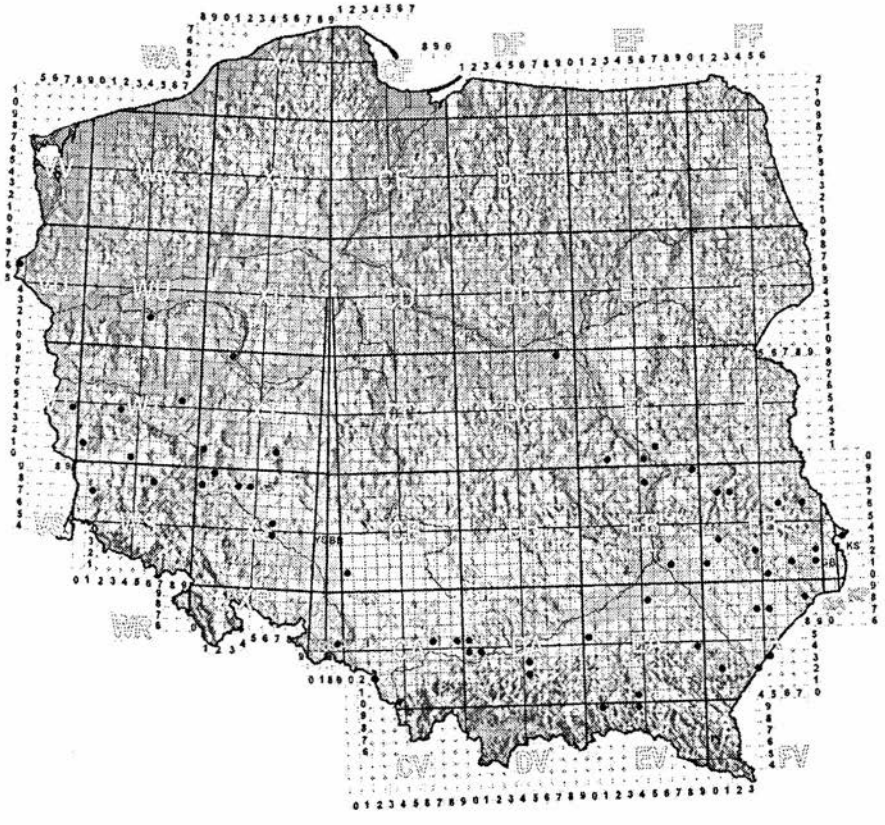
Life history and habitat. Flight season: from mid-May to early August in one protracted generation; two generations in southern Europe. Inhabits broad-leaved and mixed woodland, heaths, clearings and fallow land, riparian scrub, parks and gardens. A thermophilous species. LHPs: various herbaceous plants and shrubs, e.g. *Artemisia* spp., *Aster* spp. *Rubus* spp., *Cytisus* spp. and *Rosa* spp. (a polyphagous species). In exceptional cases even exotic plants have been accepted, like *Ipomoea purpurea* (L.) ROTH (J. BURY - pers. comm.) and *Mimosa* spp. (EBERT et al. 2003). The moths are active late at night.

Distribution. Eurosiberian. Known from the Atlantic to Japan, and from the Mediterranean Basin as far north as Luxembourg and Poland. In Poland found locally in southern and occasionally in central regions (in the Odra valley as far as Bielinek nad Odrą). Has become more common in the last twenty years[1] and is probably expanding northwards (MALKIEWICZ 2003).

Localities in Poland: Oborniki Śląskie (XS38), Trzebnica (XS48) (RAEBEL & TOLL 1962; MALKIEWICZ 2003); Szprotawka (WT40), Jaroszówka (WS68), Chobienia (XT01), Ruda Milicka (XT61), Odyniec ad Szczepanów (XS17), Miłcz (XS19)

[1] http://www.entomo.pl/forum/viewtopic.php?t=6037)

(MALKIEWICZ 2003); Zagórzyce (XS08), Janików (XS64) (A. MALKIEWICZ leg., coll. AM); Markowa (EA94), Sonina (EA94), Gniewczyna Tryniecka (EA05) (J. BURY leg., coll. JBu); Jedlicze (EA40), Przejazd (EC20), Leśniówka (EV49), Siary (EV19), Gorlice-Zawodzie (EV19) (R. ZAMORSKI leg., coll. RZ); Pociecha (DC89) (D. Marczak leg.); Imielin (CA75) (A. LARYSZ leg.); Muchocin (WU52), Zaborówiec (WT85) (Ł. MATUSZEWSKI leg., coll. ŁM); Puszczykowo (XT29) (ROMANISZYN 1929; E. PALIK leg.); Puszcza Niepołomicka (DA52), 'Dębina' res. (DA53) (STRZAŁKA & WOJTUSIAK 1973); Kraków-Bodzów (DA14), Brzoskwinia (DA04) (W. ZAJDA leg., coll. WZ); Kaczyce (CA22) (A. KWICZALA leg.); Węgierka (FA12) (J. MAZEPA leg.); 'Bielinek' res. (VU46) (BLAIK 2010); Krzeszowice (DA05), Barcikowice (WT34), Ruda Różaniecka (FA57) (R. SZPOR leg., coll. RSz); Lipa (EB71), Nowa Dęba (EA58), Starzawa (FA42), Budzyń (FA53), Nowy Lubliniec (FA47), Machnów (FA88), Tyszowce (FB91), Śniatycze (FB71), Werbkowice (FB92), Kulików (FB42), Targowisko (FB13), Jeziórko (EB50), Janowice (EB58), Bąkowiec (EC50), Garbów (EB99), Ryki (EC61), Świdnik (FB17), Mełgiew (FB27), 'Sobowice' res. (FB66), Roskosz res. (FB86) (K. PAŁKA leg. and obs.); Hrebenne (KS93) (BUSZKO et al. 1996b); Żabinek ad Mosina (XV05), Gubin (VT85),



33. Distribution of *Ascotis selenaria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

Janów Lubelski (FB01) (BARANIAK & SOSIŃSKI 2000); Ozimek (CB01), Wójtowa Wieś ad Gliwice (CA37); Ustroń (CA40) (H. BRZEZINA leg.); Ligota Tworkowska (BA95) (RAEBEL & TOLL 1962); Imielin (CA75), Kaczyce (CA22) (LARYSZ 2008).

Conservation status. Not threatened.

Comments. Could be confused with *Hypomecis punctinalis* (SCOP.), but the discal spot is usually wider and the male's antennae are ciliate and not pectinate as in that species. Female larger, with a more massive body.

Ectropis HÜBNER, 1825

77. *Ectropis crepuscularia* (DENIS & SCHIFFERMÜLLER 1775)

Geometra crepuscularia DENIS & SCHIFFERMÜLLER 1775: 101, Austria, Vienna district.
Boarmia bistortata (GOEZE, 1781).
Ectropis bistortata (GOEZE, 1781).

Adults: colour pl. XII: fig. ♂ 77; ♀ 77a-d.

Genitalia: ♂ - pl. 26: figs. 77, 77a; ♀- pl. 61: 77, 77a.

Description. Wingspan 29-43 mm. Head greyish-brown with a smooth-scaled frons. Patagium slightly blackened on top. Antennae dark grey, ciliate-fasciculate in the male, filiform in the female. Wing ground colour whitish-grey, more or less coarsely freckled brown. Discal spot absent. Forewing medial area fairly narrow, without a medial line. Postmedial line jagged, with an adjoining brown band in the terminal area (in the pale form); half-way along two small, dark marks at veins M3 and Cu1. Pale wavy marginal line usually well visible. Hindwing with a thin, jagged medial line and a wavy marginal line. A row of small, dark dots along the fringe bases. Fringes bilayered, often bicoloured. Hindwing termen slightly scalloped. Very dark forms with a greyish-black wing ground colour quite common; wing pattern then reduced to black dashes replacing lines and the pale, wavy marginal line. The dorsal row of double spots on the abdomen not very prominent, except on the second segment.

Life history and habitat. Flight season: two generations, from early March to early June and from mid-July to mid-August. Inhabits broad-leaved and mixed woodland, in the mountains up to the coniferous forest zone; also urban parks and gardens. LHPs: deciduous trees and shrubs, e.g. *Betula* spp., *Salix* spp., *Carpinus betulus* L., *Corylus avellana* L. and *Cytisus scoparius* L.

Distribution. Holarctic. From western Europe to the Far East (including Japan), and from the Mediterranean Sea to central Scandinavia. Common throughout Poland; in the montane mixed and coniferous forest zones up to ca 800 m.

Conservation status. Not threatened.

Comments. Could be confused with *P. consonaria* (HBN.), but differs from this latter species in the more wavy marginal line and the more strongly jagged postmedial line. Dark forms often require genitalia dissection, however.

Paradarisa WARREN, 1894

78. *Paradarisa consonaria* (HÜBNER, 1799)

Geometra consonaria HÜBNER, 1799: pl. 30, fig. 157, Europe.
Boarmia consonaria (HÜBNER, 1799).
Ectropis consonaria (HÜBNER, 1799).

Adults: colour pl. XII: fig. ♂ 78a, c; ♀ 78b, d.

Genitalia: ♂ - pl. 27: figs. 78, 78a, 78b; ♀- pl. 61: 78.

Description. Wingspan 34-38 mm. Head greyish-brown with a smooth-scaled frons. Top of patagium not blackened. Antennae dark grey, ciliate-fasciculate in the male, filiform in the female. Wing ground colour grey with fine brown freckling. Medial area broad. Discal spot visible but faint. Antemedial line strongly curved with a broad, dark brown band on the inside. Medial line rarely distinct. Postmedial line irregularly wavy, with no outer projections. To the outside of this line, a centrally placed, rectangular, dark brown blotch reaching the whitish wavy marginal line. Hindwing with a thin, dark brown medial line and traces of a band in the terminal area. Forewing termen slightly, hindwing termen strongly scalloped. Melanic forms occur, mainly in the mountains, with a very dark terminal area, and even completely blackish-brown specimens with just traces of a wavy marginal line. The first abdominal segment has a large, greyish-white ring.

Life history and habitat. Flight season: one generation, from mid-April to early June. Occurs in deciduous and mixed woodland, in the montane mixed forest zone; also urban parks. Prefers beech woods or woodland with a good proportion of beeches. LHPs: broad-leaved trees, such as *Fagus sylvatica* L., *Carpinus betulus* L. and *Sorbus aucuparia* L. In southern Germany also other shrubs were suggested as larval food, including *Vaccinium* spp. (EBERT et al. 2003) Overwinters as a pupa in the leaf litter.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 1200 m in the mountains.

Conservation status. Not threatened.

Comments. See under *E. crepuscularia* (DEN. & SCHIFF.).

Parectropis SATO, 1980

79. *Parectropis similaria* (HUFNAGEL 1767)

Phalaena similaria HUFNAGEL 1767: 512, Germany, Berlin region.
Parectropis extersaria (HÜBNER, 1799).
Boarmia luridata (BORKHAUSEN, 1794).
Boarmia extersaria (HÜBNER, 1799).

Adults: colour pl. XII: fig. ♂ 79a-c; ♀ 79d.

Genitalia: ♂ - pl. 27: figs. 79, 79a; ♀- pl. 61: 79.

Description. Wingspan 34-38 mm. Head cream-brown, with a smooth-scaled frons. Top of patagium not blackened. Antennae brownish-grey, ciliate-fasciculate in

the male, filiform in the female. Wing ground colour creamy-white with dense brown speckling. Forewing discal spot elongated, on the proximal side of a faint medial line. Lines black, more strongly marked at the costa, less distinct or reduced to a row of dark spots towards the dorsum. On the inside of the marginal line, halfway along the wing, a whitish patch with uneven edges. Hindwing with traces of lines in the form of dark spots on the veins and a reduced wavy marginal line; discal spot absent. Fringes of both pairs of wings greyish brown with dark brown spots. Melanic forms may occur locally, with very dark basal and medial areas on the forewing and an almost completely dark hindwing.

Life history and habitat. Flight season: one generation, mid-May to early August. Occurs in broad-leaved and mixed woodlands, up to the mixed woodland zone in the mountains; also urban parks. Probably prefers oak-hornbeam woodland, deciduous riparian woodland and woods with hazel. LHPs: deciduous trees, e.g. *Corylus avellana* L., *Alnus glutinosa* (L.) GAERTN., *Acer* spp. Overwinters as a pupa.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the north of the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable habitats; up to ca 900 m in the mountains.

Conservation status. Not threatened.

Aethalura McDUNNOUGH, 1920

80. *Aethalura punctulata* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra punctulata DENIS & SCHIFFERMÜLLER, 1775: 106, England
Boarmia punctulata (DENIS & SCHIFFERMÜLLER, 1775)
Boarmia punctularia (HÜBNER, 1787)

Adults: colour pl. XII: fig. ♂ 80; ♀ 80

Genitalia: ♂ - pl. 27: figs. 80, 80a, 80b; ♀- pl. 62: 80

Description. Wingspan 20-28 mm. Head pale grey, frons smooth-scaled spotted brown. Top of patagium not blackened. Antennae dirty brown, ciliate-fasciculate in the male, filiform in the female. Ground colour pale grey with sparse brown speckling. Discal spot small, usually distinct, but sometimes fused with the partial medial line. Forewing with three arc-like brown lines, conspicuously thicker at the costa, often indistinct at the dorsum. Wavy grey marginal line not always clearly visible. Hindwing with two thin brown lines fading away towards the costa. Discal spot often scarcely discernible. Fringes on the termen of both pairs of wings bicoloured – grey with dark spots. A pale grey dorsal blotch at the base of the abdomen.

Life history and habitat. Flight season: one generation, mid-April to early June. Occurs in damp mixed and deciduous woodland, heathland, bogs, riparian thickets, parks and gardens. Typical habitats are the *Alno–Padion* and *Alnion glutinosae* associations (EBERT et al. 2003). LHPs: various broad-leaved trees such as *Betula* spp. and *Alnus* spp.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Ematurga Lederer, 1853

81. *Ematurga atomaria* (Linnaeus, 1758)

Phalaena (Geometra) atomaria Linnaeus, 1758: 521, Europe.

Adults: colour pl. XII: fig. ♂ 81a-b; ♀ 81c-d.

Genitalia: ♂ - pl. 28: figs. 81, 81a, 81b; ♀- pl. 62: 81.

Description. Wingspan 24-32 mm. Head pale grey, female with a smooth-scaled, brown-spotted frons, male with a brown, rough-scaled frons. Top of patagium not blackened. Antennae plumose (the last 4 flagellomeres are free) in the male, filiform in the female. Wing ground colour yellow in the male, whitish-yellow in the female, with dense brown freckling, sometimes covering almost entire wing area. Up to four brown lines on the forewing, three on the hindwing. A barely visible pale spot in the brown terminal area in the male where the ground colour shows through. Sometimes dark components of the pattern are extensive and may partly or wholly merge. Discal spots indistinct. Fringes yellow (male) or whitish (female) with brown spotting.

Life history and habitat. Flight season: from mid-April to late August in two overlapping generations. Active by day in sunny weather, nectaring on many diverse plants and animal excreta. LHPs: many shrubs and herbaceous plants, e.g. *Genista* spp., *Cytisus scoparius* L., *Calluna vulgaris* L., *Artemisia* spp., *Hypericum* spp., *Achillea* spp., *Vicia* spp. and *Lotus* spp. Overwinters as a pupa. Inhabits mainly woodland edges, roadsides, dry scrub, meadows and clearings, where it is one of the most common geometrids, especially in spring.

Distribution. Nominal subspecies: Western Palaearctic. From the Iberian Peninsula to the Urals, and from the Mediterranean basin to the Arctic Circle. Very common throughout Poland in most open habitats; up to ca 700 m in the mountains. Other subspecies occur in North America and Asia.

Conservation status. Not threatened.

Comments. Females may be confused during flight with *Isturgia carbonaria* (Cl.), from which they differ in the browner wing pattern, larger size and absence of pale rings on the abdomen.

Tephronia Hübner, 1825

82. *Tephronia sepiaria* (Hufnagel, 1767)

Geometra sepiaria Hufnagel, 1767: 516, Germany, Berlin region.
Tephronia cremiaria (Freyer, 1837).

Adults: colour pl. XIII: fig. ♂ 82a, c; ♀ 82b.

Genitalia: ♂ - pl. 28: figs. 82, 82a, 82b; ♀- pl. 62: 82, 82a.

Description. Wingspan 20-24 mm. Head pale grey with a smooth-scaled frons. Top of patagium not blackened. Antennae dark grey, bipectinate with the last 4-5 flagellomeres ciliate in the male, filiform in the female. Wing ground colour grey with an olive-greenish shade. Forewing lines thin, dark brown. Antemedial line kinked on inner half, outer half jagged. Medial line not distinct. Discal spot absent. Veins darkened in places, especially in the terminal area. Hindwing slightly paler with faint, thin medial line. Discal spot tiny. Fringes of both wings with dark spotting.

Life history and habitat. Flight season: one generation, from late June to late August. LHPs: lichens growing on trees and rocks; if these are unavailable, then lichens on timber fences. Overwinters as a larva. Single imagines found near buildings in towns and villages, so the species is regarded as synanthropic.

Distribution. Western Palaearctic. From the Iberian Peninsula to European Russia, and from the north of the Mediterranean basin to the Baltic countries. Regional distribution poorly known because of the sporadic, mainly historical, records. 19th century records from Gdańsk, Szczecin, Wrocław, Oborniki Śląskie, Brzeg, Zielona Góra, Głogów, Zgorzelec (Raebel & Toll 1962). Since that time not recorded from Poland.

Conservation status. Extinct (EX).

Comments. The historical specimens of the species from the territory of Poland was traced in the collections of Staudinger (MNHU, Berlin) and Toll (ISEZ, Kraków).

Bupalus Leach, 1815

83. *Bupalus piniaria* (Linnaeus, 1758)

Phalaena (Geometra) piniaria Linnaeus, 1758: 520.
Bupalus piniarius (Linnaeus, 1758).

Adults: colour pl. XIII: fig. ♂ 83b; ♀ 83a, c

Genitalia: ♂ - pl. 28: figs. 83, 83a; ♀- pl. 63: 83

Description. Wingspan 30-38 mm. Head of female rust-red with smooth-scaled frons; frons of male smooth-scaled, dark brown sparsely spotted yellow. Top of patagium not blackened. Antennae brown, pectinate to the tips in the male, filiform in the female. Considerable dimorphism in wing colour. In the male, upper sides of both wings dark brown with pale yellow or white patches in the basal area and towards the dorsum. Remnants of dark brown lines and long, dark veins can be seen against these patches. Wings of the female tawny-brown, darker in the post-medial area. Apical area of forewing dark brown. Indistinct brown lines can be made out, which on the hind wings may blend into the ground colour giving the impression of an almost uniformly brown pattern (especially in northern populations). Fringes in both sexes pale yellow or white with dark brown spots. A conspicuous white streak crosses the middle of the hind-wing underside, intersected in two places by traces of lines.

Life history and habitat. Flight season: one generation, from early May to early July. Flies during the daytime in sunny weather. LHPs: Various *Pinus* spp., but in Poland mostly *Pinus sylvestris* L.; exceptionally on other conifers such as *Pseudotsuga menziesii* and *Larix decidua* MILL. in the Alps (EBERT et al. 2003). Overwinters as a pupa. In Poland inhabits various woodland habitats with pines, but prefers tree stands dominated by pine, including monocultures, where on poor, sandy soils numbers may reach pest proportions.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Very common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Cabera TREITSCHKE, 1825

84. *Cabera pusaria* (LINNAEUS, 1758)

Phalaena (Geometra) pusaria LINNAEUS, 1758: 522, Europe.
Deilinia pusaria (LINNAEUS, 1758).

Adults: colour pl. XIII: fig. ♂ 84; ♀ 84.

Genitalia: ♂ - pl. 29: figs. 84, 84a; ♀- pl. 63: 84.

Description. Wingspan 23-30 mm. Head white with a smooth-scaled frons. Antennae white with pale grey bands, bipectinate with 12-13 free flagellomeres in the male, filiform in the female. Ground colour white, glossy, with sparse dark freckling, particularly in the terminal area. Forewing with three, hindwing with two distinct dark grey lines. Forewing postmedial line almost straight, antemedial line strongly curved. The discal spot is a small black dot, visible only on the hindwing.

Life history and habitat. Flight season: from early May to late August in one or two generations depending on climate and altitude. LHPs: *Salix* spp., *Betula* spp., *Alnus* spp., rarely on other deciduous trees and shrubs; larva July – October. Overwinters as a pupa. Found in various woodland and scrub habitats from sea level to 1000 m; also urban parks and gardens. Nocturnal; has been seen on flowers (EBERT et al. 2003). Easily disturbed during the day, especially in overcast weather and in the late afternoon.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Very common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened.

Comments. May be confused with the other members of this genus (all the species also differ slightly in their Genitalia: males – aedeagus, females – bursa copulatrix) and with the white species of the genus *Scopula: S. nemoraria, S. caricaria* and *S. immutata*. The latter, however, have more convoluted lines and a differently coloured frons.

85. *Cabera leptographa* (Wehrli, 1936)

Cabera leptographa Wehrli, 1936: 564, Afganistan: Southern Bucharas, Kulab.

Adults: colour pl. XIII: fig. ♂ 85; ♀ 85.

Genitalia: ♂ - pl. 29: figs. 85, 85a; ♀- pl. 63: 85, 85a.

Description. Wingspan 21-26 mm. Head yellowish with a smooth-scaled frons. Antennae white with pale grey bands, bipectinate with 9 free flagellomeres in the male, filiform in the female. Wing ground colour white, glossy, with sparse, dark freckling, especially in the terminal area and along the costa. Forewing with two-three, hindwing with two yellowish-brown lines. Antemedial lines frequently blurred. Discal spot often faint. Fringes the same hue as the ground colour, without spotting.

Life history and habitat. Flight season: one generation, from mid-June to late July. Inhabits willow clumps in fens and calcareous marshland. LHPs: *Salix rosmarinifolia* L., *S. aurita* L., *S. viminalis* L., *S. cinerea* L.; larva July – September. Overwinters as a pupa. Nocturnal, but easily disturbed on warm evenings before dusk. By day well concealed in willow thickets. Comes to light in small numbers, but does not stray far from its breeding habitat (Buszko & Pałka 1992).

Distribution. Palaearctic. From eastern Germany and eastern Austria to eastern Siberia. Rarely encountered throughout the area, so the distribution has not been well studied. In Poland known from a few localities in east-central and north-eastern regions.

Conservation status. Endangered (EN).

Comments. May be confused with the other *Cabera* species, but these are usually larger; also with the white species of the genus *Scopula: S. nemoraria, S. caricaria* and *S. immutata* (female); in the latter, however, the lines are more convoluted, the frons is a different colour, and the antennae in the male are narrower. A genitalia preparation is often indispensable for correct identification.

86. *Cabera exanthemata* (Scopoli, 1763)

Phalaena exanthemata Scopoli, 1763: 218, fig. 542, Italy, Carnia.
Deilinia exanthemata (Scopoli, 1763).

Adults: colour pl. XIII: fig. ♂ 86; ♀ 86.

Genitalia: ♂ - pl. 29: figs. 86, 86a; ♀- pl. 63: 86.

Description. Wingspan 25-30 mm. Head yellowish-brown with a smooth-scaled frons. Antennae white with pale grey bands, bipectinate with 12-13 free flagellomeres in the male, filiform in the female. Wing ground colour white, less glossy than in the other *Cabera* spp., evenly but quite intensely freckled brown. Forewing with three, hindwing with two distinct dark grey or yellowish lines. Forewing postmedial line strongly curved. Discal spots absent. Fringes the same hue as the ground colour.

Life history and habitat. Flight season: between mid-May and late August in one or two overlapping generations, depending on climate and altitude. LHPs: mainly

Salix spp., but also *Populus tremula* L., *Betula* spp., *Alnus* spp., less commonly other deciduous trees and shrubs; larva July – October. Overwinters as a pupa. Found in various moist woodland habitats and thickets from sea level to 1200 m, and also in anthropogenic habitats like urban parks and gardens. Active at night; has been seen on flowers (EBERT et al. 2003). Easily disturbed during the day, especially in cloudy weather or in the late afternoon.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the Mediterranean basin to the Arctic Circle. Very common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened.

Comments. May be confused with the other members of this genus and also yellowish species of the genus *Scopula: S. corrivalaria, S. floslactata* and *S. immutata*. The latter, however, have more convoluted lines, a differently coloured frons and thinner antennae (male).

Lomographa HÜBNER, 1825

87. *Lomographa bimaculata* (FABRICIUS, 1775)

Phalaena bimaculata FABRICIUS, 1775: 635, Germany, Leipzig.
Bapta bimaculata (FABRICIUS, 1775).

Adults: colour pl. XIII: fig. ♂ 87; ♀ 87.

Genitalia: ♂ - pl. 30: figs. 87, 87a, 87b; ♀- pl. 64: 87.

Description. Wingspan 25-28 mm. Head white, with a chocolate brown, smooth-scaled frons. Antennae white at the base, then brown, shortly ciliate in the male, filiform in the female. Wing ground colour white, glossy. Two distinct blackish-brown spots on the forewing costal margin, from which run the very faint, thin, jagged antemedial and postmedial lines. One or both may be reduced to black spots on the veins. Discal spot tiny. Forewing terminal area sometimes with brown shading, spilling over onto the fringes. Hindwing with an indistinct, thin, slightly jagged line. A thin, dark brown line runs along the bases of the fringes on both wings. Fringes bilayered, darker on the forewing.

Life history and habitat. Flight season: from mid-April to early July in one protracted generation, depending on climate and altitude. LHPs: *Prunus* spp., *Crataegus* spp., less commonly *Tilia* spp., *Betula* spp. and other deciduous trees and shrubs, usually between May and August. Overwinters as a pupa. Found in a variety of damp woodland and scrub habitats up to low altitudes in the mountains, including urban parks and gardens. Imago nocturnal.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East including Japan, and from the Mediterranean basin to the Arctic Circle. Common throughout Poland in suitable habitats; up to ca 700 m in the mountains.

Conservation status. Not threatened.

Comments. Worn individuals could be confused with the white species of the genus *Scopula,* e.g. *S. immutata, S. nemoraria, S. caricaria.* The two distinct costal spots on *L. bimaculata* are sufficient diagnostic criteria, however.

88. *Lomographa temerata* (Denis & Schiffermüller, 1775)

Geometra temerata Denis & Schiffermüller, 1775: 116, Austria, Vienna district.
Bapta temerata (Denis & Schiffermüller, 1775).

Adults: colour pl. XIII: fig. ♂ 88; ♀ 88.
Genitalia: ♂ - pl. 30: figs. 88, 88a; ♀- pl. 64: 88.

Description. Wingspan 25-27 mm. Head white with a smooth-scaled frons. Antennae white at the base, then brown to the tip, shortly ciliate in the male, filiform in the female. Wing ground colour white, glossy. Forewing antemedial line preserved as a short, black, often wavy line at the anal margin. Postmedial line greyish-black, wavy and quite broad, fading away towards the costal margin. Discal spot a distinct black dot. A greyish-black smudge in the terminal area below the apex. Hindwing with a faint grey line and tiny discal spot. A line of short, black dashes along the bases of the fringes on both wings, more prominent on the forewing. Forewing fringe brownish, hindwing fringe white.

Life history and habitat. Flight season: from early May to early July in one generation, depending on climate and altitude. Caterpillar feeds on *Prunus padus* L. and other *Prunus* spp., less often *Tilia* spp. and *Salix* spp., as well as other deciduous trees and shrubs, usually from June to August. Overwinters as a pupa. Occurs in various types of woodland and scrub from sea level to 1000 m, including anthropogenic habitats like parks and gardens in towns. Imago nocturnal.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East including Japan, and from the Mediterranean basin to the Arctic Circle. Very common throughout Poland in suitable habitats; up to ca 1000 m in the mountains.

Conservation status. Not threatened

Comments. Worn individuals may be confused with white species of the genus *Scopula,* e.g. *S. immutata, S. nemoraria, S. caricaria,* but differ from the latter in the dark spot at the wing apex.

Aleucis Guenée, 1845

89. *Aleucis distinctata* (Herrich-Schäffer, 1839)

Erranis distinctata Herrich-Schäffer, 1839: 81, Germany.
Lomographa distinctata (Herrich-Schäffer, 1839).

Adults: colour pl. XIII: fig. ♂ 89; ♀ 89.
Genitalia: ♂ - pl. 30: figs. 89, 89a, 89b; ♀- pl. 64: 89.

Description. Wingspan 22-25 mm. Head brown with a smooth-scaled frons. Antennae brown, shortly ciliate in the male, filiform in the female. Forewing ground colour matt greyish-brown. Lines and discal spot indistinct. Postmedial line strongly jagged. Termen concave just below the apex. Fringes the same hue as the adjacent ground colour. Hindwing pale grey, glossy, with a fairly well marked jagged line and discal spot. Fringe darker than the adjacent ground colour, freckled darkly, like the dorsum. A row of black dots along the fringe bases of both wings. A single dorsal row of white spots on the abdomen.

Life history and habitat. Flight season: one generation, from early April to mid-May, depending on weather, climate and altitude. LHPs: *Prunus spinosa* L., less often on other *Prunus* spp. like *P. padus* L., usually from May to July; also *P. domestica* L. in captivity – this may be due to the moth having been caught in light traps in gardens (EBERT et al. 2003). Overwinters as a pupa. Inhabits south- and west-facing xerothermic slopes that are refuges of steppe vegetation and encroaching hawthorn and blackthorn scrub (*Rhamno-Prunetea*), particularly in river valleys. Often inhabits areas with calcareous soils; up to 800 m in the mountains (the Alps). More information on the species' biology and the methods of trapping it are given in EBERT et al. (2003), GELBRECHT & WEGNER (2005) and MALKIEWICZ et al. (2005).

Distribution. Western Palaearctic. From the Iberian Peninsula to Central Asia, and from the Mediterranean basin to northern Germany, Denmark and north-western Poland. Found only a few times in Poland: near Miasteczko Śląskie (Upper Silesia) in 1916-1918 (RAEBEL & TOLL 1962) and near Pamięcin (Lubuskie province) in 2002 (MALKIEWICZ et al. 2005). In Poland reaches eastern limit of the distribution area.

Conservation status. Lower Risk (LR).

Comments. In the early flight season, may be confused with *Theria rupicapraria* (DEN. et SCHIFF.), which has more rounded wing tips and more strongly marked, straighter forewing lines. In contrast to the opinion of LERAUT (2009), the females of this species have fully developed wings; the wing pattern of the males is indistinguishable from that of the females.

Theria HÜBNER, 1825

90. *Theria rupicapraria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra rupicapraria DENIS & SCHIFFERMÜLLER, 1775: 105, Austria, Vienna district.
Erannis rupicapraria (DENIS & SCHIFFERMÜLLER, 1775).
Hybernia rupicapraria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XIII: fig. ♂ 90a, c; ♀ 90b; pl. 17, fig. 7.
Genitalia: ♂ - pl. 31: figs. 90, 90a; ♀- pl. 64: 90.

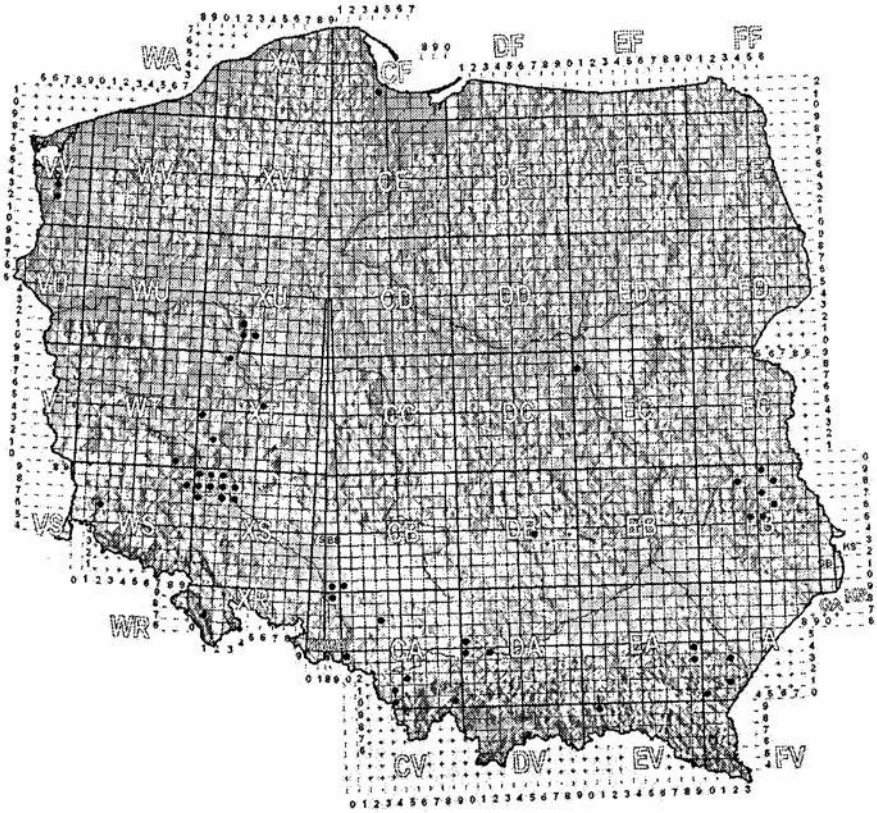
Description.

Male. Wingspan 27-31 mm. Head with a rough-scaled, greyish-brown frons. Antennae brown, pectinate. Wing ground colour greyish-brown, glossy, yellowish on the veins. Lines thin, dark brown. Antemedial line marked with at least three brown

spots on the veins. Postmedial line wavy, distally bordered pale. Discal spot large, oval. Medial area can be darker than the ground colour. Hindwing pale grey with a distinct discal spot and a faint line. A row of fine dark dots along the fringe bases on both wings. Fringe wide, greyish brown. Dorsal side of abdomen plain.

Female. Length 10-12 mm. Head with a rough-scaled, greyish-brown frons. Antennae brown, with a cream base, filiform. Thorax brown, glossy. Wings rudimentary, ground colour greyish-brown. Forewing apex sharply pointed. The medial area is narrow, tapering towards the dorsum. Rudimentary hindwing with a thin medial line.

Life history and habitat. Flight season: one generation, from mid-February to mid-April, depending on weather, climate and altitude. Imagines crepuscular and nocturnal. LHPs: *Prunus spinosa* L. and *Crataegus* spp. (*Rhamno-Prunetea*), occasionally on other *Prunus* spp., in captivity caterpillars also accept *P. domestica* L.; usually in May and June. Overwinters as a pupa. The habitat is blackthorn and hawthorn scrub on leeward, warm woodland edges, on xerothermic slopes, and gorges in hilly areas. Sometimes occurs in flat thickets among fields in river valleys with a warm microclimate. In neighbouring countries also found at lower altitudes in the mountains (up to 750 m) (EBERT et al. 2003).



34. Distribution of *Theria rupicapraria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

Distribution. Western Palaearctic. From the Iberian Peninsula to Central Asia, and from the Mediterranean basin to southern Scandinavia. In Poland found mainly in the south; in the central districts known only from vicinity of Poznań and Warsaw; definitely absent from the far north-east of the country. From Gdańsk and the former East Prussia (Masurian Lakeland) only historical data available (ROMANISZYN & SCHILLE 1929). The species was reported also from western Pomerania (historical Pommern) as common, so localities were not listed in URBAHN & URBAHN (1939). So did authors of other historical works, and in result the list of old records in Poland is underestimated.

Localities in Poland: Poznań-Umultowo (XU31), Kobylnica (XU41) (SOSIŃSKI 1995); Murowana Goślina (XU32), Miedzianka ad Kielce (DB64) (SOSIŃSKI 2002); Bronów ad Góra (XT12) (A. MALKIEWICZ leg., coll. AM); Puszczykowo (XT29) (BARANIAK & SOSIŃSKI 2000); Jeżewo (XT55) (Wize 1917); Leszno (XT04), Kraków (DA24), Gdańsk (CF42), Warszawa vicinity (EC08) (ROMANISZYN 1929); Gliwice (CA37), Ligota Tworkowska (CA04), Bielsko-Biała (CA52) (RAEBEL & TOLL 1962); Kraków (DA24), Rybna (DA04), Zalas (DA04), Tenczynek (DA05) (RAZOWSKI & PALIK 1969); Babiogórski P.N. (CA90) (ZAJDA & PRZYBYŁOWICZ 2003); Bircza (FA00), Leszczawa (FA00) (BIELEWICZ 1973); Lubań (WS26?) (Sommer 1895); Rudna (WT80), Morzęcin Wielki (XS38), Wrocław-Świniary (XS37) (A. MALKIEWICZ leg., coll. AM); Szymiszów (CB00), Ligota Dolna (BA99) (BLAIK 2004); Kosorowice (BB90) (BLAIK 2007); Husów (EA93), Markowa (EA94), Przemyśl (FA21), Ostrów (FA23) (J. BURY leg., coll. JBu); Kraków-Bodzów (DA14), Strzegocin (CC88) (W. ZAJDA leg., coll. WZ); Ustroń (CA40), Równica (CA41) (H. BRZEZINA leg., coll. HB); Prawików (XS07), Miękinia, Niziny (XS27), Bukowice (XS28), Zagórzyce, Lubiąż, Rudno (XS08), Boraszyn (XS09), Wrzosy, Kretowice (XS19), Wielka Lipa (XS38), Lipnica (XS18), Skokowa (XS29) (M. MATRAJ leg., coll. MM); Krościenko (DV57) (J. ZIĘBA leg.); Urszulin (FB59), Tarnów (FB68), Pawłów (FB57), Krupe (FB55), Łopiennik Górny (FB45), Ciechanki (FB38), Rudka (FB66) (K. PAŁKA leg. and obs.); Zawadówka res. (FB66) (M. HOŁOWIŃSKI leg., coll. MH); Gorlice (EV19) (R. ZAMORSKI leg., coll. RZ); Miłosna, Mierzowice (WS98) (E. MYŚKÓW leg.) (www.lepidoptera.pl).

Conservation status. Lower Risk (LR).

Comments. In the early flight season, this species could be confused with *Theria primaria* (HAW.), in which the male wing ground colour is a darker shade of brown and the forewing antemedial line fainter, and in which the medial area of the female rudimentary wings is generally broader and does not taper towards the dorsum. Both species also clearly differ in their genitalia, mainly the male organs: uncus, juxta and aedeagus.

90A. *Theria primaria* (HAWORTH, 1809)

Geometra primaria HAWORTH, 1809: 305, United Kingdom.

Adults: colour pl. XIII: fig. ♂ 90Aa; ♀ 90Ab.
Genitalia: ♂ - pl. 39: figs. 90A, 90Aa-90Ad.

Description.

Male. Wingspan 26-29 mm. Form and colour of head, thorax and wings similar to that of the previous species; for differences - see the Comments to *T. rupicapraria*.

Female. Length 12-14 mm. At rest the rudimentary wings reach more than half-way along the abdomen; for other differences, see the Comments to *T. rupicapraria*.

Life history and habitat. Flight season: one generation, from early January to mid-March, depending on weather and climate. Otherwise, the biology is similar to that of the previous species.

Distribution. West European. From the Iberian Peninsula to the Jutland Peninsula, including Italy, France, Austria, Germany, Denmark, Great Britain and Ireland. In view of its presence in eastern Mecklenburg-Vorpommern (GELBRECHT & WEGNER 2005), its occurrence in north-western Poland cannot be ruled out.

Comments. A male specimen of this species was found in the integrated collection of the Natural History Museum of the University of Wrocław [MPUWr], identified as *Theria rupicapraria* with the labels 'Obernigk F.93' and 'ex coll. ?' (pl. 13, fig. 90 Aa). Examination of the genitalia showed that this is a male *T. primaria* (HAW.). The only known place with such a historical name is Oborniki Śląskie on the Trzebnica Hills, but the enigmatic, coded nature of the label and its unknown author call for caution in any interpretation. This species should not be included in the checklist of Polish geometrids until such time as a voucher specimen of undisputed origin has been obtained.

Campaea LAMARCK, 1816

91. *Campaea margaritaria* (LINNAEUS, 1761)

Phalaena (Geometra) margaritaria LINNAEUS, 1761: 328, Sweden, Stockholm.
Campaea margaritata (LINNAEUS, 1767).
Metrocampa margaritata (LINNAEUS, 1767).

Adults: colour pl. XIV: fig. ♂ 91a, 91c; ♀ 91b.

Genitalia: ♂ - pl. 31: figs. 91, 91a, 91b; ♀- pl. 65: 91.

Description. Wingspan 33-50 mm. Head white with a brownish-yellow, smooth-scaled frons. Antennae white, bipectinate with 7-8 free flagellomeres in the male, filiform in the female. Thorax whitish-green. Wing ground colour whitish-green in fresh specimens, fading to dirty white. Discal spots absent. Forewing with two thin white lines, hindwing with one such line. Medial area with a slightly darker, olive tone, especially the proximal side of the postmedial line. Forewing apex pointed, with a small, brown, comma-shaped spot. Hindwing termen scalloped with a small, wedge-shaped projection half-way along.

Life history and habitat. Flight season: two generations, usually from early June to late July and from mid-August to late September. Only one generation at higher altitudes in the mountains, from late June to mid-August. LHPs: mainly *Fagus sylvatica* L., but also *Quercus* spp., *Carpinus betulus* L., *Corylus avellana* L., *Salix* spp. and others.

Overwinters as a larva. Inhabits broad-leaved woodland, less often mixed forests, parks and gardens; also the montane mixed forest zone (*Fagion sylvaticae*).

Distribution. Western Palaearctic. From Morocco to Russia and the Caucasus, and from the Balkan Peninsula to central Scandinavia and the British Isles. Generally common throughout Poland in suitable habitats; up to ca 1200 m in the mountains.

Conservation status. Not threatened.

Comments. Local populations may periodically reach very large numbers, as demonstrated by the results of catches at screens or light traps. (EBERT et al. 2003; BOROWIAK & CHRZANOWSKI 2007). In the 1980s and 1990s a rapid expansion was recorded in the Finnish Baltic islands and on the southern coast of Finland (MIKKOLA 1997).

92. *Campaea honoraria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra honoraria DENIS & SCHIFFERMÜLLER, 1775: 315, Austria, Vienna district.
Metrocampa honoraria (DENIS & SCHIFFERMÜLLER, 1775).
Gerinia honoraria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XIV: fig. ♂ 92; ♀ 92.

Genitalia: ♂ - pl. 31: figs. 92, 92a-92c; ♀- pl. 65: 92.

Description. Wingspan 33-50 mm. Head cream-grey with a brown, smooth-scaled frons. Antennae greyish-brown, bipectinate to the tip in the male, filiform in the female. Thorax the same hue as the wing ground colour, which is rust-brown or olive-greenish in the male and pale brown in the female. Forewing with two grey lines, hindwing with one such line, all bordered pale on the inside. Forewing with small dark discal spot. Forewing termen slightly, hindwing termen strongly indented.

Life history and habitat. Flight season: one generation in central Europe, from late May to late June; two generations in southern Europe, from mid-April to mid-May and from late-September to mid-October. LHPs: *Quercus* (including *Q. ilex)* and *Olea europaea*. Overwinters as a pupa. Oak woodland and forest steppe are the basic habitats; evergreen shrubs and olive groves in the Mediterranean region.

Distribution. Western Palaearctic. From North Africa to Holland and Germany (Lower Saxony), and from Portugal to the Balkan Peninsula. Recorded twice in Poland: near Świebodzice (Sudeten Foothills) in the 19th century (WOCKE 1872; RAEBEL & TOLL 1962) and at Wojcieszów (Kaczawskie Mountains) ca 1935 (RESSLER 1935); no specimens collected since. No extant voucher specimens; present-day occurrence requires confirmation.

Conservation status. Probably extinct (EX?).

Comments. This species, traditionally classified as belonging to the genus *Campaea* LAMARCK, 1816, has now been placed in the newly designated genus *Gerinia* LERAUT, 2009. This change could be regarded as justified in view of the structural differences in the genitalia of both sexes and in the morphology of the labial palps of the females (LERAUT 2009). But as the caterpillars of both species are very similiar, I prefer to leave it in the traditional genus *Campaea*. The systematic position of the new genus remains enigmatic, so for the time being it has not been changed.

Hylaea HÜBNER, 1822

93. *Hylaea fasciaria* (LINNAEUS, 1758)

Phalaena (Geometra) fasciaria LINNAEUS, 1758: 521, Europe.
Ellopia prosapiaria (LINNAEUS, 1758).
Ellopia fasciaria (LINNAEUS, 1758).

Adults: colour pl. XIV: fig. ♂ 93b; ♀ 93a, 93c.
Genitalia: ♂ - pl. 32: figs. 93, 93a-93c; ♀- pl. 65: 93, 93a.

Description. Wingspan 32-39 mm. Head with brown, smooth-scaled frons. Antennae brown, pectinate to the tip in the male, filiform in the female. Distinctive dimorphism in wing ground colour, dependent on larval food: **f. *fasciaria***: ground colour rust-red, with greyish-brown to pale-grey lines; **f. *prasinaria*:** ground colour green, with white lines. Intermediate forms are also found. Forewing with two bright lines, hindwing with one such line. Lines from white to greyish-green in all forms. Medial area somewhat darker. Discal spots absent. Fringes the same hue as the wings, but in f. *prasinaria* often rufous-brown, like the costa.

Life history and habitat. Flight season: one generation, from mid-June to early August; recently, a second generation of f. *fasciaria* was found in September. LHPs: *Picea abies* KARST – f. *prasinaria* and *Pinus sylvestris* L. – f. *fasciaria*, less commonly on *Pinus strobus* L., *Abies alba* L. and *Larix decidua* MILL. Overwinters as a larva. Occurs in coniferous and mixed forest habitats containing LHPs in the foothills and the mountains up to the mixed forest zone (the *Abieti-Piceetum* association and associations in the *Fagion sylvaticae* alliance), as well as in pine forests and mixed forests with pine stands in the lowlands.

Distribution. Palaearctic. From the Iberian Peninsula to the Far East, and from the north of the Mediterranean basin to southern Scandinavia. Common throughout Poland in suitable habitats; up to ca 900 m in the mountains.

Conservation status. Not threatened.

Pungeleria ROUGEMONT, 1903

94. *Pungeleria capreolaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra capreolaria DENIS & SCHIFFERMÜLLER, 1775: 105, Austria, Vienna district.
Puengeleria capreolaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XIV: fig. ♂ 94; ♀ 94; pl. 18, fig. 6.
Genitalia: ♂ - pl. 32: figs. 94, 94a, 94b; ♀- pl. 66: 94.

Description. Wingspan 30-34 mm. Head rufous with a smooth-scaled frons. Antennae brown, pectinate to the tip in the male, filiform in the female. Wing ground colour pale yellow to pink with more or less intensive brown flecking. Forewing medial area broad, somewhat darker than the other parts of the wing. Lines thin, dark brown. Postmedial line jagged, with a pale border; antemedial line slightly kinked near the

costa. Discal spot distinct, elongated. Hindwing paler with a faint, thin line, more strongly marked on the veins.

Life history and habitat. Flight season: one generation, from mid-July to early September. LHPs: *Abies alba* MILL., less commonly *Picea abies* KARST. Larvae are nocturnal; during the day concealed among the needles, merging into the background. Overwinters as a larva. Inhabits coniferous and mixed forests with fir, in the foothills and mountains up to the mixed forest zone (*Abieti-Piceetum* and associations in the *Fagion sylvaticae* alliance); in the Świętokrzyskie (Holy Cross) Mountains found in the upland mixed fir woodland association *Abietetum polonicum*.

Distribution. Eurosiberian. Known from the Alps to Sakhalin, and from the Mediterranean basin to the Carpathian and Sudeten Mountains. In Poland, local in the mountains and foothills in suitable habitats. In the Tatras up to ca 1000 m, in the other Polish mountains up to ca 800 m. Used to be frequent in the Sudetens (STEPHAN 1925; RAEBEL & TOLL 1962), now quite rare (BOROWIAK & CHRZANOWSKI 2007; KOKOT 2007). Not found recently in the Świętokrzyskie (Holy Cross) Mountains (ŚLIWIŃSKI et al. 1991) or in Upper Silesia (RAEBEL & TOLL 1962). Historical data from the Warsaw area (ROMANISZYN 1929) probably based on mistaken identification. The only reliable historical records outside the mountain and foothill areas are from Ojców (BIEŻANKO 1923; RAZOWSKI 1995).

Conservation status. Not threatened.

Cleorodes WARREN, 1894

95. *Cleorodes lichenaria* (HUFNAGEL 1767)

Phalaena lichenaria HUFNAGEL 1767: 512, Germany, Berlin region
Boarmia lichenaria (HUFNAGEL 1767)

Adults: colour pl. XIV: fig. ♂ 95; ♀ 95.

Genitalia: ♂ - pl. 32: figs. 95, 95a, 95b; ♀- pl. 66: 95.

Description. Wingspan 25-31 mm. Head pale grey with smooth black scales on the white frons. Antennae pale grey, bipectinate to the tips in the male, dentate in the female. Patagium not blackened on the top. Wing ground colour grey with an olive greenish tint and more or less intense, dark speckling. Discal spots usually indistinct. Forewing lines thin, black, bordered white – antemedial line on the inside, postmedial line on the outside. Postmedial line strongly jagged, with three larger and three smaller projections. Marginal wavy line absent. Hindwing with one strongly jagged line and conspicuous dots along the wing edge. Fringes of both wings delicately dark spotted.

Life history and habitat. Flight season: one generation, from early June to late August. LHPs: lichens growing on trees and rocks; according to PORTER (1997), especially on oaks, hawthorns and blackthorn. Overwinters as a larva. Pupation takes place under a layer of mosses and lichens in the soil or detritus beneath the foraging area. In Poland occurs in damp deciduous and mixed woodlands, especially montane ones and a few natural ones in the lowland such as the Białowieża Forest (BUSZKO et al. 1996a).

Distribution. Western Palaearctic. Known from the Iberian Peninsula to Kazakhstan, and from the Mediterranean Basin to southern Scandinavia. Used to occur all over Poland in suitable environments. Now known from just a few isolated localities in the centre and east of the country. Up to ca 700 m in the mountains (BIELEWICZ 1973).

Conservation status. Critically endangered (CR) (BUSZKO & NOWACKI 2002). The main reason for the decline in its populations and habitat is thought to be air pollution from anthropogenic sources, especially from industry fuelled by coal.

Comments. The genus *Cleorodes* WARREN was transferred from Boarmiini to Gnophini according to VIIDALEPP et al. (2007).

Gnophos TREITSCHKE, 1825

96. *Gnophos furvata* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra furvata DENIS & SCHIFFERMÜLLER, 1775: 108, Austria, Vienna district.
Gnophos furvata (FABRICIUS, 1787).

Adults: colour pl. XIV: fig. ♂ 96; ♀ 96

Genitalia: ♂ - pl. 33: figs. 96, 96a; ♀- pl. 66: 96, 96a

Description. Wingspan 44-50 mm. Head greyish-brown, frons smooth-scaled. Antennae brown, filiform in both sexes. Thorax greyish-brown. Wing ground colour greyish-brown, more or less densely speckled dark brown. Medial area, and often also basal area, darker than rest of wing. Postmedial line strongly jagged, antemedial line wavy. Discal spot rather indistinct, but present on both fore- and hindwing. Termen of both wings strongly scalloped. Fringes the same hue as the ground colour.

Life history and habitat. Flight season: one generation, from late June to late August. Occurs in xerothermic environments – scrub, warm rocky slopes, rank grassland and quarries. Prefers calcareous substrates. Has been found at night on flowers: *Echium* spp., *Sedum* spp., *Knautia* spp., *Eupatorium cannabinum* L. (EBERT et al. 2003). LHPs: *Vicia* spp., *Stachys* spp., *Potentilla* spp., *Prunus spinosa* L., *Crataegus* spp., *Clematis vitalba* l., *Cotoneaster* spp. and others from September to June. Overwinters as a larva.

Distribution. Southern and parts of central Europe, from the Benelux countries and central Germany to the Czech Republic and Slovakia. Found only once in Poland, in the Pieniny mountains in the early 20th century (SITOWSKI 1910), from where the voucher specimens have been not preserved. Later searches fruitless (BŁESZYŃSKI et al. 1965; WĄSALA pers. comm.).

Conservation status. Extinct (EX).

Comments. Possible confusion species: *Gnophos obfuscata* (DEN. & SCHIFF.). *G. furvata* is larger and has a more sharply pointed forewing apex.

[*Gnophos dumetata* (TREITSCHKE, 1827)]

Gnophos dumetata TREITSCHKE, 1827: 163, Croatia, Dalmatia.
Odontognophos dumetata (TREITSCHKE, 1827).

Description. See BUSZKO (2000).

Distribution. Southern, Western Europe and parts of central Europe. Occurs in Ireland, southern France, Germany, the Czech Republic and Slovakia. Found only once in Poland, supposedly at Olszany near Krasiczyn (KOKOT 1993; BUSZKO 2000). The specimens in the collection of J. RUDNY were originally misidentified; they have been re-identified as *Gnophos (Odontognophos) sartata* (TREITSCHKE, 1827), a Pontic species, the occurrence of which in Poland, so far away from its main area of distribution, is even less probable. *O. dumetata* should therefore be deleted from the Checklist of Polish Lepidoptera.

Charissa CURTIS, 1826

97. *Charissa obscurata* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra obscurata DENIS & SCHIFFERMÜLLER, 1775: 108, Austria, Vienna district.
Gnophos obscuraria (HÜBNER, 1799).
Charissa obscuratus (HÜBNER, 1799).
Gnophos obscurata (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XV: fig. ♂ 97; ♀ 97.

Genitalia: ♂ - pl. 33: figs. 97, 97a; ♀- pl. 67: 97, 97a.

Description. Wingspan 25-33 mm. Head greyish-brown with a smooth-scaled frons. Antennae brown, filiform in both sexes. Thorax dark grey. Wing ground colour dark grey to brown with dense greyish-black speckling. Lines strongly jagged, black, distinct. Discal spot large, bordered black, the same shape on both wings. On the forewing underside a rather indistinct, pale marginal line. Postmedial line broken, if present at all. Termen of both wings strongly scalloped. Fringes the same hue as the wing ground colour. Forms with a pale grey or sandy yellow ground colour occur, as do completely black ones.

Life history and habitat. Flight season: one generation, from late July to late August. Inhabits calcareous and psammophilous grasslands, heaths, forest steppes, and also gravel pits, quarries, railway tracksides, roadsides and other open, dry ruderal habitats. LHPs: various shrubs and xerophilous herbaceous plants like *Calluna vulgaris* L., *Cytisus scoparius* L., *Genista* spp., *Artemisia* spp., *Helianthemum* spp. and *Campanula* spp. In captivity will also accept *Sedum* spp., *Gypsophila* spp. and *Polygonum aviculare* L.

Distribution. Almost the whole of Europe and Asia Minor apart from most Mediterranean islands and polar regions. In Poland local all over the country in suitable habitats, except at higher altitudes in the mountains and north-east parts (MALKIEWICZ & KOKOT 2004, 2005).

Conservation status. Not threatened.

Comments. In Poland could be confused with aberrant forms of *Charissa ambiguata* (DUP.), which has a less scalloped hindwing termen and a more greyish wing ground colour. Both species also clearly differ in the genitalia of both sexes.

98. *Charissa ambiguata* (Duponchel, 1830)

Gnophos ambiguata Duponchel, 1830: 223, pl. 186, fig 2, France, Basses Alpes.
Gnophos ambiguata (Duponchel, 1830).
Charissa ambiguatus (Duponchel, 1830).

Adults: colour pl. XV: fig. ♂ 98; ♀ 98.

Genitalia: ♂ - pl. 33: figs. 98, 98a; ♀- pl. 67: 98.

Description. Wingspan 27-33 mm. Head greyish-brown with a smooth-scaled frons. Antennae brown, filiform in both sexes. Thorax dark grey. Wing ground colour grey to greyish-brown with fine dark speckling. Lines jagged, not very distinct, more strongly marked on the veins. Pale subterminal line not always present. Discal spot a dark circle on both wings. No clear lines on wing undersides. Termen of both wings not bordered dark, but with a row of dark dots; hindwing termen slightly scalloped. Fringes the same hue as the ground colour.

Life history and habitat. Flight season: one generation, from early June to late July. In Poland inhabits open-canopied coniferous woodland (the *Leucobryo-Pinetum, Peucedano-Pinetum* and *Vaccinio uliginosi-pinetum* associations). In other countries may be found in lower montane mixed forest zones (400 – 800 m). LHPs: various plants in the herb layer, but usually *Vaccinium* spp., *Rubus* spp., *Sedum* spp. and *Plantago* spp. Overwinters as a young larva.

Distribution. The whole of Europe and Asia Minor, except for most Mediterranean islands and polar regions. In Poland local all over the country in suitable habitat, except at higher altitudes in the mountains.

Conservation status. Data deficient (DD).

Comments. In Poland may be confused only with aberrant forms of *Charissa obscurata* (Den. & Schiff.), in which the ground colour is more blackish-brown and the hindwing termen is much more distinctly scalloped.

99. *Charissa pullata* (Denis & Schiffermüller, 1775)

Geometra pullata Denis & Schiffermüller, 1775: 108, Austria, Vienna.
Gnophos pullata (Denis & Schiffermüller, 1775).
Gnophos pullatus (Denis & Schiffermüller, 1775).

Adults: colour pl. XV: fig. ♂ 99a; ♀ 99b, 99c.

Genitalia: ♂ - pl. 34: figs. 99, 99a, 99b; ♀- pl. 67: 99, 99a.

Description. Wingspan 33-36 mm. Head white with a smooth-scaled frons. Antennae brown, filiform in both sexes. Thorax pale grey. Wing ground colour dirty white with more or less intense dark grey speckling. Lines rather indistinct, jagged, darker where they meet the veins. Discal spot on both wings round with a pale centre, indistinct in dark forms. The white band on the wing undersides clearly demarcated from ground colour only on the inside. Hindwing termen slightly scalloped. A row of dark dots along termen edge in both wings.

Life history and habitat. Flight season: one generation, from mid-June to mid-August. Found only in the immediate vicinity of rocks or on the rocks themselves, where most of its life in its different developmental stages is spent. LHPs: herbaceous plants, e.g. *Sedum* spp., *Thymus* spp., *Gypsophila* spp., *Coronilla* spp. and *Asplenium* spp. Occurs in habitats with exposed patches of flowery grassland among calcareous rocks, but exclusively on the rocks themselves. In Poland found in the uplands and in low mountain areas at altitudes from ca 300 to 800 m.

Distribution. The mountains of nearly all southern and central Europe from northern Spain to Poland and Romania. In Poland found locally in the Kraków-Częstochowa Upland, the Pieniny Mountains, and formerly in the Beskid Sądecki Mountains (Rytro). Some very old records from the Sudetens (Duszniki Zdrój, Szczytna) (WOCKE 1872; STEPHAN 1926), and one specimen known from the Bieszczady Mountains (Brzegi Górne) (BIELEWICZ 1973).

Localities in Poland: Smoleń (DA08), Szczekociny (DB10), Rytro (DV78) (ROMANISZYN 1929); Ogrodzieniec (CA98), Rzędkowice (CB90) (A. MALKIEWICZ leg., coll.

35. Distribution of *Charissa pullata* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

AM); Ojców (DA16), Mników, Wrzosy ad Rybna (DA04) (Razowski & Palik 1969); Niedzica (DV47), Czorsztyn, Macelowa Góra, Upszar, Cyrlowe Skałki, Zamczysko, Trzy Korony (DV57) (Błeszyński et al. 1965); Brzegi Górne (FV14) (Bielewicz 1973); Duszniki Zdrój (WR98) (Stephan 1925); Szczytna (XR08) (Stephan 1926); Kusięta (CB72) (W. Zajda leg., coll. WZ).

Conservation status. Vulnerable (VU).

Comments. Could be confused with *Elophos dilucidaria* (Den. & Schiff.), but has a more rounded forewing termen and a more scalloped hindwing termen.

100. *Charissa glaucinaria* (Hübner, 1799)

Geometra glaucinaria Hübner, 1799: pl. 28, fig. 150, Europe.
Gnophos glaucinaria (Hübner, 1799).
Gnophos glaucinarius (Hübner, 1799).

Adults: colour pl. XV: fig. ♂ 100a; ♀ 100b, 100c.

Genitalia: ♂ - pl. 34: figs. 100, 100a-100c; ♀- pl. 67: 100.

Description. Wingspan 27-32 mm. Head white with a smooth-scaled frons. Antennae brown, filiform in both sexes. Thorax pale grey. Ground colour dirty white with more or less dense dark grey or bluish-grey mottling. Lines indistinct, jagged, darker where they meet the veins. Medial area conspicuous. On the underside of both wings a broad white band indistinctly bordered by a dark band in the medial line area. In the centre of the underside forewing terminal area a white patch, sometimes joined to the white band. Hindwing termen strongly scalloped. Wing colour variable depending on type and dominant hue of rocks in the locality of occurrence.

Life history and habitat. Flight season: one generation, from mid-May to mid-August. Found only in the immediate neighbourhood of rocks or on the rocks themselves, where most of its existence in the different developmental stages is spent. Alights on flowers to nectar, both at night and on overcast days. Concealed among the rocks during the day, ideally camouflaged; nevertheless very alert and easily disturbed. LHPs: rock vegetation, e.g. *Sedum* spp., *Thymus* spp., *Gypsophila* spp., *Silene* spp. and other herbaceous plants. Overwinters as a larva. Found in habitats with exposed flowery patches of grass among rocks, but only on the rocks themselves, mostly calcareous, at altitudes from 700 to 1700 m., and in the Alps even up to 2900 m (Krampl 1993). This same author cites a locality of this species at 300-350 m in the rocky valley of the River Vltava in the central Czech Republic.

Distribution. Mountain areas in almost all of southern and central Europe, from Spain through Romania and Greece as far as the Caucasus and Central Asia. In Poland local in the Tatra and Pieniny Mountains (Błeszyński et al. 1965), and not far away in the Malá and Vel'ká Fatra mountains of Slovakia (Krampl 1993; personal observation). Single historical records (all from the late 19th and early 20th centuries) from southern Sudeten slopes (Jánský vrch u Javorníku, Kotouč u Štramberka, Jeseník) and from the Góry Złote (Golden Mountains) (Stephan 1925); recently two specimens from Bardo Śląskie (Wartha, 21.7.[19]22) from the same period were discovered in collection of

the Upper Silesian Museum in Bytom (MGB). Also from the Kraków-Częstochowa Upland and in the Kielce region we know only historical records (Bieżanko 1923a, Romaniszyn 1929), but not confirmed by any definitively identified contemporary voucher specimens.

Localities in Poland: Roztoka (DV35), Sarnia Skała (DV25) (J. Buszko leg., coll. AM); Łysanki, Jaworzynki, Dolina Małej Łąki, Kalacka Turnia (DV25), Turnie Chochołowskie, Tomanowa (DV15) (Batkowski et al. 1972); Skała Piec (DV15) (W. Zajda leg., coll WZ); Niedzica (DV47), Czorsztyn, Macelowa Góra, Trzy Korony (DV57) (Błeszyński et al. 1965); Bardo Śl./Wartha (XR29) (leg. ?, coll. MGB); ?Dyminy ad Kielce (DB73) (Romaniszyn 1929).

Conservation status. Vulnerable (VU).

Comments. May be confused with *Charissa intermedia* (Den. & Schiff.), from which it differs in the bluish-grey mottling on the wing uppersides and the lack of a sharp, dark border on the inside of the white band across the middle of the wing underside. If this latter characteristic is missing or the specimen is damaged, certain identification

36. Distribution of *Charissa glaucinaria* (Hübner, 1799) in Poland

is possible only after genital examination (surprisingly, the genitalia are completely different). In view of this problem, the identification of all voucher specimens from localities not in the Tatra or Pieniny Mountains requires confirmation.

101. *Charissa intermedia* (WEHRLI, 1917)

Gnophos intermedia WEHRLI, 1917: 253, Switzerland, Jura [Originally as ssp. of *glaucinaria*].
Gnophos intermedia (WEHRLI, 1917).

Adults: colour pl. XV: fig. ♂ 101a; ♀ 101b, 101c.
Genitalia: ♂ - pl. 34: figs. 101, 101a-101c; ♀- pl. 68: 101.

Description. Wingspan 29-35 mm. Head grey with a smooth-scaled frons. Antennae brown, filiform in both sexes. Thorax pale grey. Wing ground colour dirty white with more or less dense dark grey or yellowish-grey freckling. Lines rather faint, jagged, darker where they meet the veins, much darker near the costa. Forewing medial area not darker than rest of this wing. Discal spots on both wings small, oval, inconspicuous.

37. Distribution of *Charissa intermedia* (WEHRLI, 1917) in Poland

On the undersides of both wings a broad white band sharply delimited from the ground colour by a dark stripe in the medial line area. The white patch in the middle of the forewing underside terminal area always joined to the white band. Termen of hindwing distinctly scalloped. Wing colour variable, depending on the type and dominant hue of rocks in the locality of occurrence.

Life history and habitat. Flight season: one generation, from early May to mid-July. Found only in the immediate vicinity of bare or lichen-covered rocks, where most of its existence in its various developmental stages is spent. Alights on flowers to nectar, both at night and on overcast days. Concealed on rocks during the day, ideally camouflaged, but alert and easily disturbed. LHPs: rock plants such as *Sedum* spp., *Campanula* spp., *Clematis* spp. and *Silene* spp. Overwinters as a larva. Found in habitats with exposed flowery patches of grass among rocks, but only on the rocks themselves, mostly calcareous, at altitudes from 300 to 1700 m (KRAMPL 1993), hence generally lower than *C. glaucinaria* (HBN.). This same author cites a locality of this species at 300-350 m in the rocky valley of the River Vltava in the central Czech Republic.

Distribution. Low mountains in almost all central and south-eastern Europe, from France (Alsace), across the Alps, the Czech Massif and the Carpathians to the Balkans. In Poland local in the Tatra and Pieniny Mountains and also the Kraków-Częstochowa Upland (MASŁOWSKI & MASŁOWSKI 1935).

Localities in Poland: Smoleń (DA08), Strzegowa (DA08) (MASŁOWSKI & MASŁOWSKI 1936); Grabczychy - Pieniński N.P. (DV57) (R. Wąsala leg., coll. AM); Gubałówka (DV26), Dolina Kościeliska, Wielkie Koryciska, Turnie Chochołowskie, Żar (DV15) (BATKOWSKI et al. 1972).

Conservation status. Vulnerable (VU).

Comments. May be confused with *Charissa glaucinaria* (HÜBNER), but the freckling on the wing uppersides is yellowish, and the white band across the middle of the undersides is sharply delineated on the inside. Should these characteristics be indistinct or missing, identification must be based on genital examination. In view of this problem, the identification of all voucher specimens from localities not in the Tatra or Pieniny Mountains requires confirmation.

Elophos BOISDUVAL, 1840

102. *Elophos dilucidaria* (DENIS et SCHIFFERMÜLLER, 1775)

Geometra dilucidaria DENIS et SCHIFFERMÜLLER, 1775: 315, Austria, Vienna district.
Gnophos dilucidaria (DENIS et SCHIFFERMÜLLER, 1775).
Catascia dilucidaria (DENIS et SCHIFFERMÜLLER, 1775).
Yezognophos dilucidarius (DENIS et SCHIFFERMÜLLER, 1775).

Adults: colour pl. XV: fig. ♂ 102a, 102b; ♀ 102c, 102d.
Genitalia: ♂ - pl. 35: figs. 102, 102a-102c; ♀- pl. 68: 102, 102a.

Description. Wingspan 27-32 mm. Head white with a grey, smooth-scaled frons. Antennae pectinate to the tip, filiform in the female. Thorax pale grey. Wing ground

colour bluish-grey with sparse, dark grey or brown freckling. Medial area the same hue as the ground colour. Lines faint, jagged, darker at the angles, often visible only in the form of dark spots on the veins. A single jagged line on the hindwing. Discal spots tiny, round or oval (forewing). Forewing termen smooth, that of hindwing slightly scalloped. Fringes the same hue as ground colour. Female smaller than male; pattern on ♀ wings often rudimentary.

Life history and habitat. Flight season: one generation, from early July to late August. Found mainly near rocks or in bilberry stands in mountain glades or pastures. Nectars on flowers, both at night and on overcast days. During the day usually concealed on rocks, perfectly camouflaged, but alert and very easily disturbed. LHPs: rock vegetation, e.g. *Helianthemum* spp., *Lotus* spp., *Achillea* spp. and *Hieracium* spp., also *Vaccinium myrtillus* L. and *Genista* spp. and grasses like *Deschampsia flexuosa* (BERGMANN 1951-1955). Overwinters as a larva. A species with a relatively broad ecological (various types of rock) and altitudinal tolerance, as it is found in the 300–2000 m zone, and in the Alps even at 3000 m. Prefers more open habitats than *Elophos vittaria* (THNBG.).

Distribution. The mountains of almost the whole of southern and central Europe, from Spain, across to the Alps, Sudetens and Carpathians. In Poland frequent in the Sudetens and almost all the Carpathian range (including the Tatras), but not the foothills, where the climate is too warm. Records from Kraków (RAZOWSKI & PALIK 1969; RAZOWSKI 1995), the Kraków-Częstochowa Upland and Kielce (ROMANISZYN 1929), and Tarnowskie Góry (RAEBEL & TOLL 1962) have not been confirmed for more than 50 years, so the species probably no longer occurs in those areas.

Conservation status. Not threatened.

Comments. Possible confusion with *Elophos vittaria* (THNBG.), from which it differs in the bluish-grey tint of the wing upperside, and also with *Elophos operaria* (HBN.), which has a straight or concave forewing costal margin.

103. *Elophos vittaria* (THUNBERG, 1788)

Phalaena vittaria THUNBERG, 1788: 74, figs, Sweden, Upsala.
Gnophos sordaria mendicaria HERRICH-SCHÄFFER, 1851.
Catascia sordaria (THUNBERG, 1788).
Parietaria vittarius (THUNBERG, 1788).
Yezognophos vittarius (THUNBERG, 1788).

Adults: colour pl. XV: fig. ♂ 103; ♀ 103; pl. XVIII, fig. 8.

Genitalia: ♂ - pl. 35: figs. 103, 103a-103d; ♀- pl. 68: 103.

Description. Wingspan 31-36 mm. Head grey with a brown, smooth-scaled frons. Antennae pectinate to the tip in the male, filiform in the female. Thorax light brown. Wing ground colour with dense, brown freckling. Medial area the same hue as the ground colour. Lines prominent, jagged, darker at the angles; only rarely just as dark points on the veins. A single jagged line on the hindwing. Discal spots distinct, oval, or occasionally round. Forewing termen smooth, hindwing termen slightly scalloped with conspicuous dark dots along the margin. Fringes the same hue as the ground colour.

Life history and habitat. Flight season: one generation, from early June to late July. Found mainly in montane forest zones, not always near rocks, often on patches of bilberry, less frequently in glades and mountain pastures. Comes to flowers for nectar, usually after dusk. Concealed during the daytime, well camouflaged on tree-trunks, but alert and easily disturbed. LHPs: ground cover plants, e.g. *Vaccinium myrtillus* L., *Campanula* spp., *Plantago* spp., *Taraxacum* spp. and *Clematis* spp.; in captivity also *Lonicera* spp. and *Symphoricarpos* spp. Overwinters as a larva. Stenotopic: restricted as to habitat (montane mixed and coniferous forest zones) and to altitude (400 – 1600 m), in the Alps to ca 2000 m. Prefers more wooded habitats than *E. dilucidaria* (DEN. & SCHIFF.).

Distribution. A boreal-montane species. The mountains of southern and central Europe, from Spain, the Alps, Sudetens, Carpathians and northern Europe as far as the Arctic Circle. In Poland found in many localities throughout the Sudetens and the High and Western Tatras.

Conservation status. Not threatened.

Comments. May be confused with *E. dilucidaria* (DEN. & SCHIFF.), from which it differs in the greyish-brown freckling on the wing uppersides and the more continuous lines on both wings.

104. *Elophos operaria* (HÜBNER, 1813)

Geometra operaria HÜBNER, 1813: pl. 69, fig. 359, Europe.
Gnophos operaria (HÜBNER, 1813).
Gnophos operarius (HÜBNER, 1813).

Adults: colour pl. XV: fig. ♂ 104; ♀ 104.
Genitalia: ♂ - pl. 35: figs. 104, 104a, 104b; ♀- pl. 69: 104, 104a.

Description.

Male. Wingspan 35-38 mm. Head grey with a rough-scaled, grey frons. Antennae narrowly pectinate to the tip. Thorax pale grey. Wing ground colour pale grey with dense brown freckling. Medial area the same hue as the ground colour. Lines prominent, jagged, darker at the angles; very occasionally, lines very faint, with only the dark spots on the veins visible. On the hindwing, a single, jagged line, often broken. Discal spots distinct, round or oval (forewing). Forewing costal margin straight or slightly concave. Termen of both wings smooth, with no indentations. Fringes the same hue as the ground colour.

Female. Length 11-12 mm. Head dark grey; antennae filiform. Wing stumps variable in length, in Polish populations approximately the same length as the thorax (can be longer in Alpine populations). Wing pattern consists of indistinct lines.

Life history and habitat. Flight season: one generation, from mid-June to early August. Diurnal, very easily disturbed. Usually found near rocks or on mountain pastures and ridges with plentiful rock debris and loose boulders. Caterpillars feed on various herbaceous plants, but their biology is poorly known. Overwinters as a larva. Found in the 1400–2200 m zone, and up to ca 2200 m in the Alps. Prefers open habitats.

Distribution. The mountains of central Europe: the Alps, Sudetens and Carpathians. The record from the L'viv area (Ukraine) must be erroneous (ROMANISZYN 1929). In Poland found in the Karkonosze Mts and the Śnieżnik Massif (Sudetens) (1 ex., Schneeberge, P.H. RAEBEL leg.) and in both the High and Western Tatras. The record from the Śnieżnik requires confirmation, because the information on the voucher specimen label is incomplete and the date on it does not tally with the one given by the author in his publication (RAEBEL & TOLL 1962). Very rarely and long ago found on the Polish side of the Karkonosze Mts.; most records are from the southern, Czech side of this range (LIŠKA 2001).

Localities in Poland: Hala Gąsienicowa, Kasprowe Uhrocie, Liliowe, Czerwone Wierchy (DV25), Dolina Pięciu Stawów, Opalony Wierch (DV35), Hala Tomanowa, Siwe Sady (DV15) (BATKOWSKI et al. 1972); Mnichy Chochołowskie, Ornak, Trzydniowiański Wierch, Kominiarski Wierch, Twardy Upłaz (DV15) (A. MALKIEWICZ, K. PAŁKA, W. ZAJDA, K. NUPPONEN leg., coll. AM, WZ); Śnieżka/Schneekoppe (WS52) (F. PAX leg., coll. ZFMK); Kocioł Małego Stawu (WS42) (A. BORKOWSKI leg., coll. MGB; MALKIEWICZ 2001; BORKOWSKI et al. 2004); Czarna Kopa (WS52) (RAEBEL &

38. Distribution of *Elophos operaria* (HÜBNER, 1813) in Poland

TOLL 1962; MARSCHNER 1932-1934); Śnieżnik (XR36) (RAEBEL & TOLL 1962); Babia Góra (CV99) (ZAJDA & PRZYBYŁOWICZ 2003)

Conservation status. Vulnerable (VU).

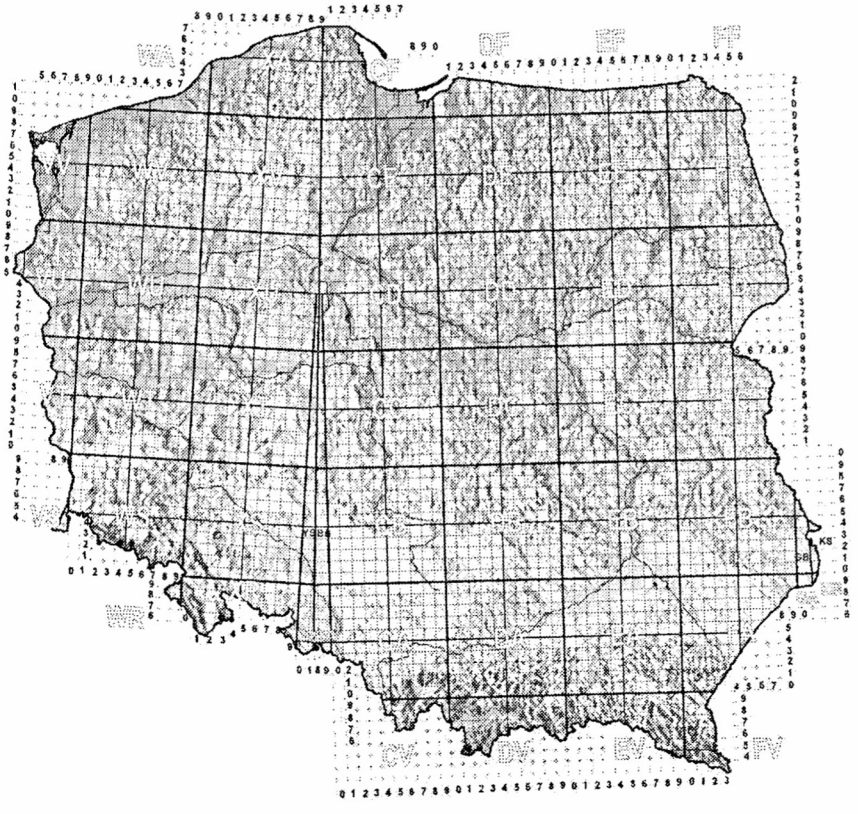
Comments. Could be confused with *Elophos vittaria* (THNBG.), and also with *E. dilucidaria* (DEN. & SCHIFF.), both of which have a convex forewing costal margin. All species also clearly differ in their genitalia.

Psodos TREITSCHKE, 1827

105. *Psodos quadrifaria* (SULZER, 1776)

Phalaena (Geometra) quadrifaria SULZER, 1776: 162, pl. 23, fig. 4, Alps
Torula quadrifaria (SULZER, 1776)

Adults: colour pl. XVI: fig. ♂ 105a, 105c; ♀ 105b, 105d; pl. XVIII, fig. 7.
Genitalia: ♂ - pl. 36: figs. 105, 105a, 105b; ♀- pl. 69: 105.



39. Distribution of *Psodos quadrifaria* (SULZER, 1776) in Poland

Description. Wingspan 22-25 mm. Head black, frons rough-scaled. Antennae filiform in both sexes. Wings blackish-brown, glossy, with wide orange bands: a roughly oval one along the forewing termen covering about 1/3 of the wing, and a wedge-shaped patch in the hindwing terminal area covering about one half of that wing. Fringes velvety black, glossy. Wing undersides similarly coloured, but orange patches even broader.

Life history and habitat. Flight season from mid-June to late July. LHPs: various herbaceous plant species. Overwinters as a larva. Inhabits the turf among rocks and also alpine meadows above the tree line between 1300 and 2100 m. Active by day in sunny weather, voraciously nectaring on flowers.

Distribution. European. Known only from some European mountain ranges: the Alps, Pyrenees, Carpathians and Sudetens. In Poland undisputed records only from the Tatra Mts. (common) and Karkonosze Mts. (rare). Single old findings from the Babia Góra Mt. and the Śnieżnik Massif are not documented by evidence, despite the information from RAEBEL & TOLL (1962) and BUSZKO (2000). The latest records from the Polish Karkonosze Mts. (Równia pod Śnieżką) date back to the 1960s (BORKOWSKI et al. 2004; MALKIEWICZ 2001; BOROWIAK & CHRZANOWSKI 2007). The status of ssp. *sudetica* STERNECK, 1918 remains questionable (see the map).

Localities in Poland: Równia pod Śnieżką (WS42, WS52) (BORKOWSKI 1985, MALKIEWICZ 2001); Śnieżnik Kłodzki (XR36) (RAEBEL & TOLL 1962); Tatry Zachodnie (DV15, DV25) (BATKOWSKI et al. 1972; BUSZKO et al. 2000); Kasprowy Wierch (DV25), Tatry Zachodnie (DV15) (W. ZAJDA leg., coll. WZ).

Conservation status. Endangered (EN) (only in the Sudetens).

Comments. The record from the Poznań area (Kobylepole) must be erroneous (SCHUMANN 1902; ROMANISZYN 1929).

Glacies MILLIÉRE, 1874

106. *Glacies canaliculata* (HOCHENWARTH, 1785)

Phalaena canaliculata HOCHENWARTH, 1785: 336, pl. 7, fig. 5.
Psodos canaliculata (HOCHENWARTH, 1785).
Psodos schwingenschussi WEHRLI, 1915.

Adults: colour pl. XVI: fig. ♂ 106a, 106c; ♀ 106b.

Genitalia: ♂ - pl. 36: figs. 106, 106a-106c; ♀- pl. 69: 106, 106a.

Description. Wingspan 21-25 mm. Head black with a rough-scaled frons, vertex speckled grey. Antennae filiform in both species. Wing ground colour ash grey or greyish-green, with strong yellowish or orange mottling and a black pattern. Forewing medial area bordered with jagged black lines, converging somewhat in the rear part of the wing and very occasionally joining at the dorsum. The oval, black discal spot is distinct, as is the wavy line. Hindwing with a single dark line and a less conspicuous, small discal spot. Short, thick black dashes along the base of the fringes, which are

the same hue as the ground colour. Wing undersides with a prominent pale band in the terminal area.

Life history and habitat. Flight season: from early July to mid-August. Caterpillars of the ssp. *schwingenschussi* not known. LHPs: in the Alps, various herbaceous plants, e.g. *Plantago alpina, Linaria alpina, Odontites lutea, Rhinanthus* spp. and *Pedicularis* spp. Overwinters as a larva. Inhabits rocky grassland and alpine meadows above the tree line and the dwarf pine zone at altitudes of 1800 – 2100 m in the Tatras and up to 2600 m in the Alps. Most often found in the vicinity of passes and in flat areas around mountain summits, mainly on limestone rocks. Active by day in sunny weather, nectaring intensively on flowers, especially in sheltered spots. May be locally numerous.

Distribution. European. Known only from some European mountain ranges: the Alps, Pyrenees, Carpathians (Tatras and southern Carpathians) and some Balkan mountain ranges, but only at higher altitudes. *Glacies canaliculata* ssp. *schwingenschussi* WEHRLI, 1915 known only from the Tatras and southern Carpathians.

Conservation status. Not threatened. The whole population is protected by the Tatrzański Park Narodowy (Poland) and Tatranský Narodný Park (Slovakia).

Comments. The relationships and status of all the subspecies have not yet been definitively cleared up and need further study. Worn specimens may be confused with *G. coracina* (ESP.), which is glossier and paler in colour, and with *G. noricana* (WAGNER), in which the lines are less contrastive and the wing mottling less intensive.

107. *Glacies noricana* (WAGNER, 1898)

Psodos noricana WAGNER, 1898: 715, Austria, Steiermark Fölzalpe, 1472 m.
Psodos burmanni TARMANN, 1984.

Adults: colour pl. XVI: fig. ♂ 107a, 107b; ♀ 107c.

Genitalia: ♂ - pl. 36: figs. 107, 107a, 107b; pl. 37: figs. 107c-107f; ♀- pl. 70: 107.

Description. Wingspan 22-25 mm. Head black with frons and labial palps rough-scaled; vertex black. Antennae filiform in both sexes, shortly ciliate in the male. Wing ground colour from glossy greyish-brown with an indistinct black pattern (*G. noricana noricana*) to almost uniformly dark greyish-greenish as far as the postmedial line, with a silvery dusting (*G. noricana carpathica*). Forewing medial area slightly darker than the rest of the wing, bordered by distinct, jagged black lines converging towards the dorsum but not joining there. Discal spot prominent, black, usually round. Wavy line broken and rather faint, may not be visible at all. Hindwing is similar in colour, with a single dark line and a small, faint discal spot. Clear black dashes along the bases of the fringes, which are the same hue as the ground colour. Wing undersides uniformly dark brown, with no broad pale band in the terminal area.

Life history and habitat. Flight season: from late June to early August, in the Alps from late May to mid-July. Said to be polyphagous in the Alps and Carpathians (WEHRLI 1939-1954), but no detailed study of this issue has been carried out in the western Carpathians. The overwintering form is probably the larva. The imagines inhabit

rocky grass swards and alpine meadows above the tree line and the dwarf pine zone at altitudes of 1600 – 1900 m in the Belianské Tatra Mts. and up to 2100 m in the High Tatras (KRAMPL & MAREK 1988). Active by day in sunny weather and moderate winds. Found on both limestone and crystalline rocks, where they bask with spread wings.

Distribution. European. Known only from some European mountain ranges: the Alps and the Carpathians (Tatras and southern Carpathians), only at higher altitudes up to 2500 m. *Glacies noricana carpathica* (SCHWINGENSCHUSS, 1915) recorded not only from the Belianské Tatra Mts. (Slovakia), but also from Retyezat Mts. (Romania). The subspecific status of the only two specimens known from the Polish side of Tatras at the localities of Kościelec and the Pod Kopą Kondracką pass (DV25) is not clear and requires more material and further study (MALKIEWICZ 1999).

Conservation status. Data deficient (DD). The entire western Carpathian population is probably under the protection of the Tatrzański Park Narodowy (Poland) and the Tatranský Narodný Park (Slovakia).

Comments. The life history, distribution and status of all subspecies are poorly known and need further study. Worn specimens could be confused with *G. coracina* (Esp.), which is glossy and much paler in colour, and with *G. canaliculata* (SCHWINGENSCHUSS), which has more contrastive lines and a denser, yellowish mottling on the wings. *Glacies alpinata* from the Tatras differs in its uniformly brown wings and scarcely visible discal spots and lines. Both sexes of all these species exhibit distinct differences in their genital structures; genital examination is therefore recommended if identification of worn specimens proves difficult. Moreover, the genital structures of the males exhibit significant geographical variability (pl. 36-37, figs. 107a-107f). This should be checked on a larger sample of specimens than was available for the present project.

108. *Glacies coracina* (ESPER, 1805)

Phalaena coracina ESPER, 1805: 74, pl. 197, fig. 5, Alpen des Juragebirges.
Psodos coracina (ESPER, 1796).

Adults: colour pl. XVI: fig. ♂ 108a, 108b; ♀ 108c.
Genitalia: ♂ - pl. 37: figs. 108, 108a; ♀- pl. 70: 108, 108a.

Description. Wingspan 21-23 mm. Head black with frons and labial palps rough-scaled; vertex speckled grey. Antennae filiform in both sexes, shortly ciliate in the male. Wing ground colour glossy silver-grey to greyish-brown, with a black pattern. Forewing medial area darker than the rest of this wing, bordered by black, jagged lines converging somewhat towards the rear of the wing, though rarely actually joining at the dorsum. Discal spot prominent, oval or round, black. Wavy line rather indistinct, broken. Hindwing somewhat darker with a single dark line and a small, faint discal spot. Distinct black dashes along the bases of the fringes, which are the same hue as the ground colour. Wing undersides with a broad, but rather faint pale band in the terminal area.

Life history and habitat. Flight season: from late June to early August. In the Alps and northern Europe caterpillars forage on various herbaceous plants and dwarf

birch (*Betula nana*). Overwinters as a larva (twice in Scotland – two-year life cycle). Inhabits rocky swards and alpine meadows above the tree line and dwarf pine zone at altitudes of 1700 – 2000 m in the western Tatras and up to 3000 m in the Alps. Active by day in sunny weather, nectaring intensively on flowers, particularly in sheltered spots. In overcast weather concealed on rocks and limestone boulders in cryptic positions. Locally may be numerous, more so in even-numbered years (BATKOWSKI et al. 1972; NIESIOŁOWSKI 1929).

Distribution. Eurosiberian. An 'arctic-alpine' type, known from some European mountain ranges: the Pyrenees, central and eastern Alps, Carpathians (the Tatras and southern Carpathians), also Scotland and polar areas from Lapland and the Scandinavian mountains (ssp. *lappona* WEHRLI) across Siberia and the Far East to Japan.

Conservation status. Not threatened. The whole population in the Tatra mountains is under the protection of the Polish and Slovak Tatra National Parks (Tatrzański Park Narodowy, Tatranský Narodný Park).

Comments. The relationships and status of all the subspecies have yet to be definitively cleared up and require further study. Worn individuals may be confused with *G. canaliculata* (HOCH.), which is darker and not glossy, and also with the larger *G. noricana* (WAGNER), in which the lines are less contrasting and the wing freckling less dense.

109. *Glacies alpinata* (SCOPOLI, 1763)

Phalaena alpinata SCOPOLI, 1763: 228, fig. 571, Italy, Carnia.
Psodos alpinata (SCOPOLI, 1763).

Adults: colour pl. XVI: fig. ♂ 109; ♀ 109.

Genitalia: ♂ - pl. 37: figs. 109, 109a; ♀- pl. 70: 109, 109a.

Description. Wingspan 22-25 mm. Head black with a rough-scaled frons. Antennae filiform in both sexes. Wings blackish-brown, glossy. Lines jagged, blurred, usually rather indistinct or reduced. Discal spot faint, elongated. Fringes velvety black, glossy. Wing undersides the same colour as the uppersides, except that the postmedial line is visible only at the costal margin.

Life history and habitat. Flight season from mid-June to early August. LHPs: various herbaceous plant species and *Vaccinium* spp. Overwinters as a larva. Inhabits the sward among rocks and alpine meadows above the tree line at altitudes between 1200 and 2100 m. Often found in dwarf pine scrub (*Pinus mugo* L.). Active by day in sunny weather, nectaring intensively on flowers.

Distribution. Palaearctic. In Europe known only from some mountain ranges: the Pyrenees, Alps, Carpathians and Sudetens. In Poland reported only from the Tatras (common), the Karkonosze Mts. (uncommon) and the Śnieżnik Massif (rare). Has occurred in the immediate vicinity of this last locality, in the Hrubý Jeseník Massif (RAEBEL & TOLL 1962; LIŠKA 2001). One specimen from Babia Góra Massif was discovered in the collection of MGB with the date of collection: 21 VI 1961 (leg. A. DROZDA)

Localities in Poland: Równia pod Śnieżką (WS42, WS52) (Borkowski 1985, Malkiewicz 2001); Śnieżnik Kłodzki (XR36) (Raebel & Toll 1962; Malkiewicz 1992 – unpubl.); Tatry Zachodnie (DV15, DV25) (Batkowski et al. 1972; Buszko et al. 2000); Czerwone Wierchy (DV25), Babia Góra (CV99) (A. Drozda leg., coll. MGB).

Conservation status. Vulnerable (VU) (only in the Sudetens).

Comments. May be confused with *Glacies noricana* (Wagner, 1898), but the wing uppersides are of a blacker shade and lines and discal spots are less distinct. There are also considerable differences in the genitalia of both sexes.

40. Distribution of *Glacies alpinata* (Scopoli, 1763) in Poland

Siona Duponchel, 1829

110. *Siona lineata* (Scopoli, 1763)

Phalaena lineata Scopoli, 1763: 218, fig.540, Italy, Carnia.
Scoria lineata (Scopoli, 1763).

Adults: colour pl. XVI: fig. ♂ 110; ♀ 110.

Genitalia: ♂ - pl. 38: figs. 110, 110a-110c; ♀- pl. 71: 110.

Description. Wingspan 35-45 mm. Head white with a smooth-scaled frons. Antennae ciliate in the male, filiform in the female. Wing uppersides snow-white with faint grey or black veins (in females and worn specimens). The black dusting on the underside veins is very conspicuous. Also on the undersides, a postmedial line of variable width and a large discal spot. Termens of both wings bordered black. Fringes snow-white. Abdomen with a double black lateral line and a single thicker ventral one.

Life history and habitat. Flight season: one generation, from mid-May to early July. Eggs are laid in the late afternoon, usually on grasses, in rows of 3-6. Imagines active by day and at night. LHPs: many herbaceous plants and shrubs, e.g. *Hypericum perforatum*, *Plantago* spp., *Campanula* spp., *Artemisia* spp., *Peucedanum* spp., *Genista* spp. and *Rumex* spp. Once foraging has ceased, the caterpillars spin on blades of grass or the host plant a yellow, spindle-shaped cocoon, very similar to the cocoons of the Zygaenidae, in which the caterpillar pupates. Inhabits damp, flowery meadows, usually managed extensively, where a range of different flowers provides nectar for the adult moths (EBERT et al. 2003). Also found on waste ground and fallow land; nectars on pink and purple flowers such as *Knautia arvensis*, *Echium vulgare*, *Allium* sp. (SENN, pers. comm.).

Distribution. Palaearctic. From western Europe to eastern Siberia. In Poland found everywhere in the lower parts of mountains and their foothills, also in the east and north of the country. Has been found recently along the river Odra and its left-bank tributaries in Lower Silesia and Lubuskie Province (MALKIEWICZ 2003) and Pomerania Province (SENN 2008), where it is much more local. It has colonized some central districts too, e.g. Puszcza Bolimowska (SOBCZAK et al. 2012). In the last 10 years it has been expanding in eastern Germany as well (SOBCZYK et al. 2003).

Conservation status. Not threatened. Expanding.

Chariaspilates WEHRLI, 1953

111. *Chariaspilates formosaria* (EVERSMANN, 1837)

Aspilates formosaria EVERSMANN, 1837: 54, Russia, Kazan.
Crocota formosaria (EVERSMANN, 1837).

Adults: colour pl. XVI: fig. ♂ 111a, 111c; ♀ 111b.

Genitalia: ♂ - pl. 38: figs. 111, 111a; ♀- pl. 71: 111.

Description. Wingspan 29-36 mm. Head beige or grey with a smooth-scaled frons; antennae pectinate (the final 4-5 flagellomeres are free) in the male, filiform in the female. The anterior part of the thorax ash-grey or pale grey, the same colour as the costal streak. Forewing yellowish-orange, with a pale grey costal streak and greyish bands across the medial area and around the termen. Post-medial line white, diagonal, slightly curved, turning sharply towards the costa before reaching the apex; narrowly bordered blackish-brown on the outside, especially in the male. Hindwing cream, darkly

freckled in the terminal area, with a thin, blackish-brown line fading away towards the costa. Small, black discal spots visible on both wings. The double-layered fringes are from grey to coffee-brown in colour.

Life history and habitat. Flight season: mid-June to mid-July; single specimens are come across in September, the progeny of a second generation in warm summers (M. HOŁOWIŃSKI pers. comm.). Nocturnal. Inhabits fens (also calcareous), transitional bogs and waterlogged meadows, often in the early stages of succession with shrubs and tree seedlings; unchecked succession, however, even in protected areas (e.g. Biebrza National Park), is a serious threat to the species' survival. Known LHPs include *Lysimachia vulgaris*, *Caltha palustris*, and in Pomerania *Myrica gale*. Overwinters as a larva, which is also nocturnal. Being a stenotopic species, its occurrence is very local.

Distribution. From the eastern Palaearctic to central and north-western Europe; in Europe from the southern Tyrol to southern Lithuania. Distribution disjunct. In Poland two known historical localities: one near Szczecin discovered in the mid-19th century, the other in the vicinity of Chojna in the Myślibórz lake district, but where no

41. Distribution of *Chariaspilates formosaria* (EVERSMANN, 1837) in Poland

individuals were ever found again (URBAHN & URBAHN 1939). At present a few localities in the Biebrza valley (FRĄCKIEL 2005), Białowieża Forest (BUSZKO et al. 1996a), in the Lublin Polesie and Chełm areas (PAŁKA 1992; BUSZKO et al. 1996b) and in the Sandomierz Basin (DEDYŃSKI 1996).

Localities in Poland: Stepnica (VV74), Chojna (VU66) (URBAHN & URBAHN 1939); Burzyn (EE90), Bagno Ławki (FE00), Grobla Honczarowska (FE01), Goniądz (FE12), Osowiec-Twierdza (FE02), Biebrzański P.N.-Basen Środkowy (FE23), Grzędy (FE24), Jałowo ad Lipsk (FE55) (K. FRĄCKIEL leg., coll. AM; FRĄCKIEL 2005); Białowieski P.N. (FD94) (BUSZKO et al. 1996a); Hańsk (FB69), Macoszyn (FB79) (M. HOŁOWIŃSKI leg., coll. MH); Kosyń (FB79), Stulno (FB89), Bubnów (FB59), Zawadówka (FB66), Brzeźno (FB87) (PAŁKA 1992; BUSZKO et al. 1996b); Jezioro Moszne res. (FC40) (A. MALKIEWICZ leg., coll. AM); Antoniów (EB61) (DEDYŃSKI 1996).

Conservation status. Lower risk (LR) (MALKIEWICZ 2004b). The main populations of the species are to be found in the Biebrza, Polesie and Białowieża National Parks, where conservation measures to protect its habitats are being undertaken.

Aspitates TREITSCHKE, 1825

112. *Aspitates gilvaria* (DENIS & SCHIFFERMÜLLER, 1775)

Geometra gilvaria DENIS & SCHIFFERMÜLLER, 1775: 102, Austria, Vienna district.
Crocota gilvaria (DENIS & SCHIFFERMÜLLER, 1775).
Aspilates gilvaria (DENIS & SCHIFFERMÜLLER, 1775).

Adults: colour pl. XVI: fig. ♂ 112; ♀ 112.

Genitalia: ♂ - pl. 38: figs. 112, 112a, 112b; ♀- pl. 71: 112.

Description. Wingspan 24-36 mm. Head yellow with a smooth-scaled frons. Antennae pectinate to the tip in the male, dentate in the female. Wing ground colour pale yellow with brown freckling. On the forewing a narrow, oblique brown line reaching the costal margin near the apex. Discal spot tiny, not always clearly visible. Hindwing pattern scarcely visible, sometimes shows through from below. On wing undersides freckling, lines and discal spots thicker, more conspicuous. Fringes creamy yellow.

Life history and habitat. Flight season: one generation, from late July to early September. Occurs in xerothermic environments, scrub, thermophilous slopes, rank grassland, and the ssp. *fenica* on raised bogs. Caterpillars live from September to July with a winter diapause; nocturnal, when disturbed they fall to the ground and curl up. LHPs: many herbaceous plants, shrubs and bushes, including *Genista* spp., *Cytisus* spp., *Stachys* spp., *Artemisia* spp., *Achillea* spp., *Potentilla* spp., *Hypericum* spp. and *Lonicera xylosteum* (BERGMANN 1951-1955; EBERT et al. 2003); LHPs of ssp. *fenica*: *Andromeda polifolia, Empetrum* spp. and *Vaccinium* spp.

Distribution. From Siberia and central Asia to central and south-western Europe; disjunct. In Finland and the Baltic countries occurs as ssp. *fenica* Fuchs 1899 (ŠULCS & VIIDALEPP 1972). Two historical localities in Poland: the vicinities of Poznań (SCHULTZ 1887) and Sandomierz (KARPOWICZ 1928). In 1936 again caught in central Wielkopolska

(west-central Poland) (coll. K. PLUCIŃSKI, coll. S. FUGLEWICZ). Never found again since then (BARANIAK & SOSIŃSKI 2000). There are two peatbog localities in southern Lithuania (IVINSKIS 2004), so the species may have been overlooked in north-eastern Poland.

Localities in Poland: Śrem (XT37) (SCHULTZ 1887); Mosina (XT29) (SCHUMANN 1902); Poznań (XU30), Radzewice (XT38), Wąsowo (WU80) (ROMANISZYN 1929); Buk (WU00) (K. PLUCIŃSKI leg., coll. SF); Słabuszowice ad Sandomierz (EB51?) (KARPOWICZ 1928).

Conservation status. Probably extinct (EX?).

42. Distribution of *Aspitates gilvaria* (DENIS & SCHIFFERMÜLLER, 1775) in Poland

Dyscia HÜBNER, 1825

113. *Dyscia fagaria* (THUNBERG, 1784)

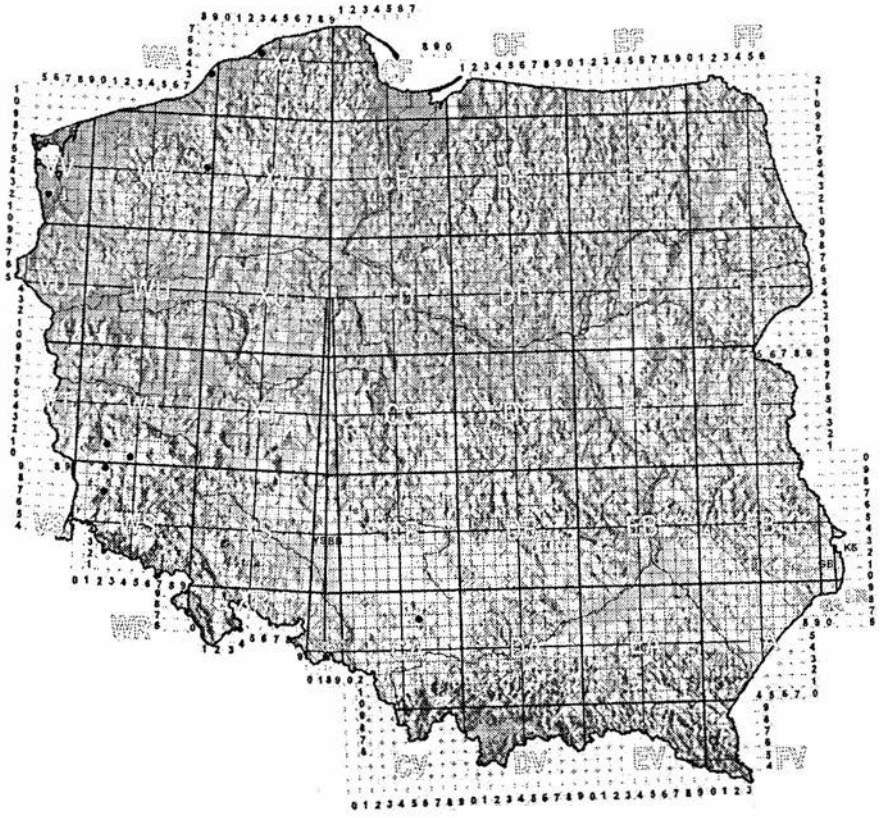
Geometra fagaria THUNBERG, 1784: 7, Sweden, Halland.
Dyscia belgaria (HÜBNER, 1790).
Scodiona belgaria (HÜBNER, 1790).

Adults: colour pl. XVI: fig. ♂ 113a, 113b; ♀ 113c.

Genitalia: ♂ - pl. 39: figs. 113, 113a, 113b; ♀- pl. 72: 113.

Description. Wingspan: male 31-39 mm, female 29-34 mm. Head pale grey, frons smooth-scaled. Antennae bipectinate in the male, filiform in the female. Wing ground colour from brownish-grey through pale grey to white with delicate dark freckling. Lines take the form of small, dark dots or spots, sometimes joined together in a jagged line. Discal spots – short, thick dashes – prominent on both wings. In the terminal area, a darkish patch of blurred outline and variable size between postmedial line and tornus. There may be dark dots on the veins along the termen of both wings, just behind the fringes. Female distinctly smaller than male.

Life history and habitat. Flight season: one generation, from late April to early June. A second generation occurs in south-western Europe in September. LHPs: Ericaceae (*Erica* spp., *Calluna vulgaris* L.) *Globularia* spp. and *Artemisia* spp. Overwinters as a larva (L-4 or L-5 instar), which resumes feeding in the spring. The main habitats



43. Distribution of *Dyscia fagaria* (Thunberg, 1784) in Poland

in Poland are heathlands on coastal and inland dunes, open-canopied pine forests, e.g. *Empetro nigri-Pinetum* WOJT. 1964 in the Baltic coastal dune belt, and subatlantic inland areas/plant communities, e.g. *Genistion pilosae* DUV. 1942 emend. SCHUB., often in former military training areas (TRUSCH et al. 1996; MALKIEWICZ & KOKOT 2004). In the eastern parts of its distribution this is a psammophilous steppe species (TRUSCH & ERLACHER 2001).

Distribution. Palaearctic. From Ireland and western France to the Yellow Sea, and in Europe from central Spain to southern Scandinavia. In Poland known from four historical localities in Pomerania (URBAHN & URBAHN 1939), Toruń (BUSZKO 2000), the southern part of Lubuskie province (SOSIŃSKI 1996) and the Bory Dolnośląskie Forest (RAEBEL & TOLL 1926; MALKIEWICZ & KOKOT 2004). Also recorded in the vicinity of Zawiercie (MASŁOWSKI & MASŁOWSKI 1936; BŁESZYŃSKI 1966), subsequently misquoted as 'Katowice' (TRUSCH & ERLACHER 2001). Also known from Lwów vicinity (ROMANISZYN 1929). In Poland reaches north-eastern limit of the distribution area.

Localities in Poland: Pilchowo (VV62), Rowy (XA35), Darłówko (WA83), Stary Chwalim (WV95) (URBAHN & URBAHN 1939); Drawsko Pomorskie – military training area (WV52) (Ł. MATUSZEWSKI leg., coll. ŁM); Toruń – Glinki (CD36) (J. BUSZKO leg., coll. AM); Zebrzydowa (WS27) (Sommer 1895); Szprotawka (WT40) (R. SZPOR leg., coll. RSz); Biernatów ad Leszno Górne (WT40), Żagań (WT21) (SOSIŃSKI 1996); 'Dzikowiec' proj. res. ad Piotrowice (WT40), Ławszowa – military training area (WS29) (MALKIEWICZ & KOKOT 2006; KOKOT & HYJEK 2011); Józefów (CA67) (MASŁOWSKI & MASŁOWSKI 1936).

Conservation status. Vulnerable (VU) (BUSZKO & NOWACKI 2002).

Comments. The secondary habitat of the species in Poland and Germany requires special kinds of protection, including the controlled use of fire in justified cases. Otherwise, the habitat of the species may soon be destroyed (MALKIEWICZ & KOKOT 2006; BENA 2012).

Perconia HÜBNER, 1823

114. *Perconia strigillaria* (HÜBNER, 1787)

Phalaena (Geometra) strigillaria HÜBNER, 1787: 13, pl. 2, fig. I (s fig. f), Germany, Augsburg.

Adults: colour pl. XVI: fig. ♂ 114a, 114b; ♀ 114c.

Genitalia: ♂ - pl. 39: figs. 114, 114a, 114b; ♀- pl. 72: 114.

Description. Wingspan 30-36 mm. Head white in the female, ash grey with a dusting of brown scales in the male. Antennae broadly pectinate in the male, filiform in the female. Wing ground colour greyish-white with coarse ash grey or brown freckling. Forewing with three or four, hindwing with two or three light brown lines. Hindwing lines almost straight. Discal spots tiny, if at all present. Hindwing termen slightly scalloped, highlighted by a dark line. Fringes usually spotted only in the female. The following features are variable: wing ground colour (females are paler), prominence and number of lines, fringe spotting.

Life history and habitat. Flight season: one generation, from early June to early July. Reported LHPs include *Calluna vulgaris* L., *Erica tetralix* L. and *Cytisus scoparius* L. Inhabits heaths, raised bogs, forest clearings and waysides in woodland on a sandy substrate. Overwinters as a small larva. Moths crepuscular and nocturnal, but also easily disturbed during the daytime. The preferred habitats are exposed, sunny forest edges and sandy paths or electricity lines, often vulnerable to the overgrowth of trees.

Distribution. Palaearctic. From Western Europe to Mongolia. In Europe in almost all countries, but absent from Portugal, Corsica and Sardinia. Widespread but local throughout Poland in suitable habitats; up to ca 600 m in the mountains.

Conservation status. Vunerable (VU).

7. ACKNOWLEDGEMENTS

I would like to express my warm gratitude to curators and colleagues in museums in Poland and abroad for making their collections available to me, namely, Dr Łukasz PRZYBYŁOWICZ (ISEZ), Dr Dariusz IWAN (MIZW), Roland DOBOSZ MSc (MGB), Prof. Marek WANAT (MPUWr), Dr Barbara MARCINIAK (MPUŁ), Bożena GRAMSZ MSc (MPJG), Dr Wolfram MEY (MNHU), Dr Dieter STÜNING (ZFMK) and Dr Sergej Yu. SINEV (ZIN). Equally warm thanks go to the owners of private Lepidoptera collections and their photographic documentation mentioned in the list below and in the text for kindly giving me access to their materials, and also to those persons who sent me single specimens and parts of their collections. Here I would like to say a special "thank you" to Prof. Jarosław BUSZKO, who presented me with his entire collection of geometrids, which he had accumulated over very many years, and also to Adam LARYSZ, Witold ZAJDA, Dr Jörg GELBRECHT, Marek HOŁOWIŃSKI, Łukasz MATUSZEWSKI, Xawery DOBRZAŃSKI, Dariusz ŁUPIŃSKI, Mariusz MLECZAK, Dr Roman WĄSALA, Izabela SZELĄG, Roman ZAMORSKI, Stefan SOBCZAK, Dr Wojciech KUBASIK, Manfred KLEßE and Stanisław FUGLEWICZ, and posthumously to Edmund FUGLEWICZ (†), Andrzej KOKOT (†) and Dr Romuald SZPOR (†). Granddaughter of the last one Magdalena PASEK kindly gave access to His great collection.

I am indebted to Krzysztof JONKO and the many contributors to his "European Butterflies and Moths" website for being able to make use of the records deposited there.

I received important faunistic information, data on life histories and habitats and photographs from Jarosław BURY, Jakub JÓZEFCZUK, Maciej MATRAJ, Ewelina MYŚKÓW, Dr. Krzysztof PAŁKA, Peter SENN, Jarosław WENTA, Jan ZIELIŃSKI and Vladimir SAVCHUK. For their invaluable assistance with the field work and with dissections of specimens I am very grateful to Ewelina MYŚKÓW, Dr. Radosław STELMASZCZYK, Xawery DOBRZAŃSKI, Dr. Jarosław KANIA and Andrzej HYJEK. Radosław STELMASZCZYK, Marta FILISTOWICZ, Dr. Aleksandra KILIAN and Janusz MASŁOWSKI helped me with the graphics.

My thanks go to Peter SENN for checking my English, translating where necessary and for correcting geographical names.

Last but not least, I am much obliged to Prof. Dariusz TARNAWSKI (Wrocław, Poland), whose efforts have made the publication of this monograph possible.

Project realized with financial support from Polish Ministry of Science and Higher Education (grant No. N303 056 31/1737).

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9. PLATES

9.1. MALE GENITALIA

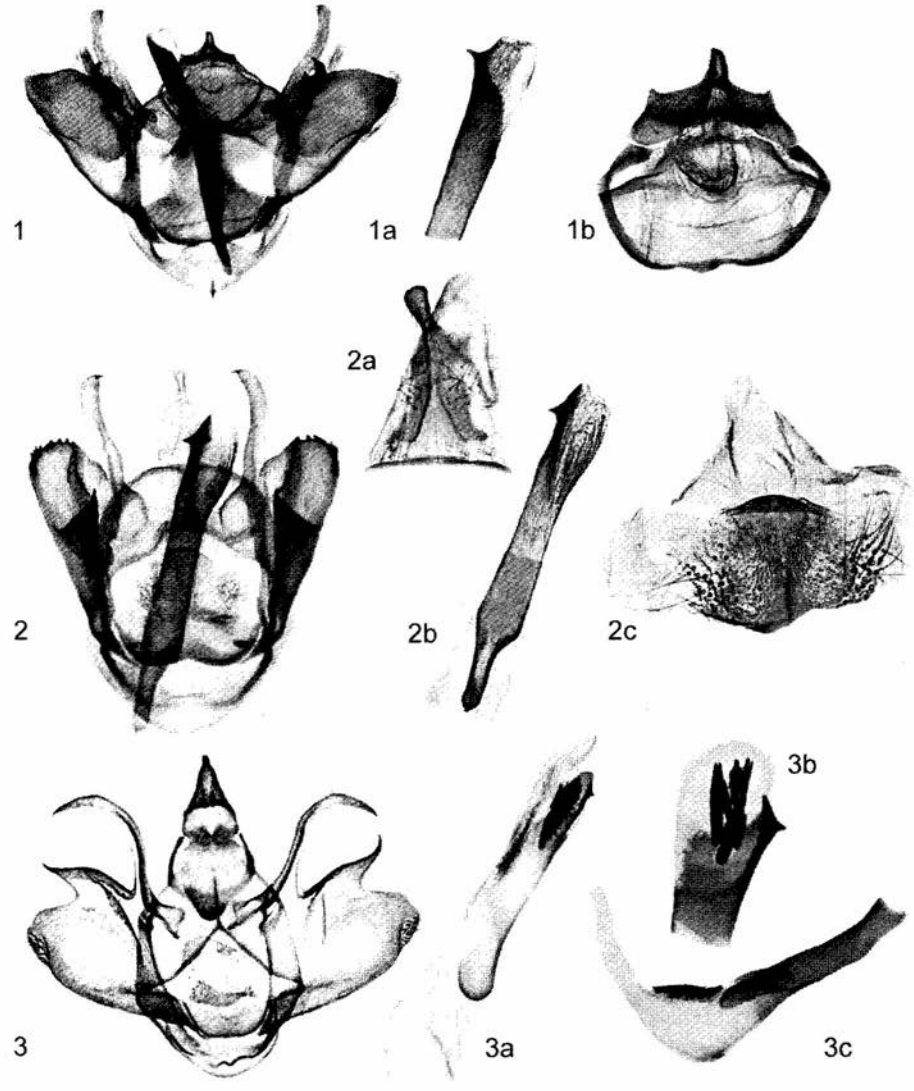

Plate 1. Male genitalia: 1. *Abraxas grossulariata*: Poland, Polesie Lubelskie; 1a. aedeagus – distal part; 1b. uncus + gnathos; 2. *Abraxas sylvata*: Poland, Wielkopolska; 2a. uncus; 2b. aedeagus; 2c. juxta + cristae; 3. *Ligdia adustata*: Poland, Dolny Śląsk; 3a. aedeagus; 3b. aedeagus – cornuti; 3c. vesica everted.

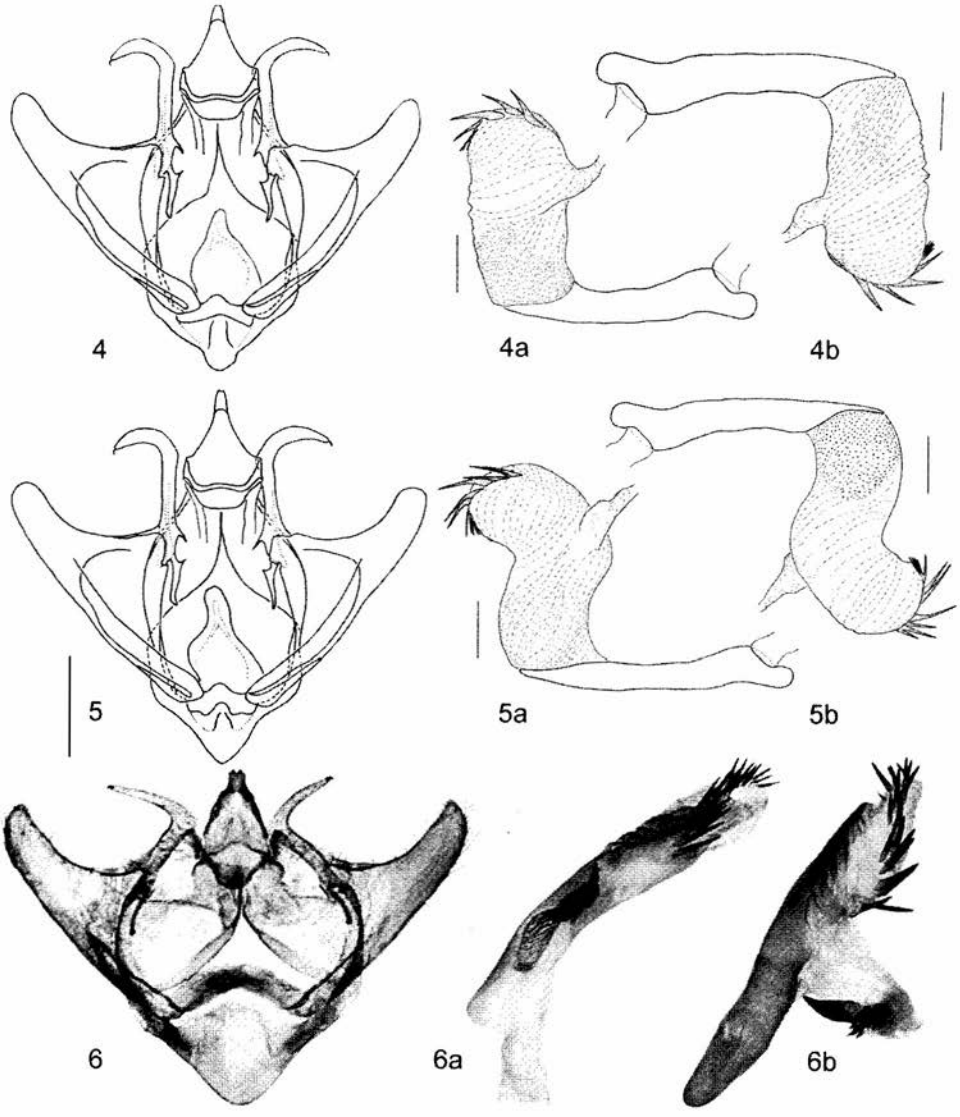

Plate 2. Male genitalia: 4. *Lomaspilis marginata*: Poland, Dolny Śląsk; 4a, 4b. vesica everted (from both sides); 5. *Lomaspilis opis*: Poland, Podlasie; 5a, 5b. vesica everted (from both sides); 6. *Stegania cararia*: Poland, Wyżyna Lubelska; 6a. aedeagus; 6b. vesica everted.

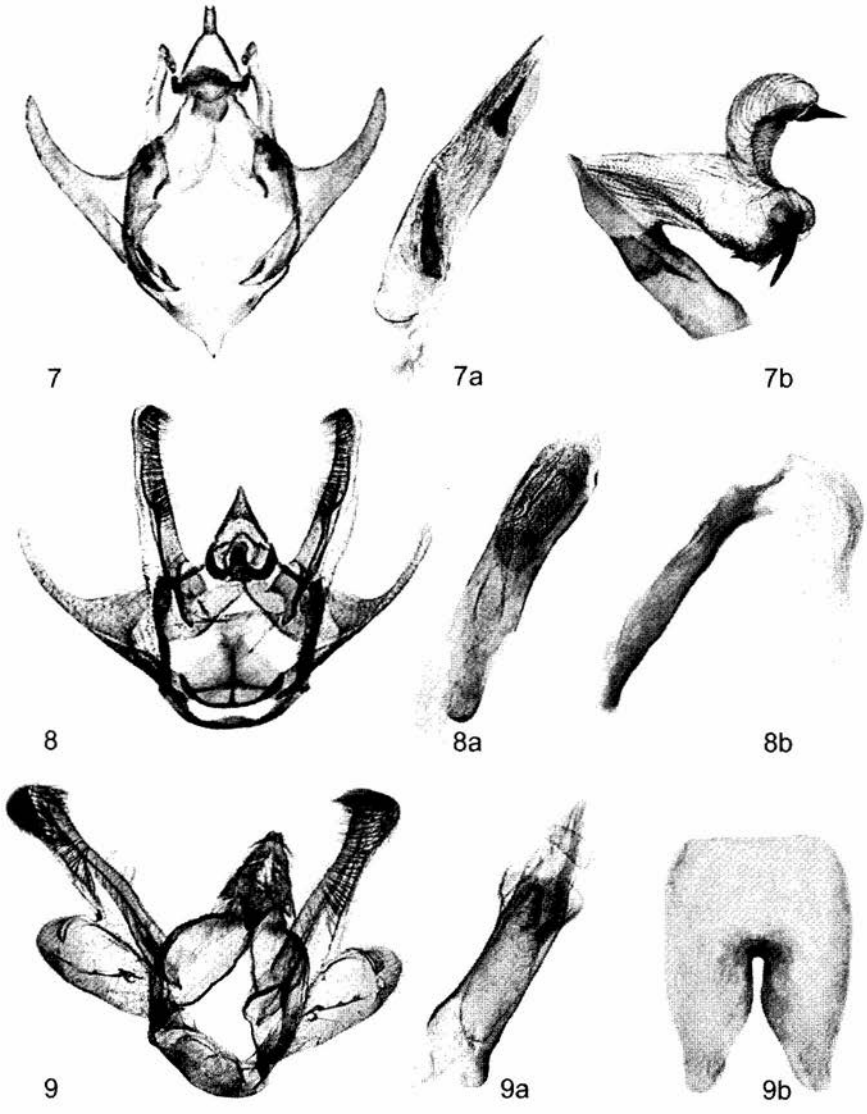

Plate 3. Male genitalia: 7. *Stegania dilectaria*: Hungary, Puszta; 7a. aedeagus; 7b. vesica everted; 8. *Heliomata glarearia*: Poland, Górny Śląsk; 8a. aedeagus: Poland, Lubelskie; 8b. vesica everted: Poland, Górny Śląsk; 9. *Macaria notata*: Poland, Ziemia Lubuska; 9a. aedeagus; 9b. sternum A8.

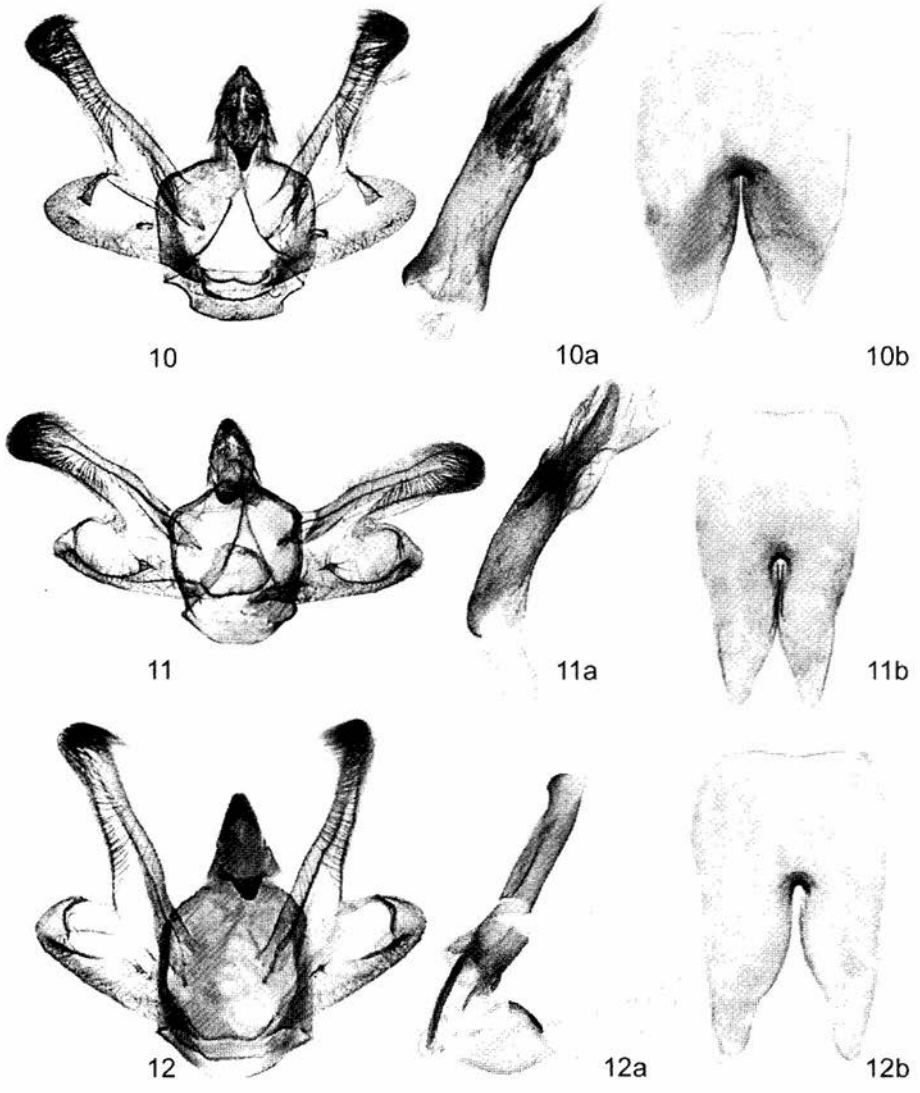

Plate 4. Male genitalia: 10. *Macaria alternata*: Poland, Wielkopolska; 10a. aedeagus; 10b. sternum A8; 11. *Macaria signaria*: Poland, Podlasie; 11a. aedeagus; 11b. sternum A8; 12. *Macaria liturata*: Poland, Ziemia Lubuska; 12a. vesica everted; 12b. sternum A8.

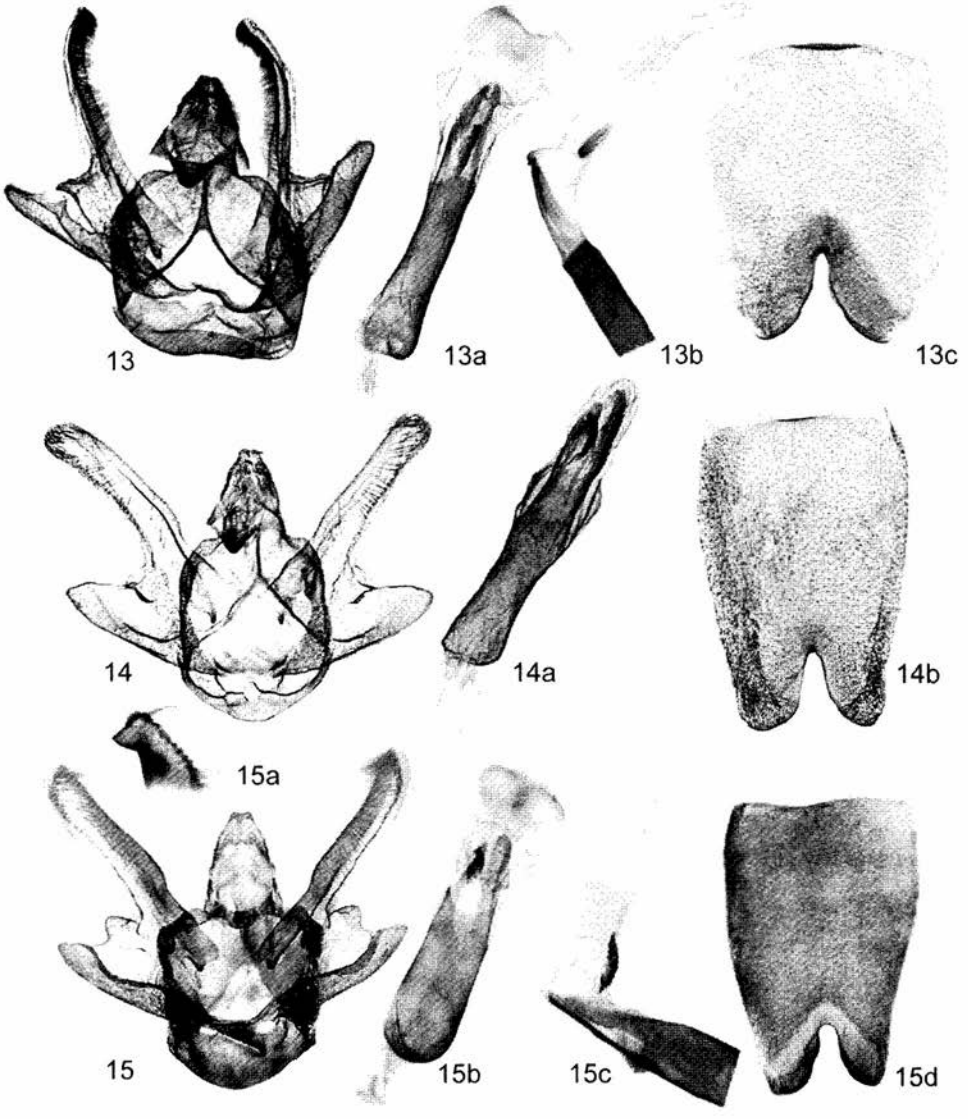

Plate 5. Male genitalia: 13. *Macaria wauaria*: Poland, Wielkopolska; 13a. aedeagus; 13b. vesica everted; 13c. sternum A8; 14. *Macaria artesiaria*: Poland, Wielkopolska; 14a. aedeagus; 14b. sternum A8; 15. *Macaria brunneata*: Poland, Dolny Śląsk; 15a. uncus; 15b. aedeagus; 15c. vesica everted; 15d. sternum A8.

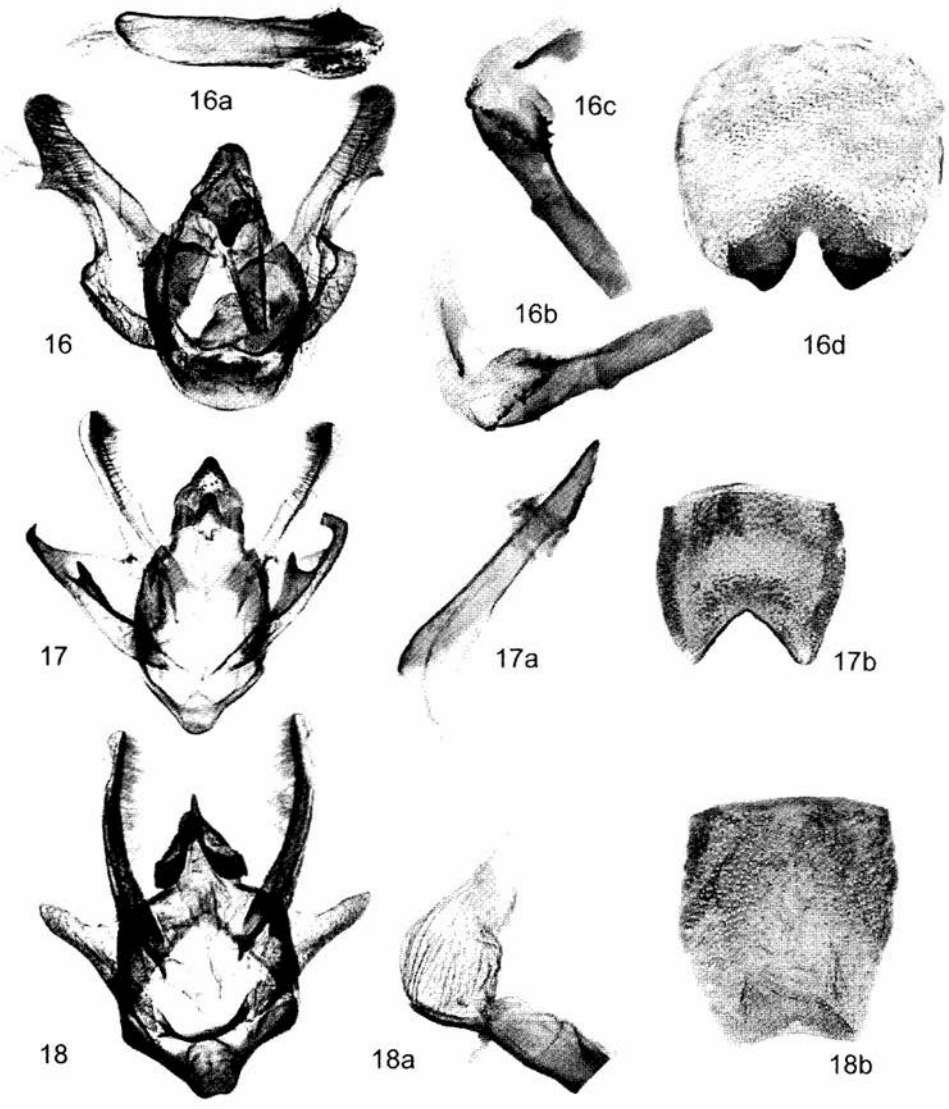

Plate 6. Male genitalia: 16. *Chiasmia clathrata*: Poland, Wielkopolska; 16a. aedeagus; 16b, 16c. vesica everted (from both sides); 16d. sternum A8; 17. *Narraga fasciolaria*: Poland, Pomorze Zachodnie; 17a. aedeagus; 17b. sternum A8; 18. *Isturgia roraria*: Poland, Małopolska; 18a. vesica everted; 18b. sternum A8.

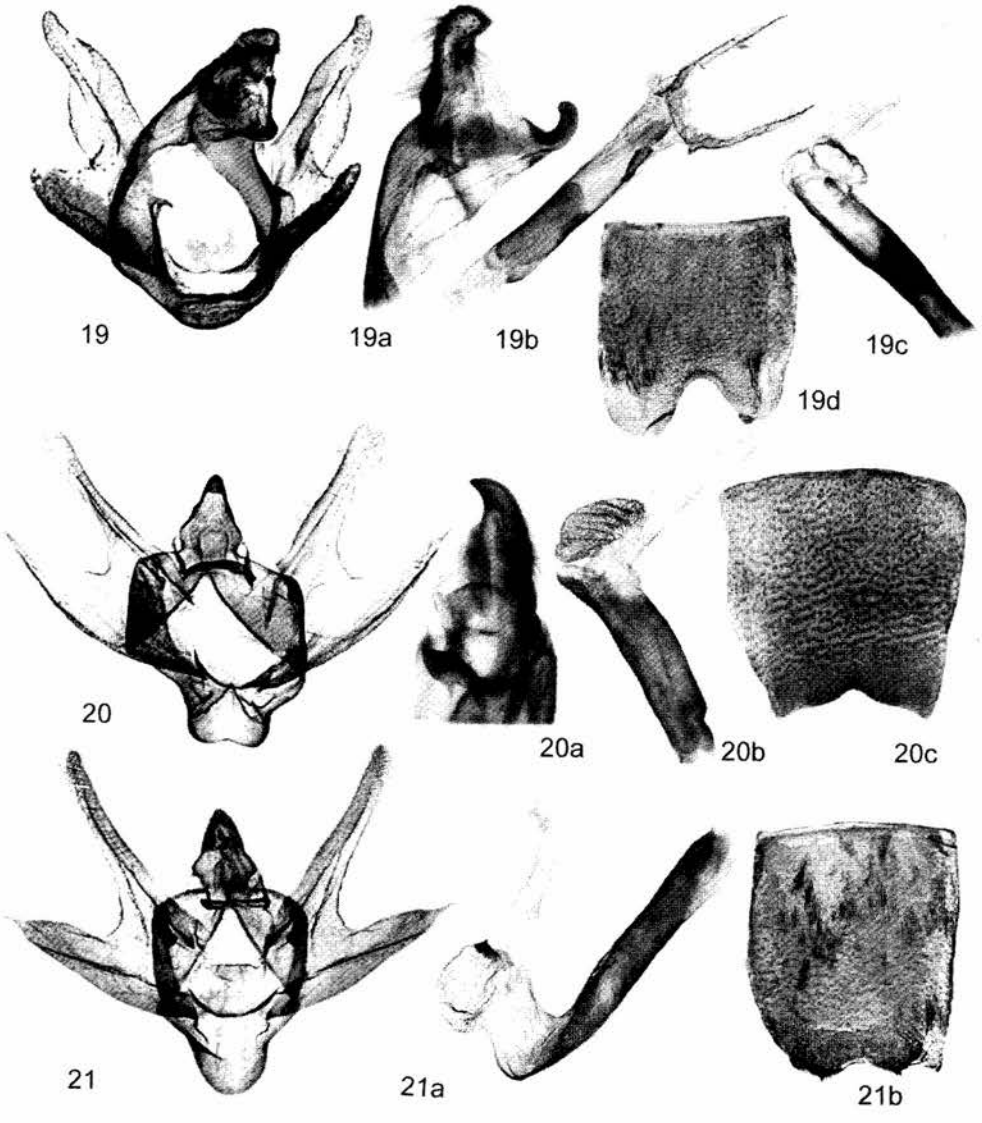

Plate 7. Male genitalia: 19. *Isturgia carbonaria*: Poland, Mazowsze; 19a. uncus + gnathos; 19b. aedeagus + juxta; 19c. vesica everted; 19d. sternum A8; 20. *Isturgia murinaria*: Poland, Kujawy; 20a. uncus + gnathos; 20b. vesica everted; 20c. sternum A8; 21. *Isturgia arenacearia*: Poland, Polesie Lubelskie; 21a. vesica everted; 21b. sternum A8.

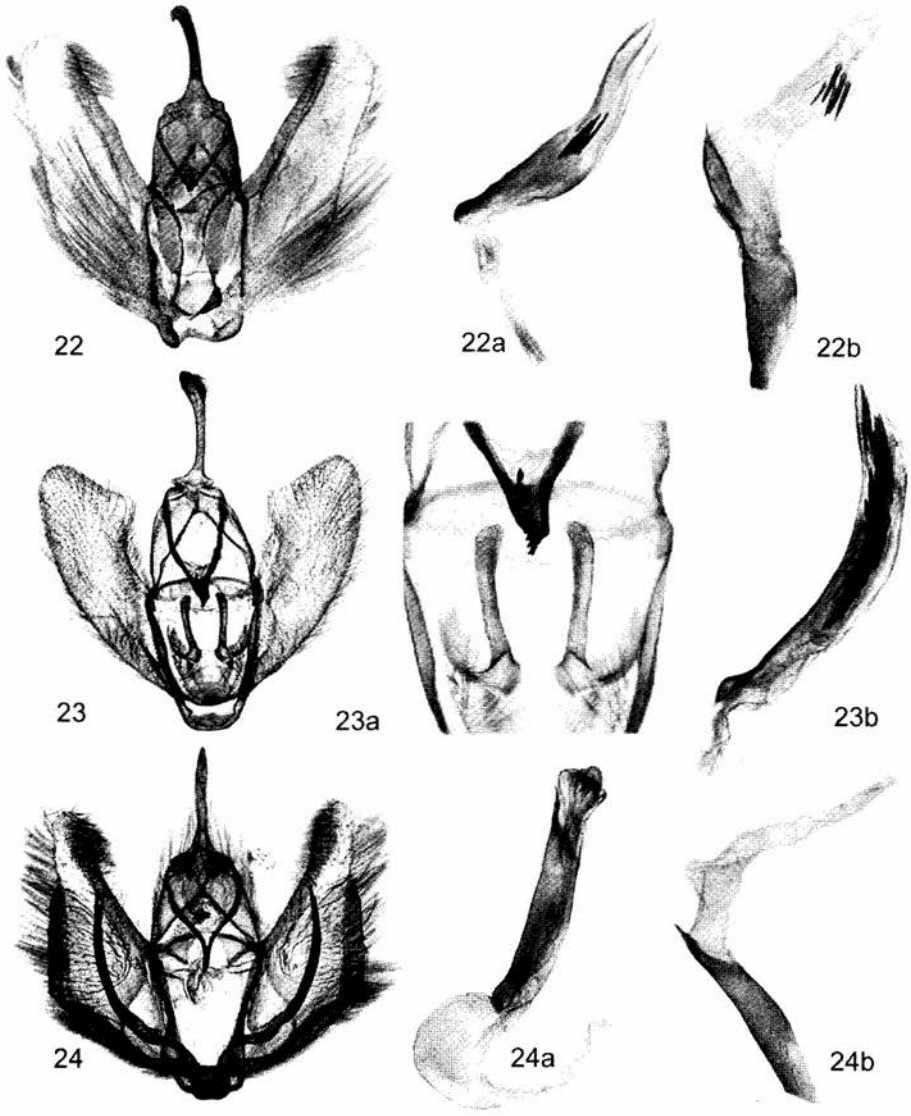

Plate 8. Male genitalia 22. *Cepphis advenaria*: Poland, Dolny Śląsk; 22a. aedeagus; 22b. vesica everted; 23. *Petrophora chlorosata*: Poland, Dolny Śląsk; 23a. gnathos + furca; 23b. vesica everted; 24. *Plagodis pulveraria*: Poland, Dolny Śląsk; 24a. aedeagus: 24b. vesica everted.

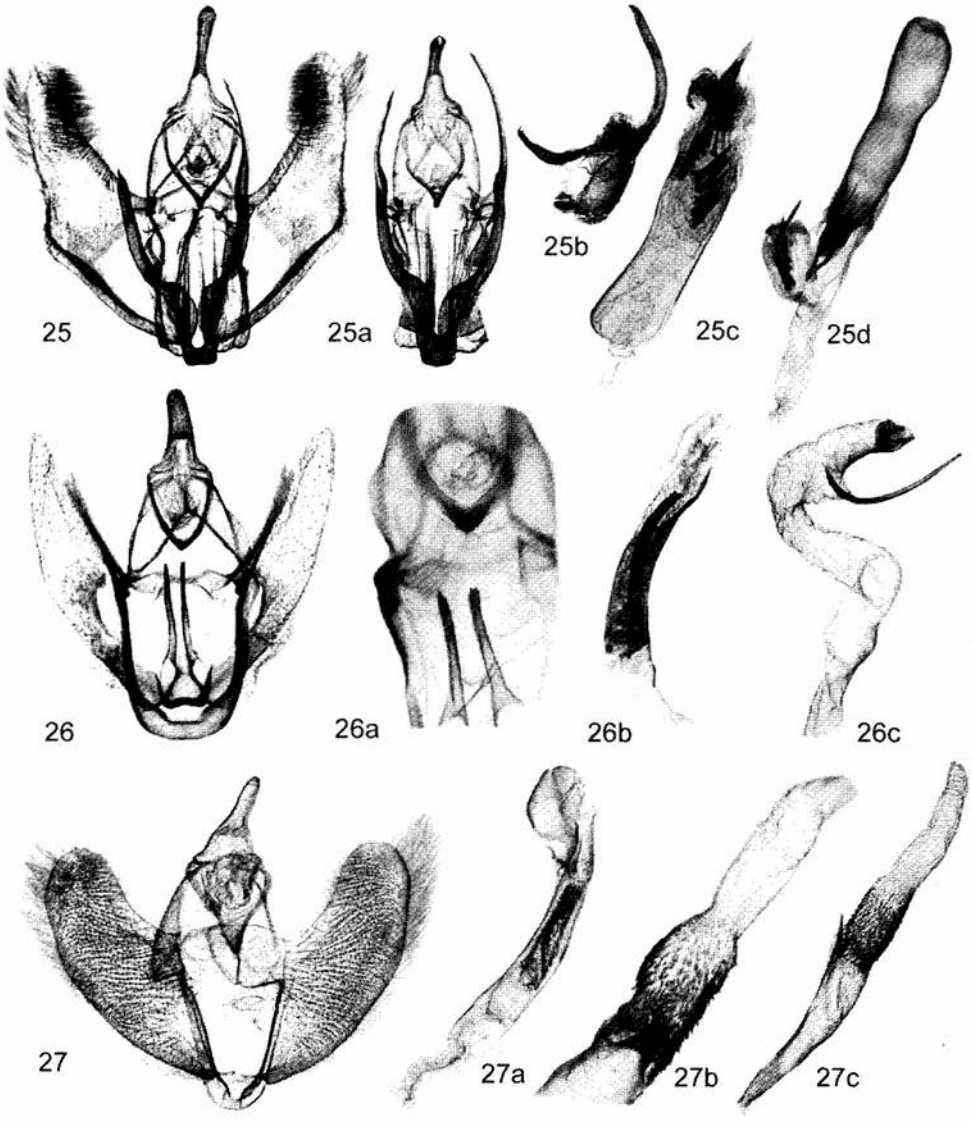

Plate 9. Male genitalia: 25. *Plagodis dolabraria*: 1 gen., Poland, Dolny Śląsk; 25a. 2 gen. (valvae removed); 25b. uncus + gnathos: Poland, Dolny Śląsk; 25c. aedeagus: Poland, Sudety; 25d. vesica everted: Poland, Dolny Śląsk; 26. *Pachycnemia hippocastanaria*: Poland, Dolny Śląsk; 26a. gnathos + furca; 26b. aedeagus; 26c. vesica everted; 27. *Opisthograptis luteolata*: Poland, Dolny Śląsk; 27a. aedeagus; 27b. (enlarged); 27c. vesica everted (lateral view).

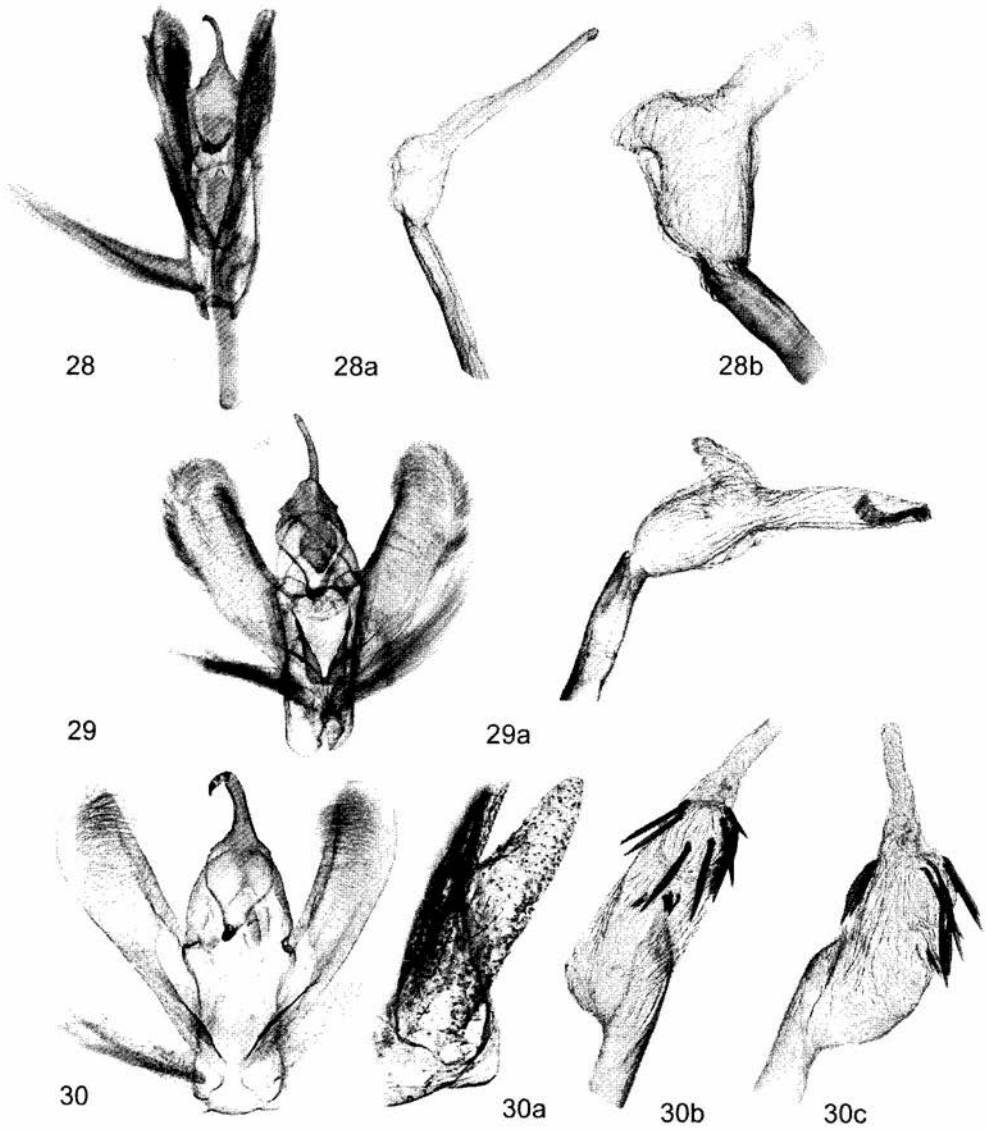

Plate 10. Male genitalia: 28. *Epione repandaria*: Poland, Dolny Śląsk; 28a. vesica everted; 28b. vesica everted (enlarged); 29. *Epione vespertaria*: Poland, Podkarpacie; 29a. vesica everted; 30. *Therapis flavicaria*: Bulgaria; 30a. corema; 30b. vesica everted; 30c. vesica everted (lateral view).

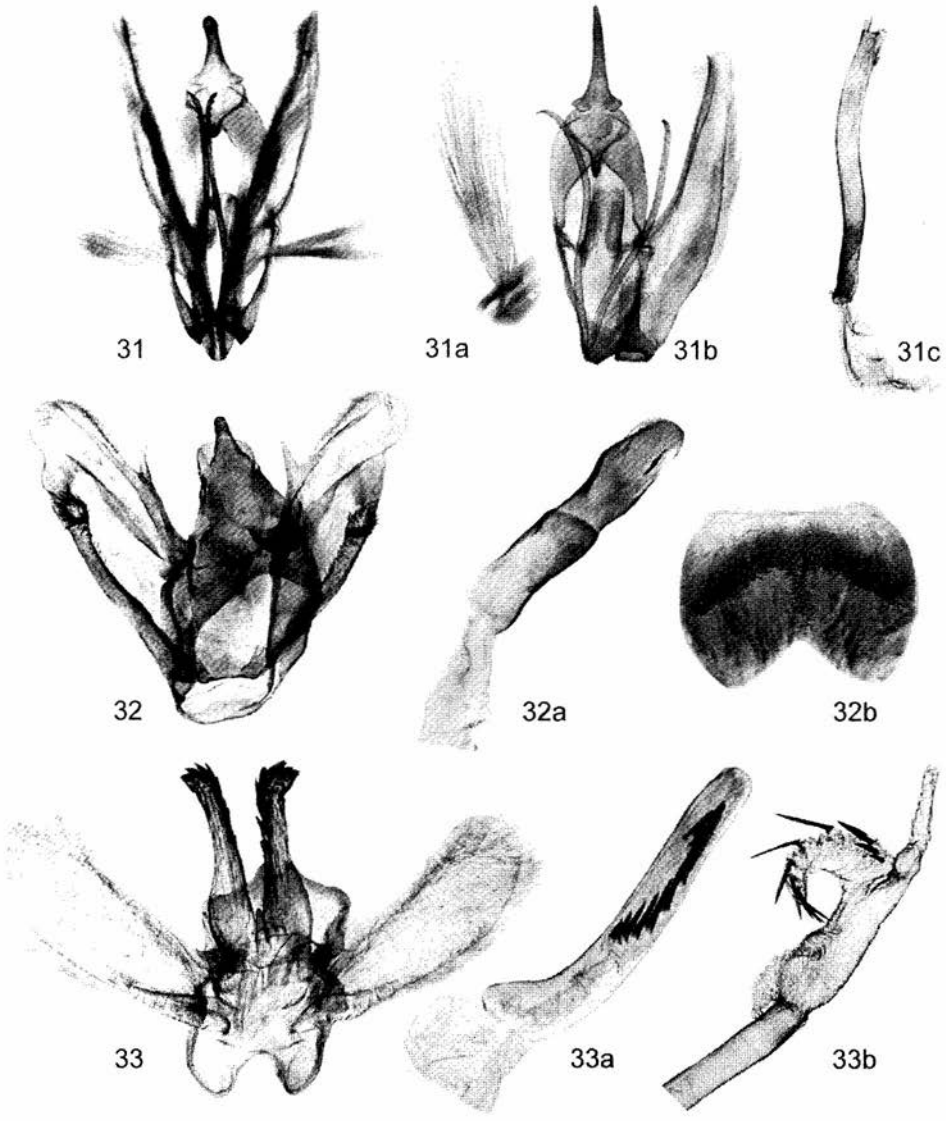

Plate 11. Male genitalia: 31. *Pseudopanthera macularia*: Poland, Dolny Śląsk; 31a. corema: Poland, Dolny Śląsk; 31b. valva (inner view): Poland, Podkarpacie; 31c. aedeagus: Poland, Dolny Śląsk; 32. *Hypoxystis pluviaria*: Poland, Podkarpacie; 32a. aedeagus; 32b. sternum A8; 33. *Apeira syringaria*: Poland, Wielkopolska; 33a. aedeagus; 33b. vesica everted.

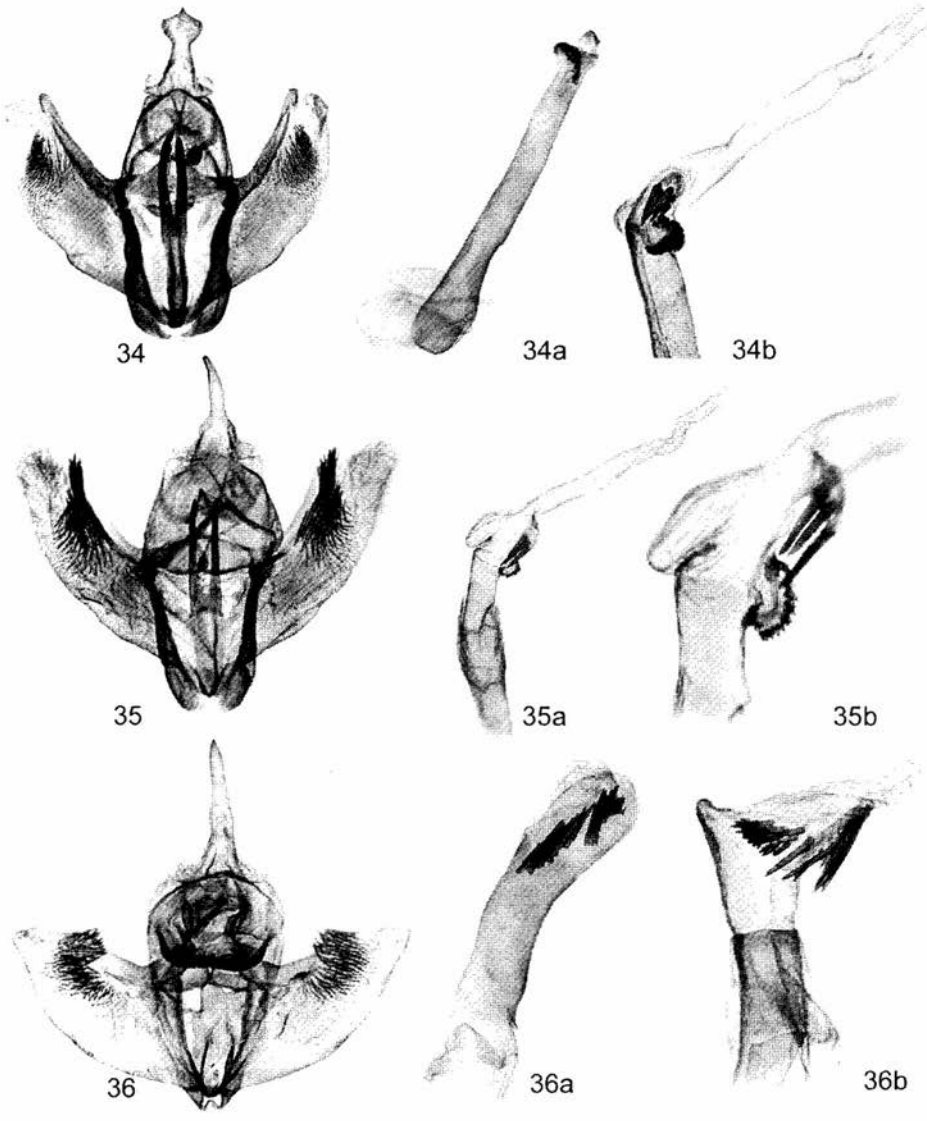

Plate 12. Male genitalia: 34. *Ennomos autumnaria*: Poland, Wielkopolska; 34a. aedeagus; 34b. vesica everted; 35. *Ennomos quercinaria*: Poland, Dolny Śląsk; 35a. vesica everted; 35b. vesica everted (enlarged); 36. *Ennomos alniaria*: Poland, Wielkopolska; 36a. aedeagus; 36b. vesica everted.

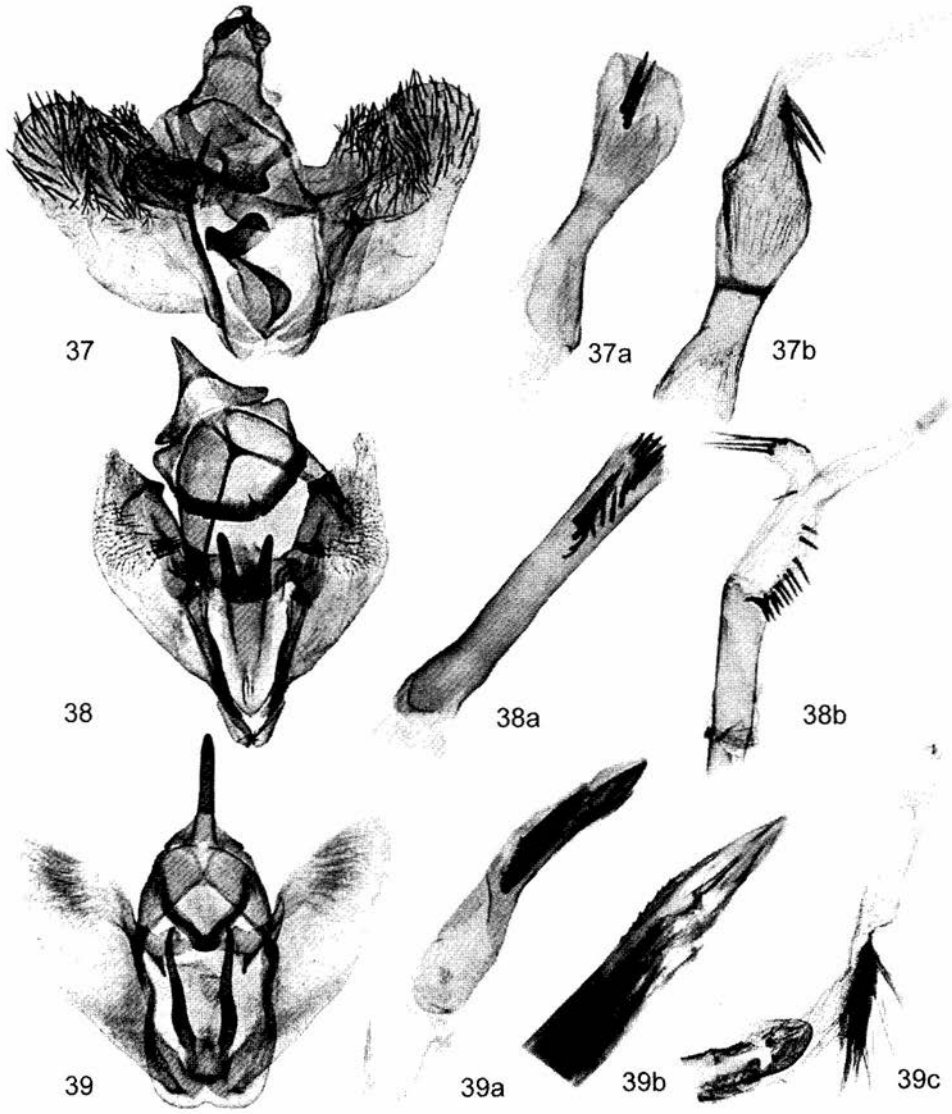

Plate 13. Male genitalia: 37. *Ennomos fuscantaria*: Poland, Wielkopolska; 37a. aedeagus; 37b. vesica everted; 38. *Ennomos erosaria*: Poland, Dolny Śląsk; 38a. aedeagus; 38b. vesica everted; 39. *Selenia dentaria*: Poland, Dolny Śląsk; 39a. aedeagus; 39b.aedeagus – distal part; 39c. vesica everted.

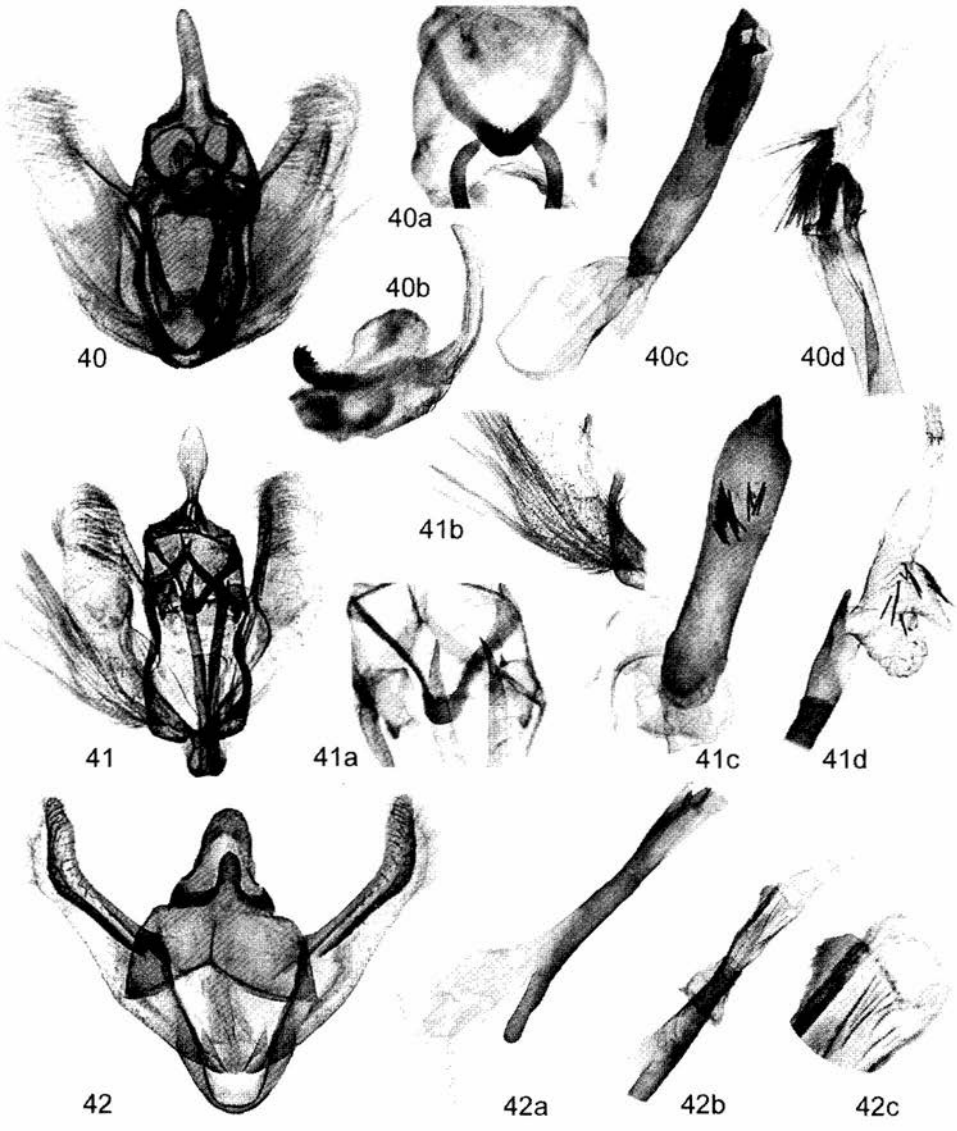

Plate 14. Male genitalia: 40. *Selenia tetralunaria*: Poland, Pomorze Zachodnie; 40a. gnathos: Poland, Dolny Śląsk; 40b. uncus: Poland, Wielkopolska; 40c. aedeagus: Poland, Dolny Śląsk; 40d. vesica everted: Poland, Dolny Śląsk; 41. *Selenia lunularia*: NE Bulgaria; 41a. gnathos; 41b. corema; 41c. aedeagus; 41d. vesica everted; 42. *Artiora evonymaria*: Poland, Dolny Śląsk; 42a. aedeagus; 42b. vesica everted; 42c. carina penis.

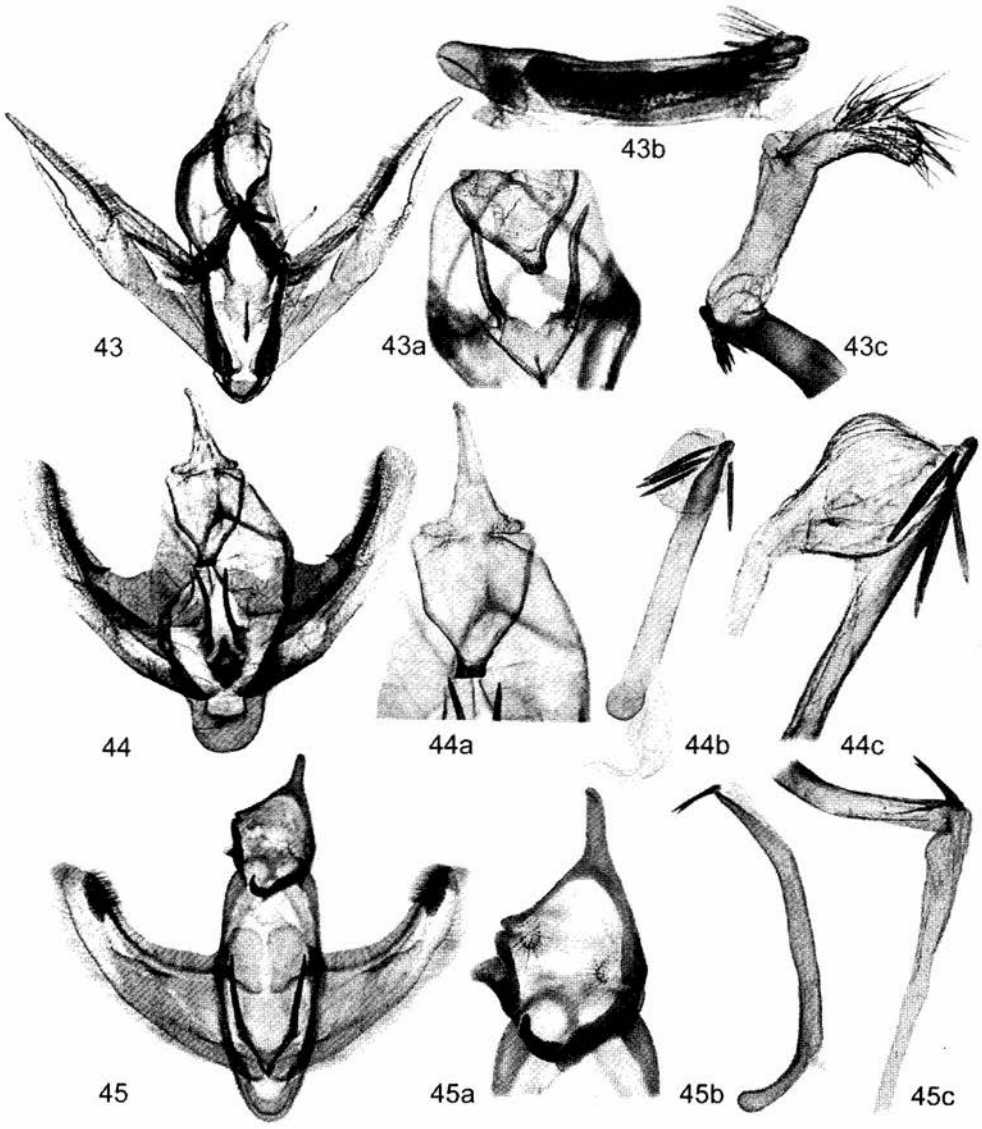

Plate 15. Male genitalia: 43. *Odontopera bidentata*: Poland, Dolny Śląsk; 43a. gnathos + juxta; 43b. aedeagus; 43c. vesica everted; 44. *Crocallis tusciaria*: SE Bulgaria; 44a. uncus + gnathos; 44b. aedeagus; 44c. vesica everted; 45. *Crocallis elinguaria*: Poland, Dolny Śląsk; 45a. uncus + gnathos; 45b. aedeagus; 45c. vesica everted.

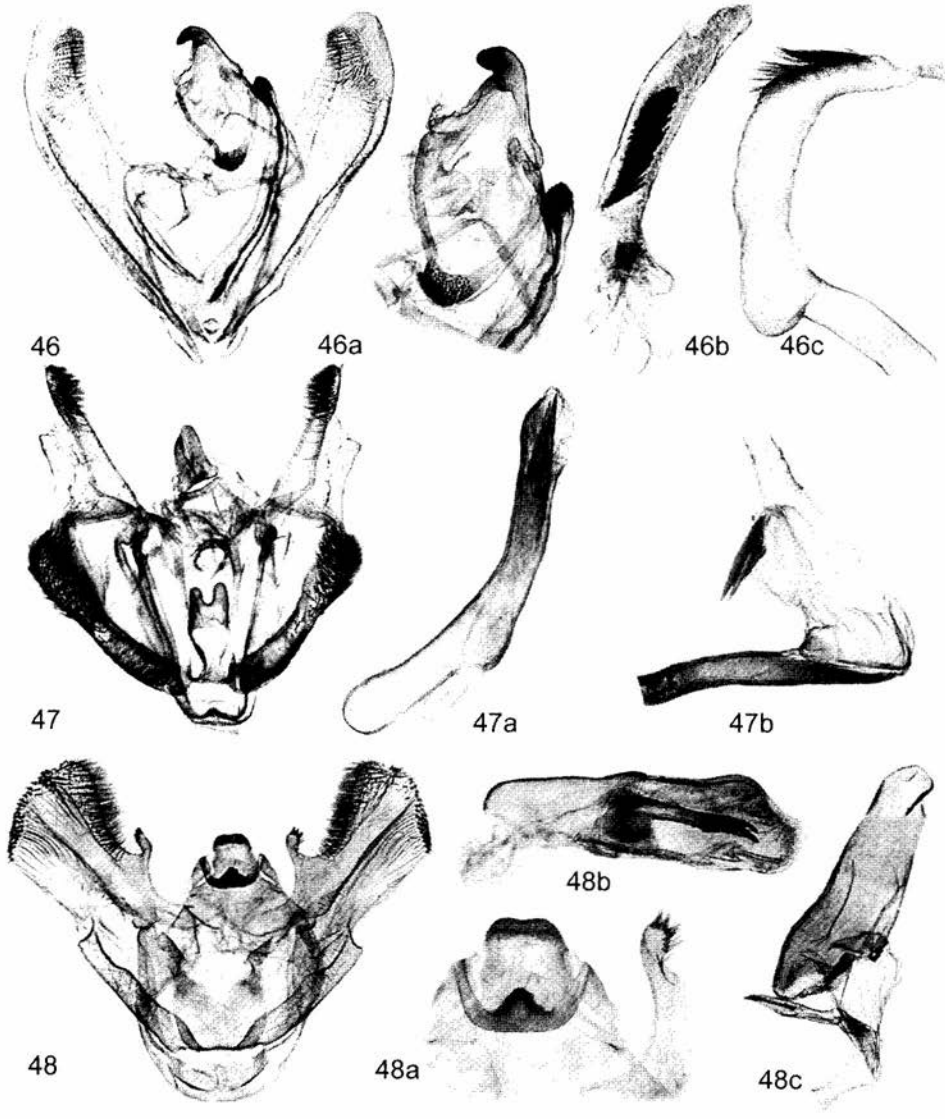

Plate 16. Male genitalia: 46. *Ourapteryx sambucaria*: Poland, Dolny Śląsk; 46a. uncus + gnathos; 46b. aedeagus; 46c. vesica everted; 47. *Colotois pennaria*: Poland, Wielkopolska; 47a. aedeagus; 47b. vesica everted; 48. *Angerona prunaria*: Poland, Wielkopolska; 48a. uncus + gnathos + left process of costa; 48b. aedeagus; 48c. vesica everted: Poland, Podlasie.

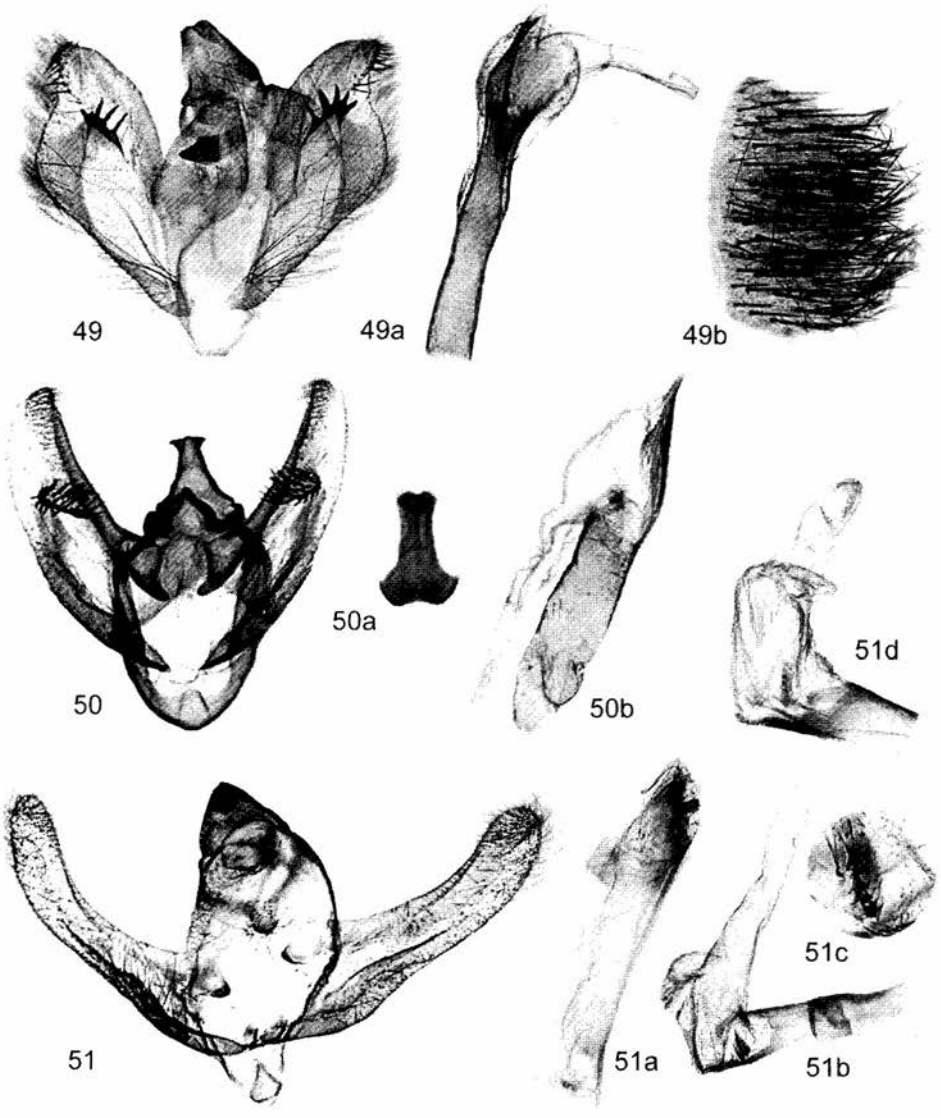

Plate 17. Male genitalia: 49. *Apocheima hispidaria*: Poland, Dolny Śląsk; 49a. vesica everted; 49b. dorsal ctenidia; 50. *Apocheima pilosaria*: Poland, Dolny Śląsk; 50a. juxta; 50b. vesica everted; 51. *Lycia hirtaria* 51a. aedeagus; 51b. vesica everted (lateral view); 51c. cornuti; 51d. vesica everted (other side).

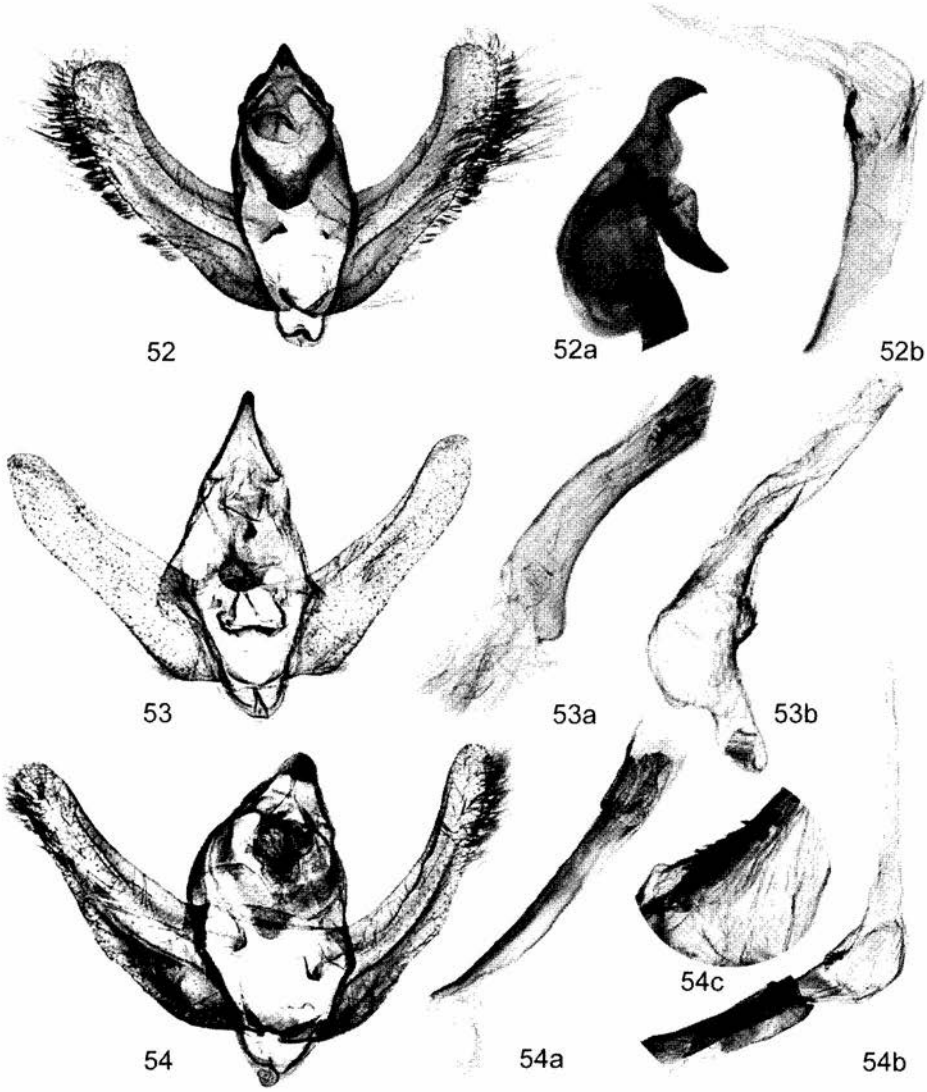

Plate 18. Male genitalia: 52. *Lycia zonaria*: orig. ?; 52a. uncus + gnathos; 52b. vesica everted; 53. *Lycia pomonaria*: Poland, Podlasie; 53a. aedeagus; 53b. vesica everted; 54. *Lycia isabellae*: Poland, Dolny Śląsk; 54a. aedeagus; 53b. vesica everted; 54c. cornuti.

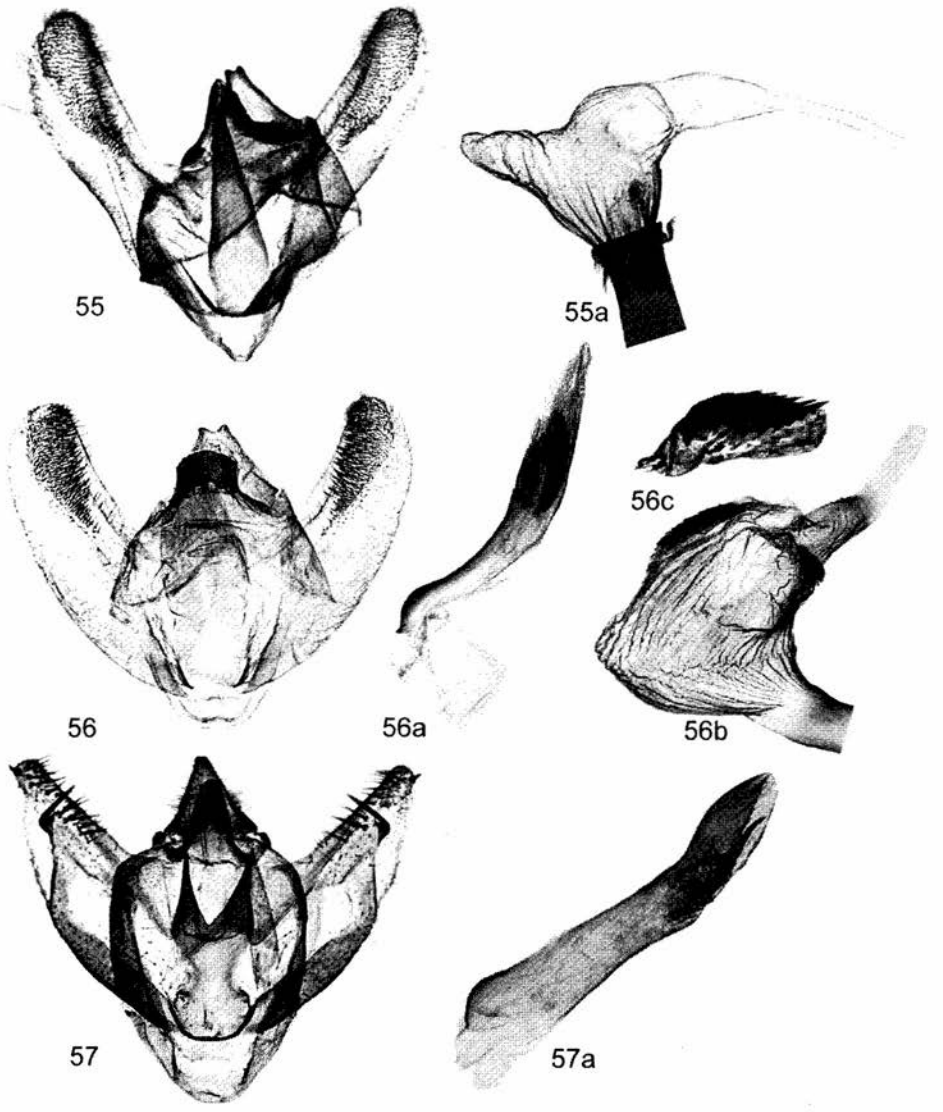

Plate 19. Male genitalia: 55. *Biston strataria*: Poland, Dolny Śląsk; 55a. vesica everted; 56. *Biston betularia*: Poland, Dolny Śląsk; 56a. aedeagus; 56b. vesica everted; 56c. cornuti; 57. *Agriopis leucophaearia*: Poland, Wielkopolska; 57a. aedeagus.

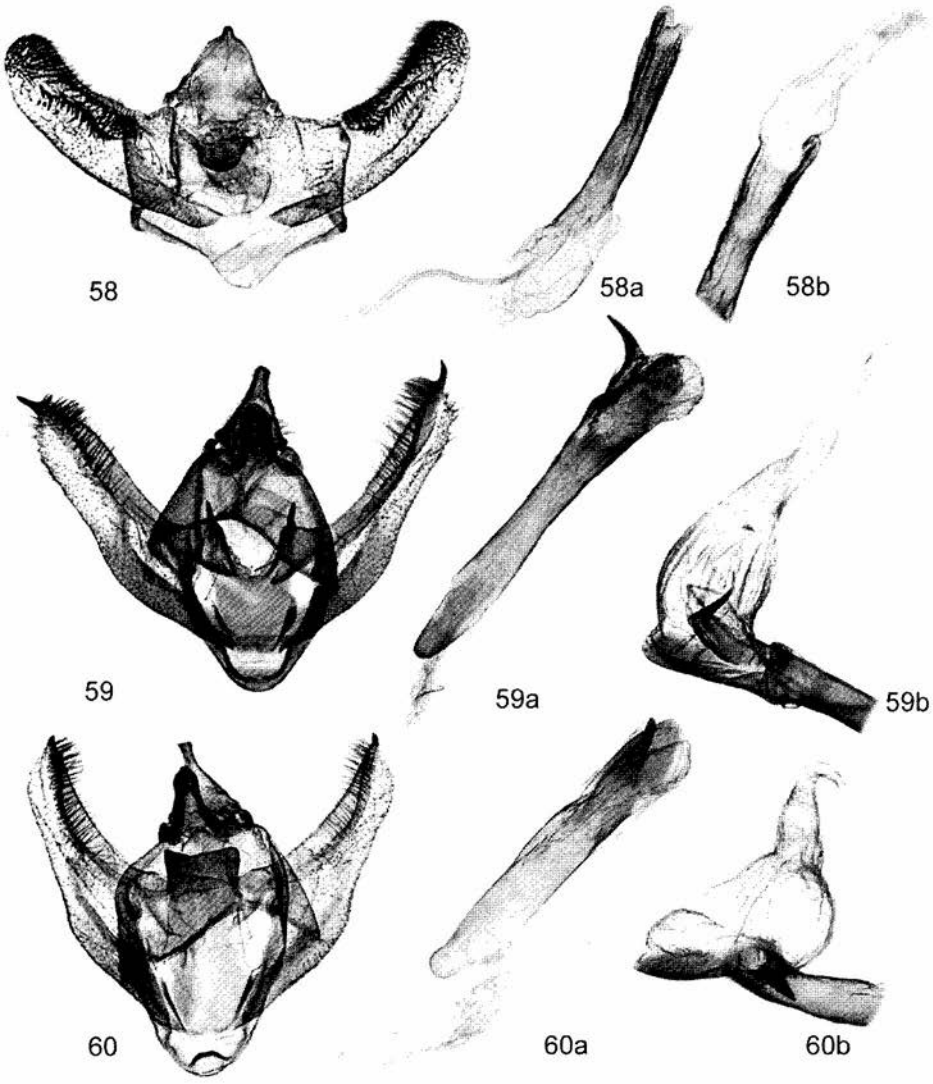

Plate 20. Male genitalia: 58. *Agriopis bajaria*: orig. ?; 58a. aedeagus; 58b. vesica everted; 59. *Agriopis aurantiaria*: Poland, Dolny Śląsk; 59a. aedeagus; 59b. vesica everted; 60. *Agriopis marginaria*: Poland, Mazowsze; 60a. aedeagus; 60b. vesica everted.

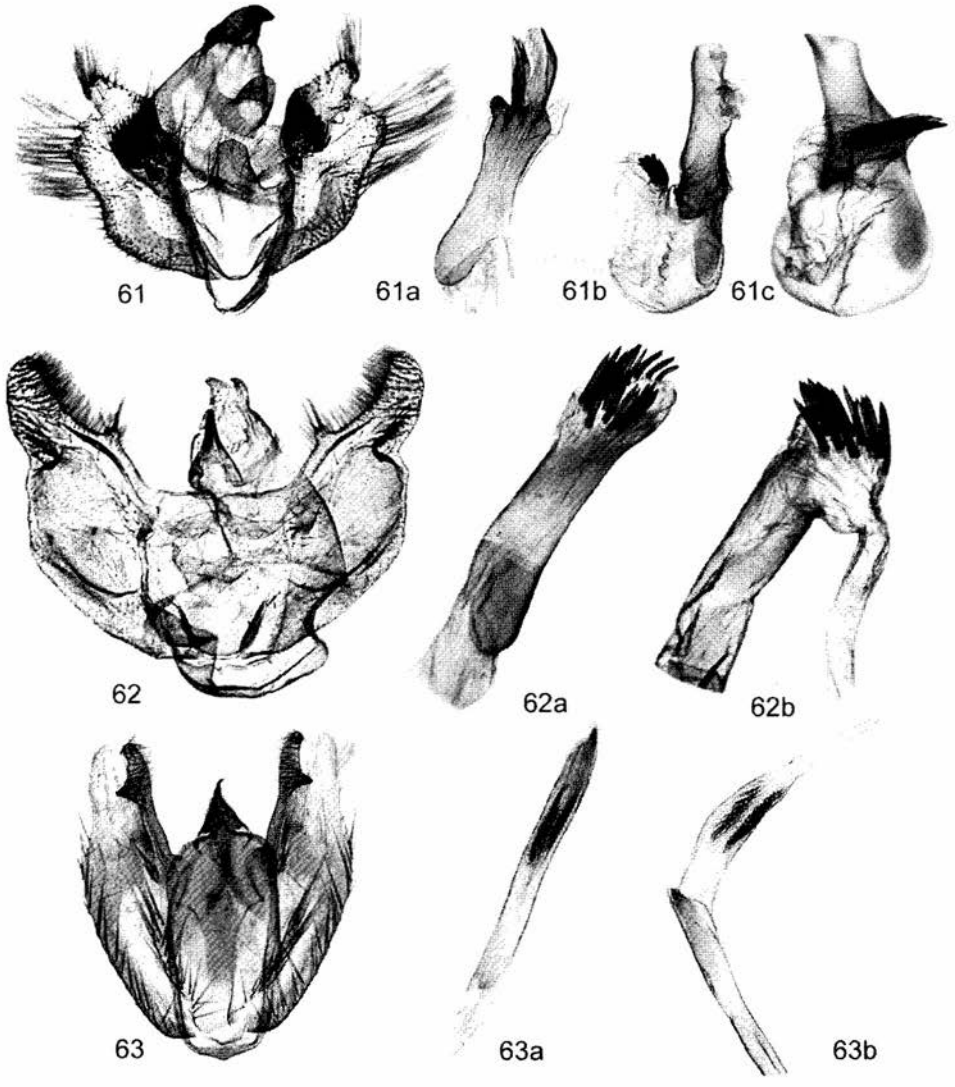

Plate 21. Male genitalia: 61. *Erannis defoliaria*: Poland, Dolny Śląsk; 61a. aedeagus; 61b. vesica everted (lateral view); 61c. vesica everted (other side); 62. *Synopsia sociaria*: Croatia, Dalmatia; 62a. aedeagus; 62b. vesica everted; 63. *Peribatodes rhomboidaria*: Poland, Dolny Śląsk; 63a. aedeagus; 63b. vesica everted.

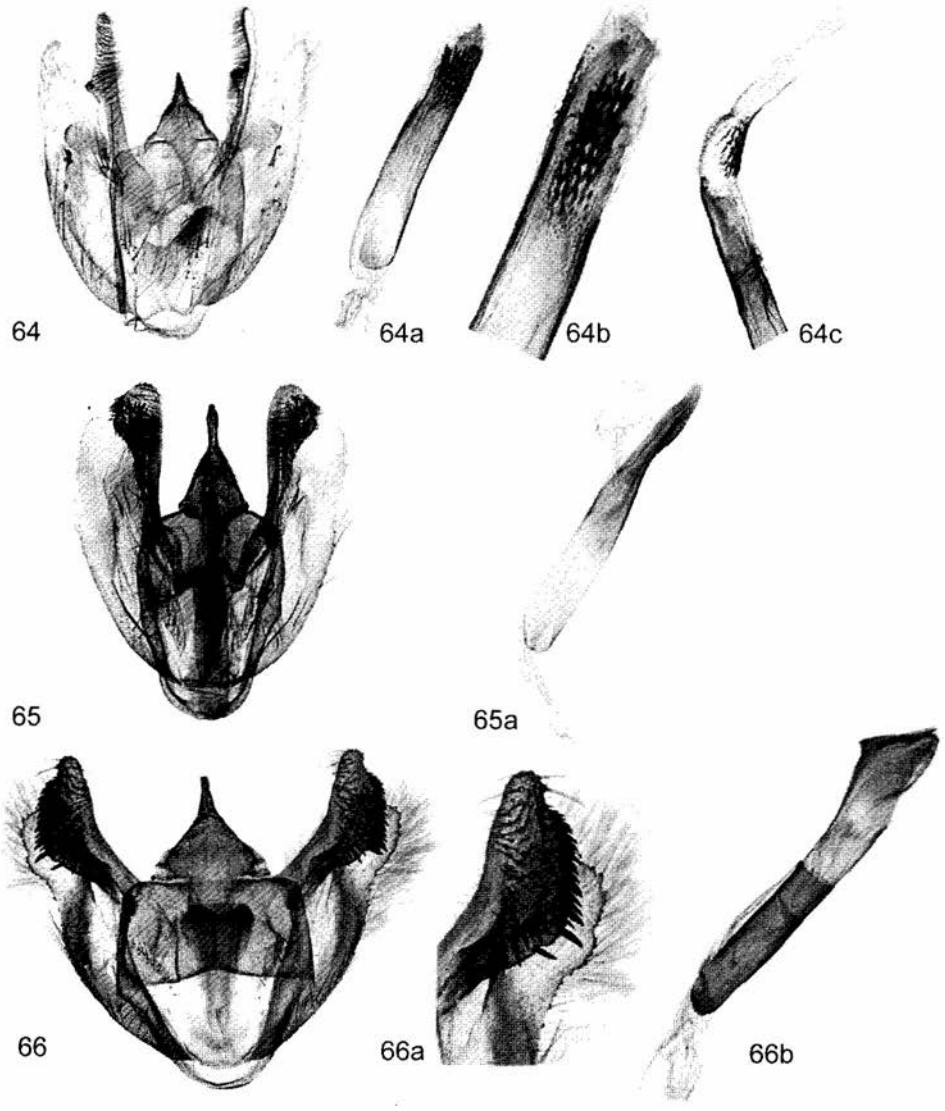

Plate 22. Male genitalia: 64. *Peribatodes secundaria*: Poland, Dolny Śląsk; 64a. aedeagus; 64b. aedeagus – distal part; 64c. vesica everted; 65. *Peribatodes ilicaria*: Morocco; 65a. aedeagus; 66. *Selidosema brunnearia*: Ukraine, near Lviv: 66a. valvula enlarged; 66b. aedeagus: Poland, Dolny Śląsk.

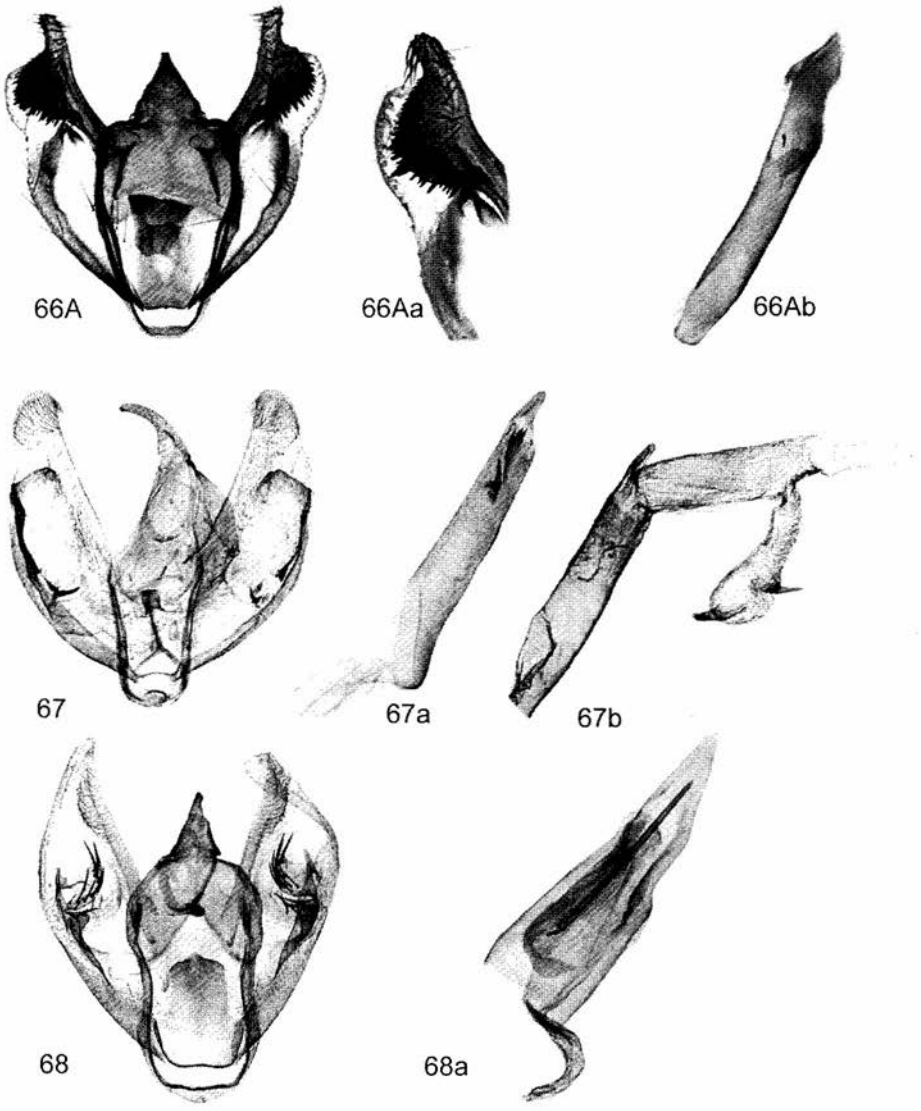

Plate 23. Male genitalia: 66A. *Selidosema plumaria*: Ukraine, Podolia; 66Aa. valvula enlarged; 66Ab. aedeagus; 67. *Cleora cinctaria*: Poland, Dolny Śląsk; 67a. aedeagus; 67b. vesica everted; 68. *Deileptenia ribeata*: Poland, Dolny Śląsk; 68a. aedeagus.

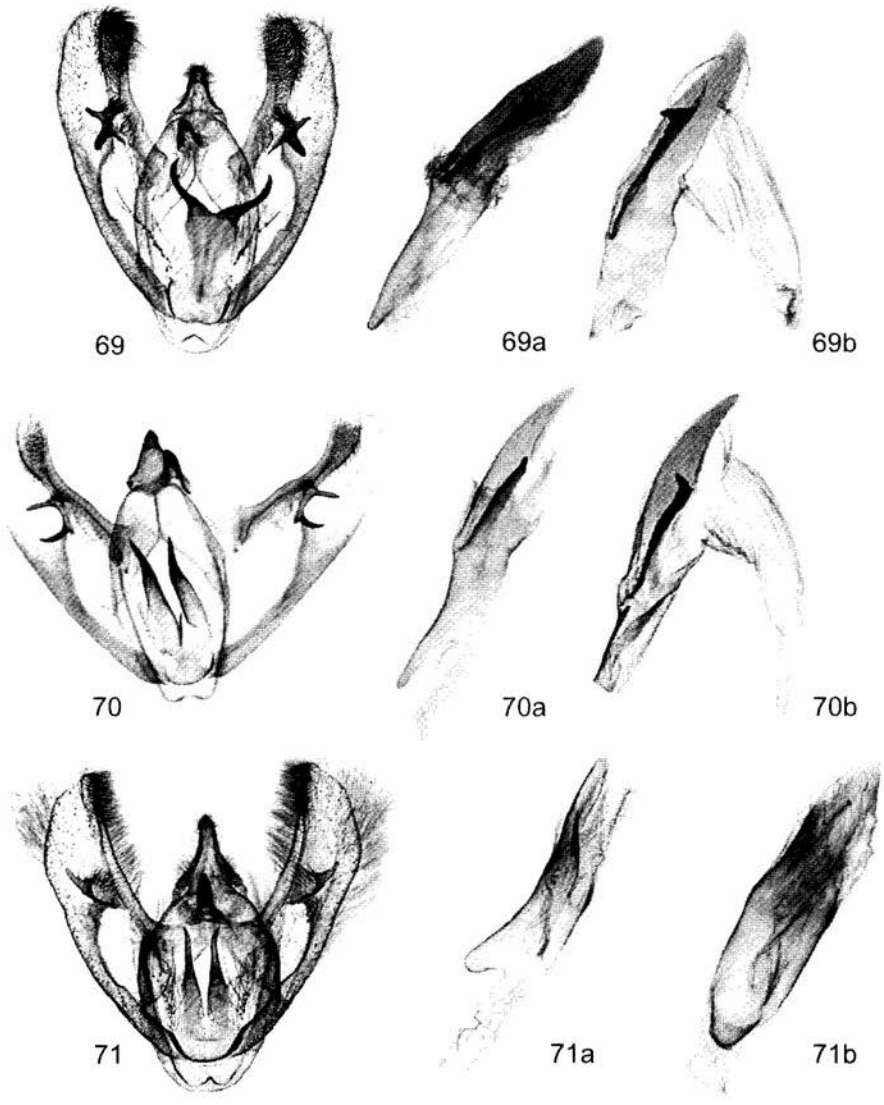

Plate 24. Male genitalia: 69. *Alcis bastelbergeri*: Poland, Tatry; 69a. aedeagus; 69b. vesica everted: Poland, Beskid Zachodni; 70. *Alcis repandata*: Poland, Dolny Śląsk; 70a. aedeagus; 70b. vesica everted: Poland, Zachodniopomorskie; 71. *Alcis jubata*: Poland, Podlasie; 71a. aedeagus; 71b. aedeagus (dorsal view).

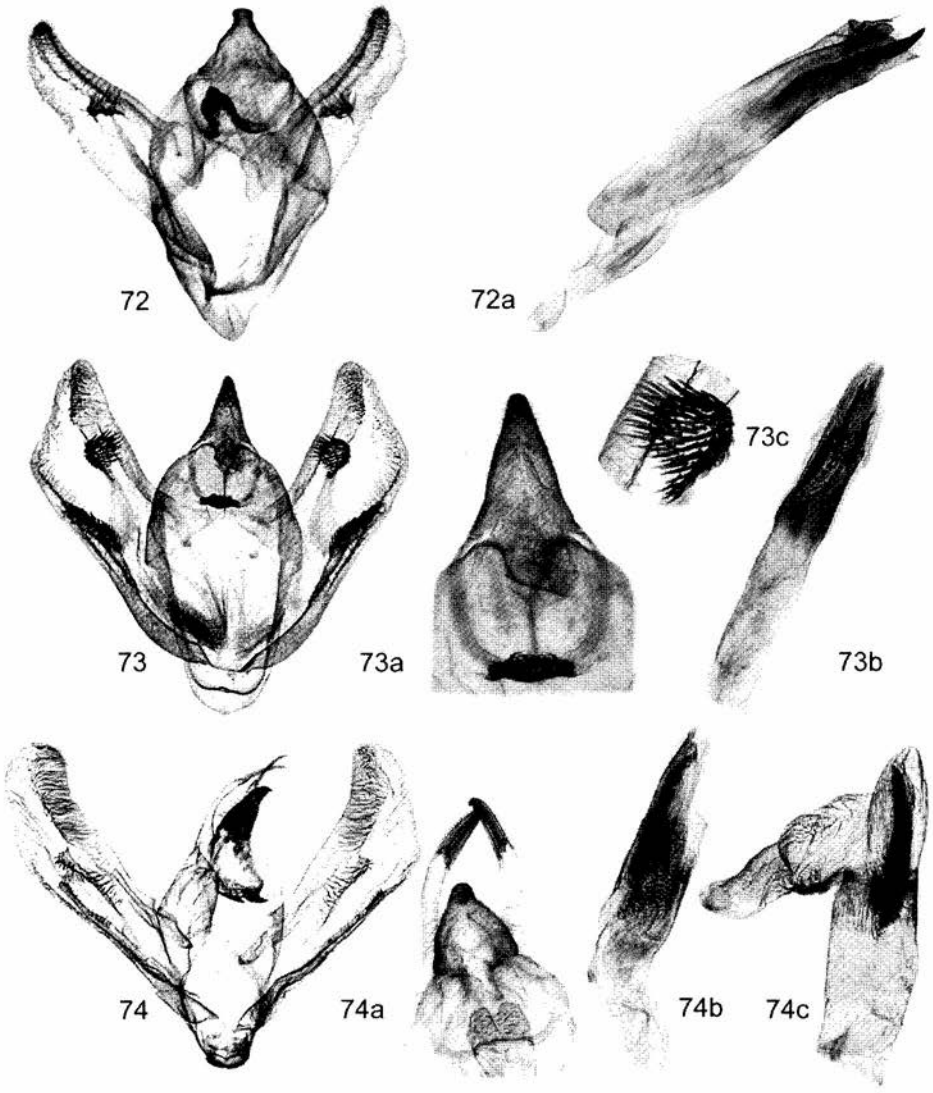

Plate 25. Male genitalia: 72. *Arichanna melanaria*: Poland, Podhale; 72a. aedeagus; 73. *Hypomecis roboraria*: Poland, Dolny Śląsk; 73a. uncus + gnathos; 73b. aedeagus; 73c. harpe; 74. *Hypomecis punctinalis*: Poland, Podkarpacie; 74a. uncus + gnathos: Poland, Dolny Śląsk; 74b. aedeagus: Poland, Podkarpacie; 74c.vesica everted: Poland, Dolny Śląsk.

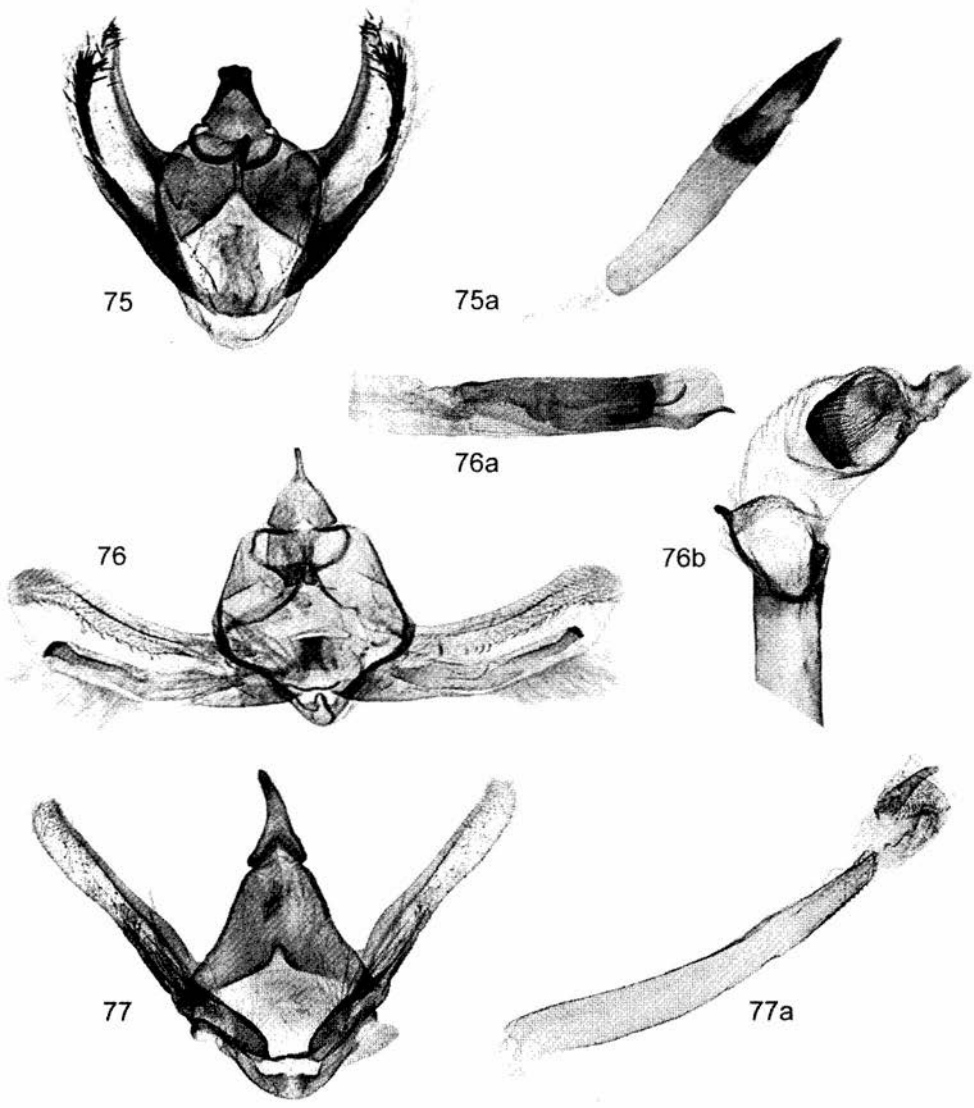

Plate 26. Male genitalia: 75. *Fagivorina arenaria*: Greece, near Joanina; 75a. aedeagus; 76. *Ascotis selenaria*: Croatia, Rakovica; 76a. aedeagus; 76b. vesica everted; 77. *Ectropis crepuscularia*: Poland, Dolny Śląsk; 77a. aedeagus + vesica semi-everted.

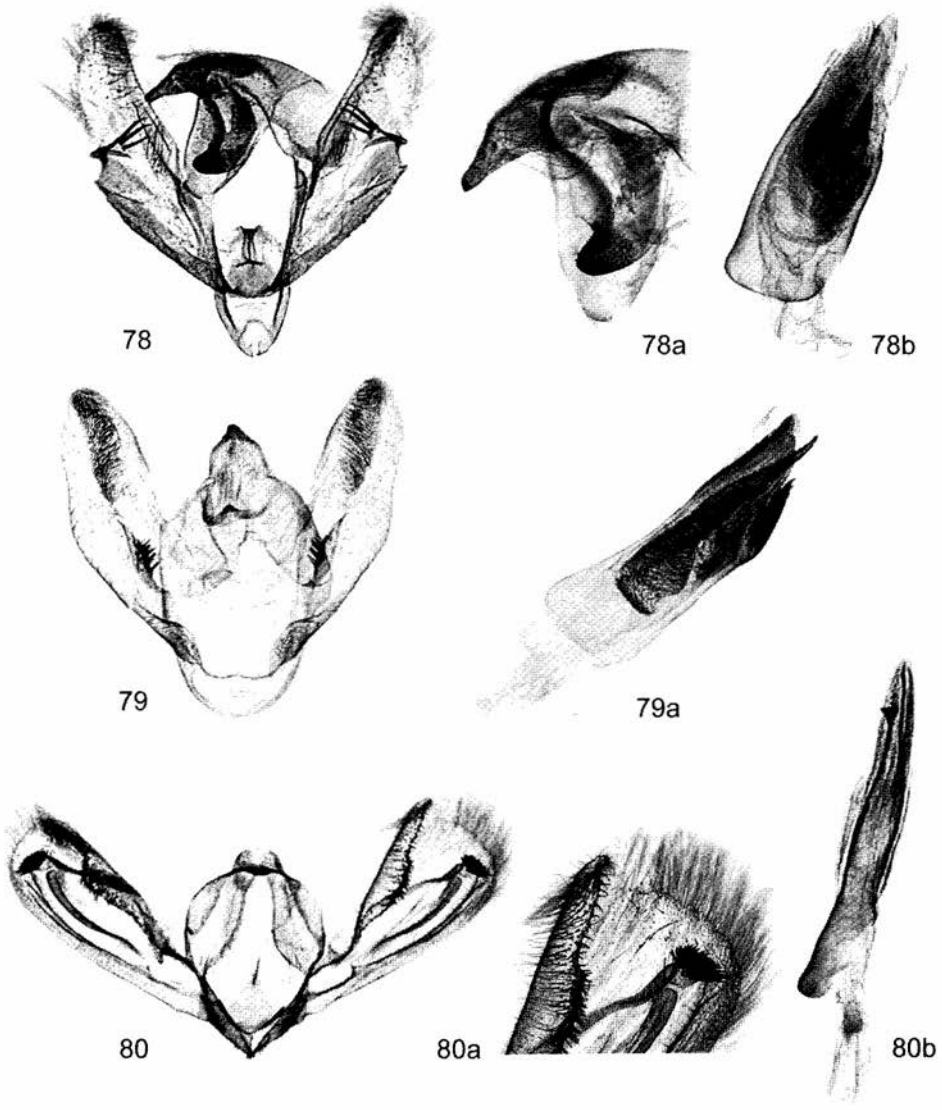

Plate 27. Male genitalia: 78. *Paradarisa consonaria*: Poland, Opolskie; 78a. uncus + ganthos; 78b. aedeagus; 79. *Parectropis similaria*: Poland, Dolny Śląsk; 79a. aedeagus; 80. *Aethalura punctulata*: Poland, Dolny Śląsk; 80a. tip of valva; 80b. aedeagus.

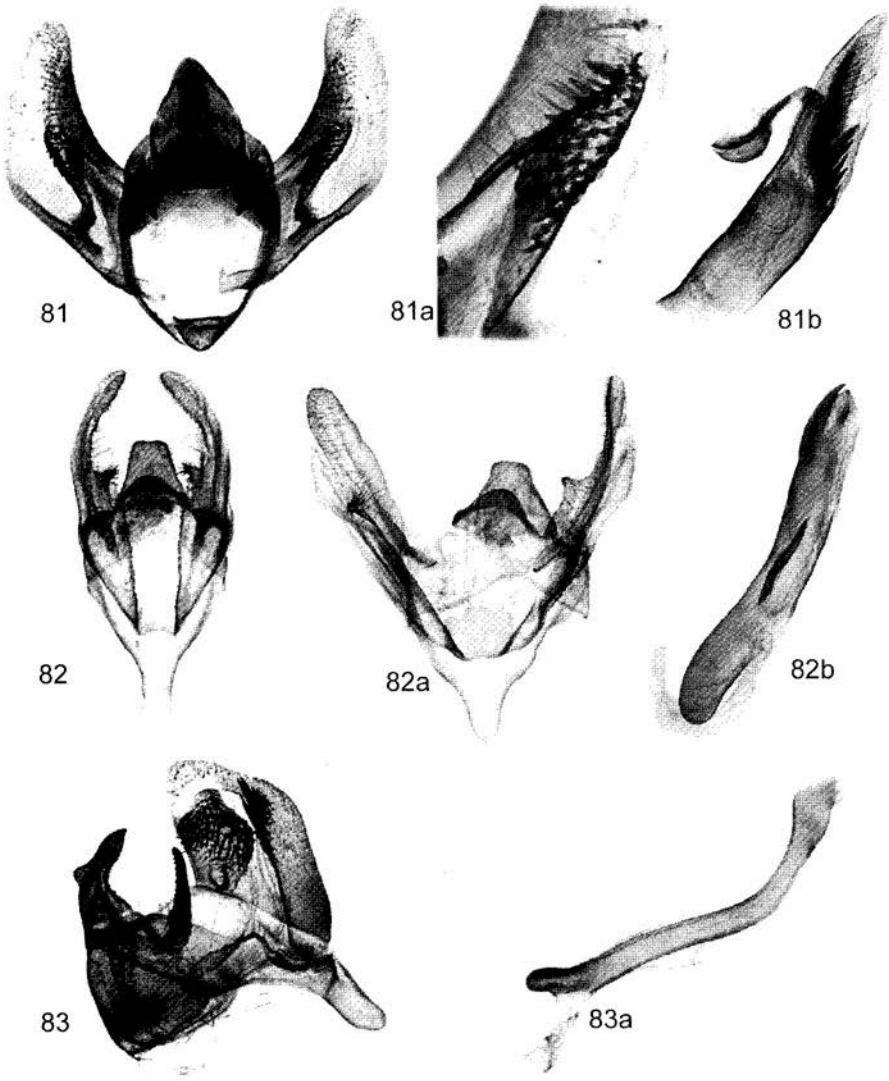

Plate 28. Male genitalia: 81. *Ematurga atomaria*: Poland, Dolny Śląsk; 81a. harpe; 81b. aedeagus; 82. *Tephronia sepiaria*: valvae closed: Hungary, Puszta; 82a. valvae semi-opened: Poland, Pomorze; 82b. aedeagus: Poland, Pomorze; 83. *Bupalus piniaria*: Poland, Dolny Śląsk; 83a. aedeagus.

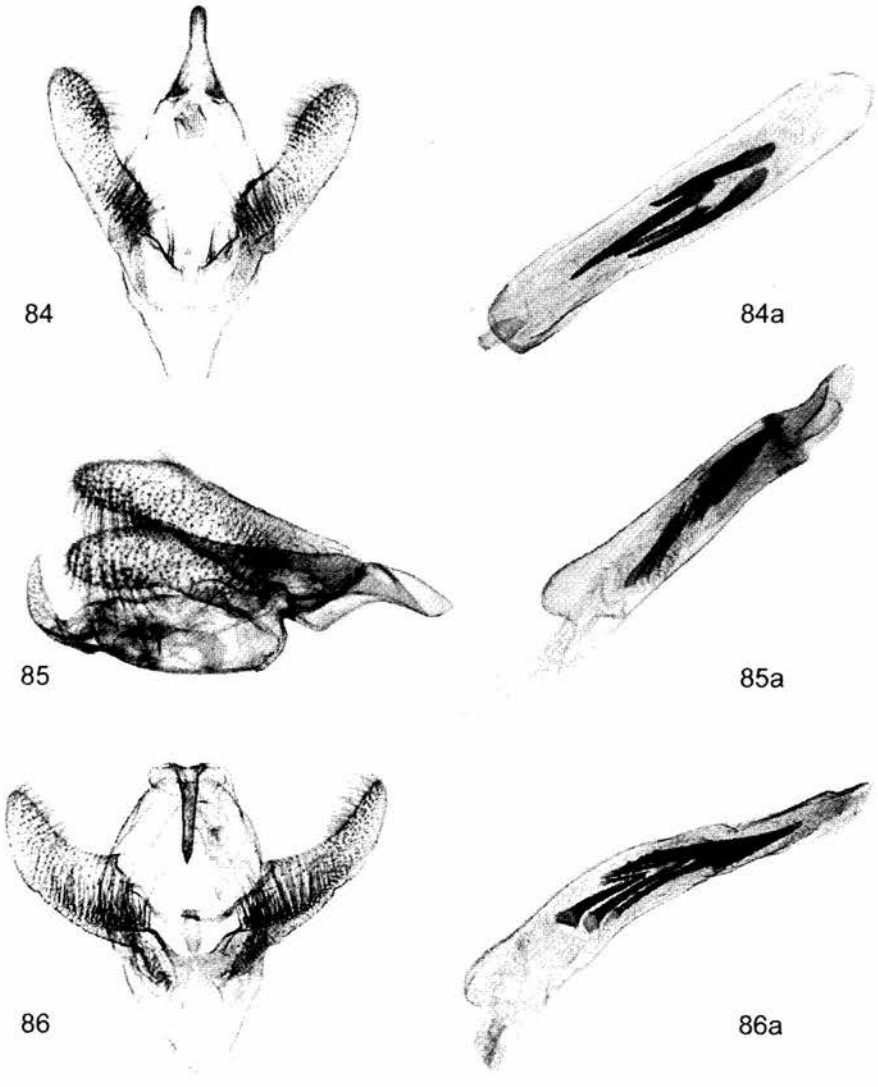

Plate 29. Male genitalia: 84. *Cabera pusaria*: Poland, Dolny Śląsk; 84a. aedeagus; 85. *Cabera leptographa*: Poland, Polesie; 85a. aedeagus; 86. *Cabera exanthemata*: Poland, Dolny Śląsk; 86a. aedeagus.

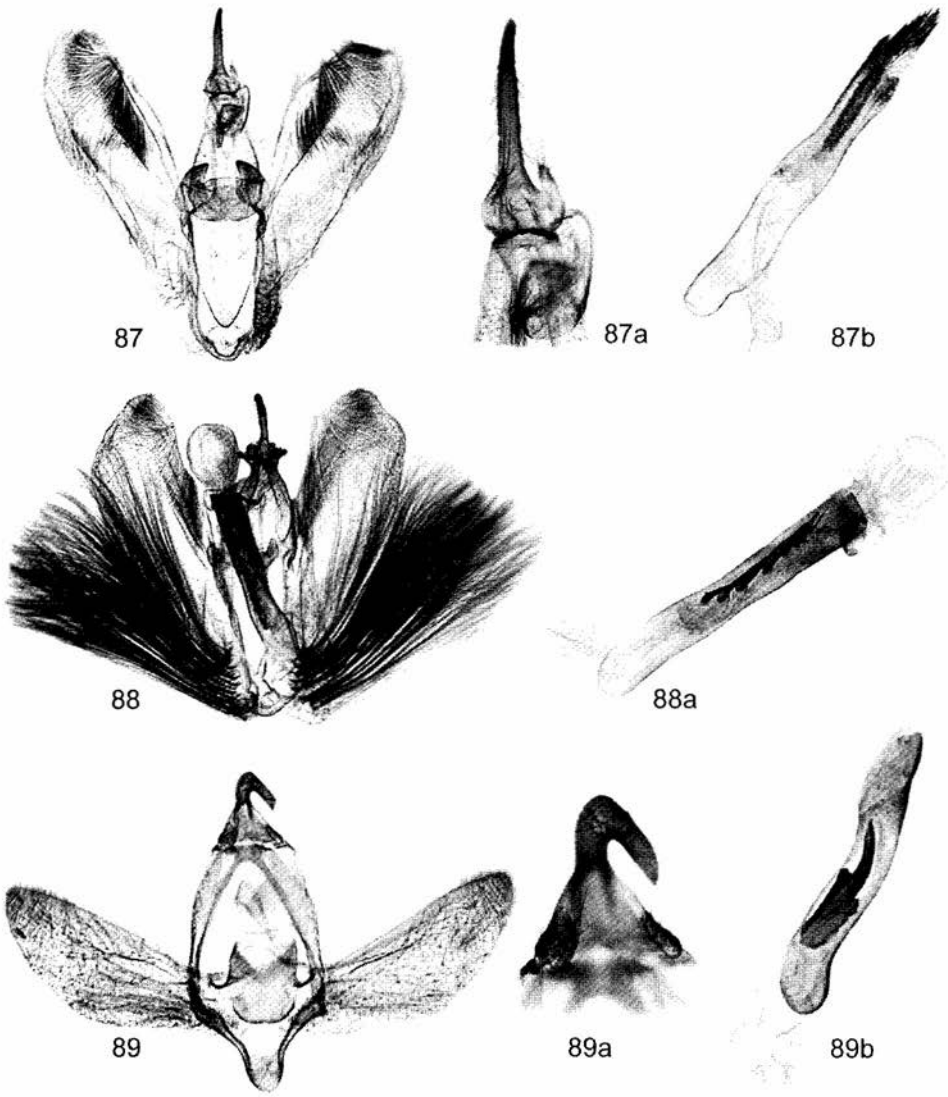

Plate 30. Male genitalia: 87. *Lomographa bimaculata*: Poland, Dolny Śląsk; 87a. uncus + gnathos; 87b. aedeagus; 88. *Lomographa temerata*: Poland, Dolny Śląsk; 88a. aedeagus; 89. *Aleucis distinctata*: Poland, Ziemia Lubuska; 89a. uncus + socii; 89b. aedeagus.

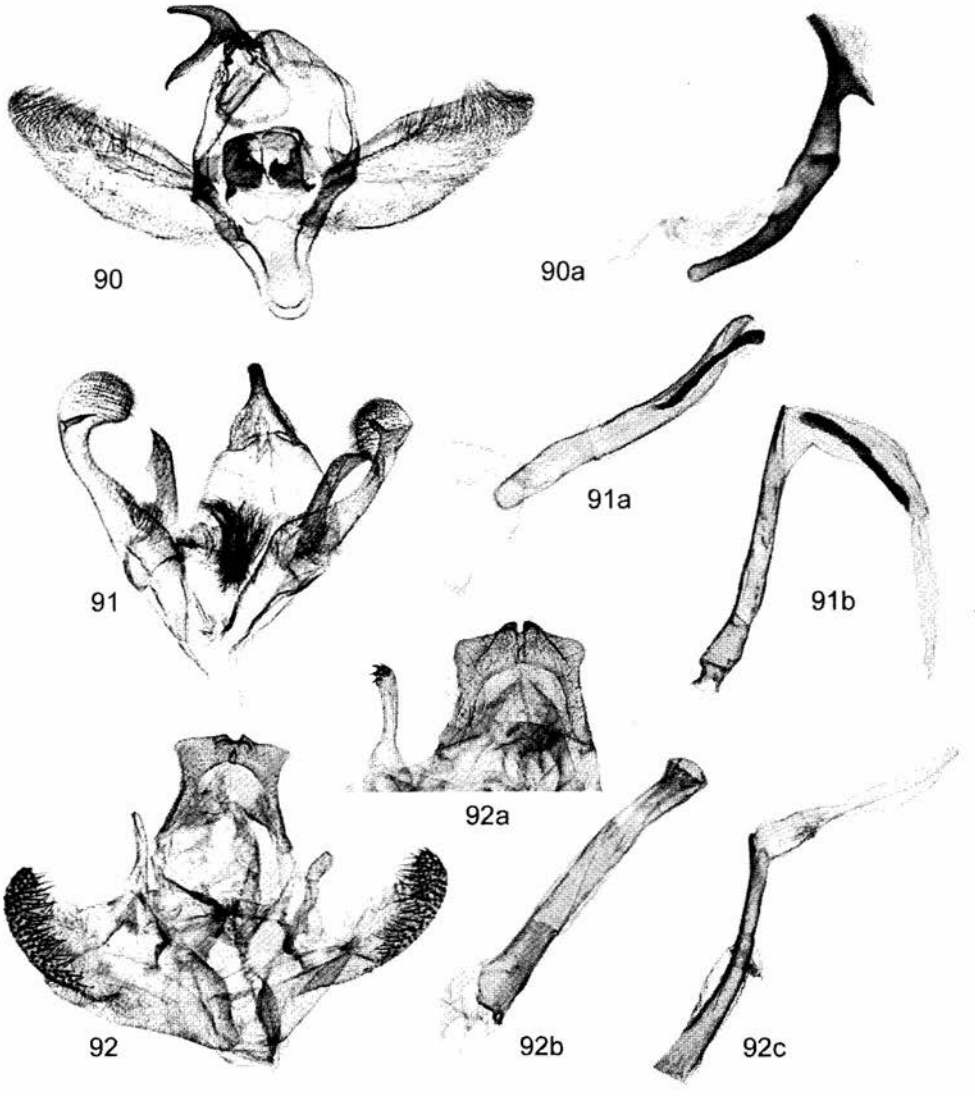

Plate 31. Male genitalia: 90. *Theria rupicapraria*: Poland, Dolny Śląsk; 90a. aedeagus; 91. *Campaea margaritata*: Poland, Dolny Śląsk; 91a. aedeagus; 91b. vesica everted; 92. *Campaea honoraria*: orig.?; 92a. uncus + left process of costa; 93b. aedeagus; 93c. vesica everted.

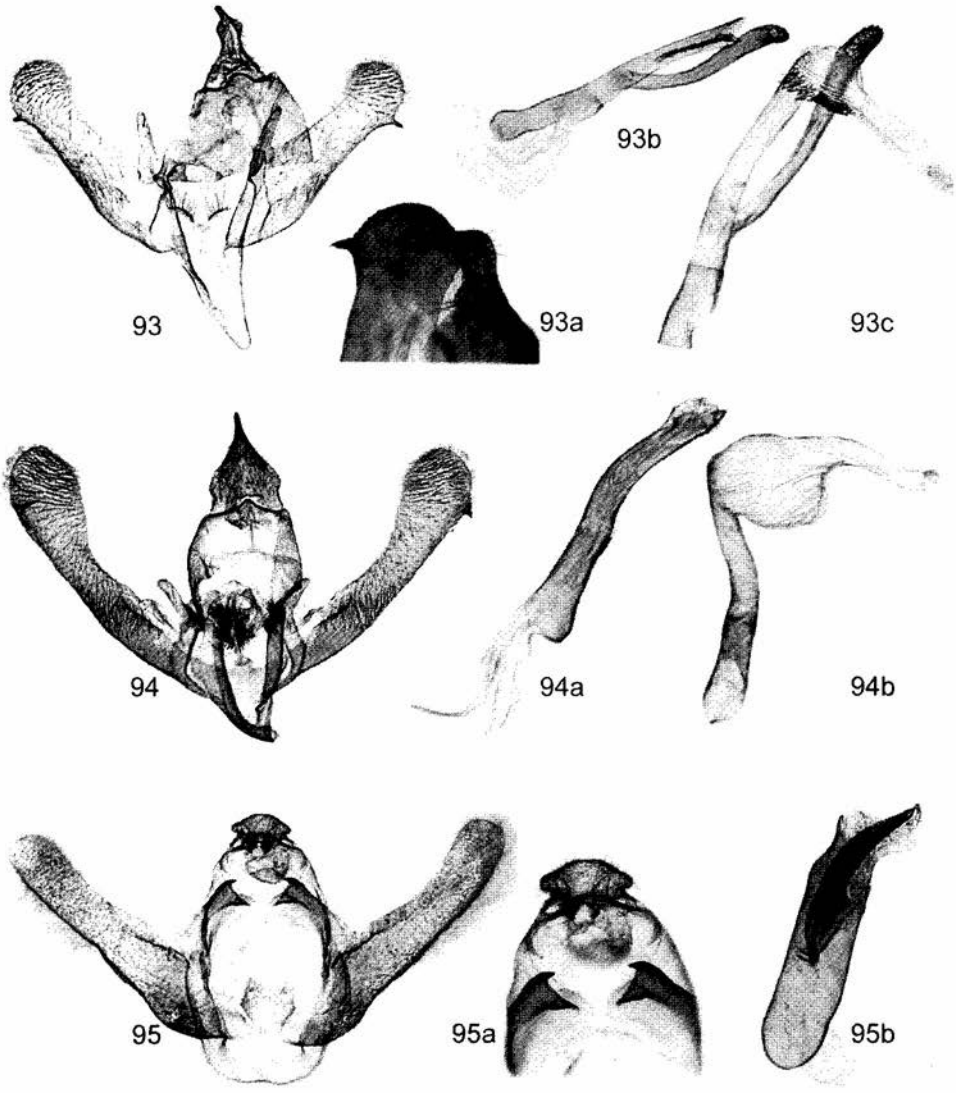

Plate 32. Male genitalia: 93. *Hylaea fasciaria*: Poland, Dolny Śląsk; 93a. uncus + tip of valva; 92b. aedeagus; 92c. vesica everted; 94. *Pungeleria capreolaria*: Poland, Beskid Zachodni; 94a. aedeagus; 94b. vesica everted; 95. *Cleorodes lichenaria*: Poland, Podlasie; 95a. uncus; 95b. aedeagus.

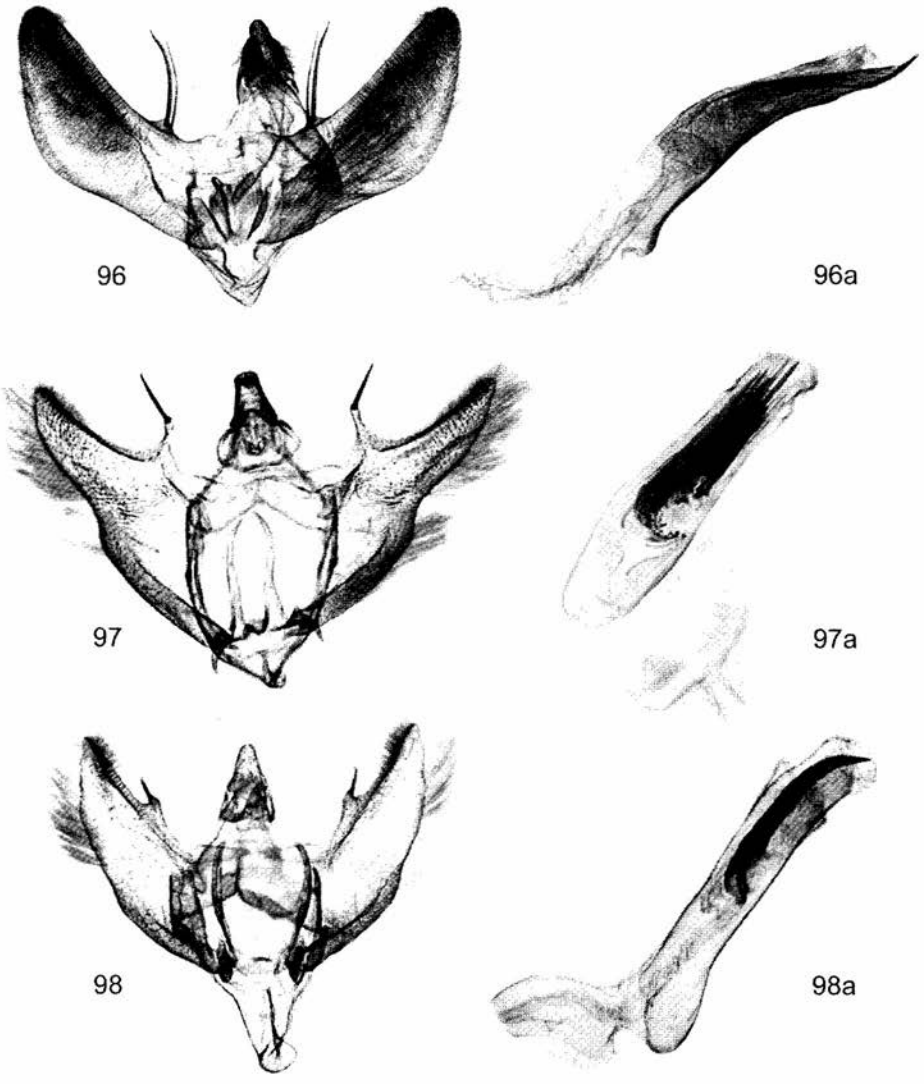

Plate 33. Male genitalia: 96. *Gnophos furvata*: Germany, Rheinland-Pfalz; 96a. aedeagus; 97. *Charissa obscurata*: Poland, Górny Śląsk; 97a. aedeagus; 98. *Charissa ambiguata*: Poland, Podlasie; 98a. aedeagus.

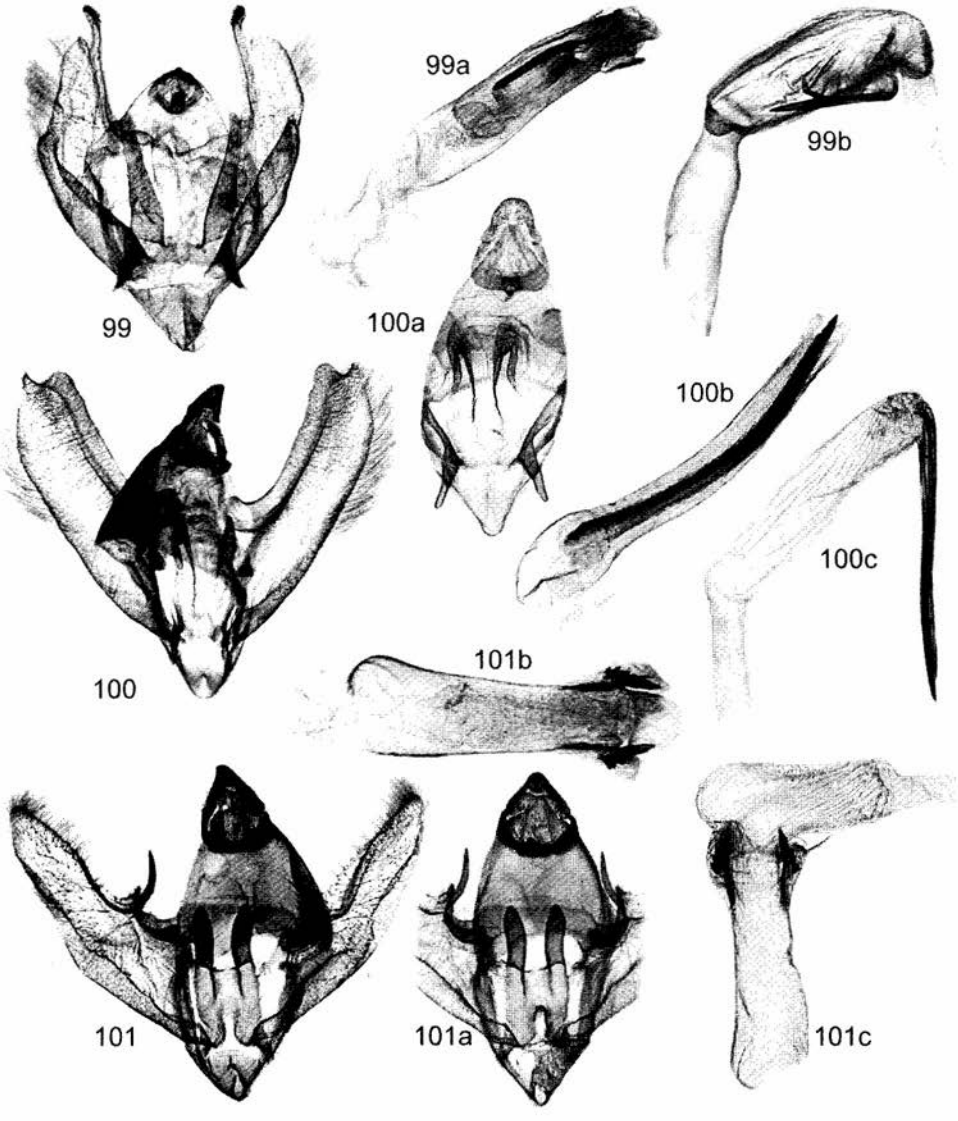

Plate 34. Male genitalia: 99. *Charissa pullata*: Poland, Małopolska; 99a. aedeagus; 99b. vesica everted; 100. *Charissa glaucinaria*: Austria, Eastern Tirol; 100a. uncus + gnathos + juxta: Italy; 100b. aedeagus: Italy; 100c. vesica everted: Italy; 101. *Charissa intermedia*: Poland, Małopolska;101a. uncus + gnathos + juxta; 101b. aedeagus; 101c. vesica everted.

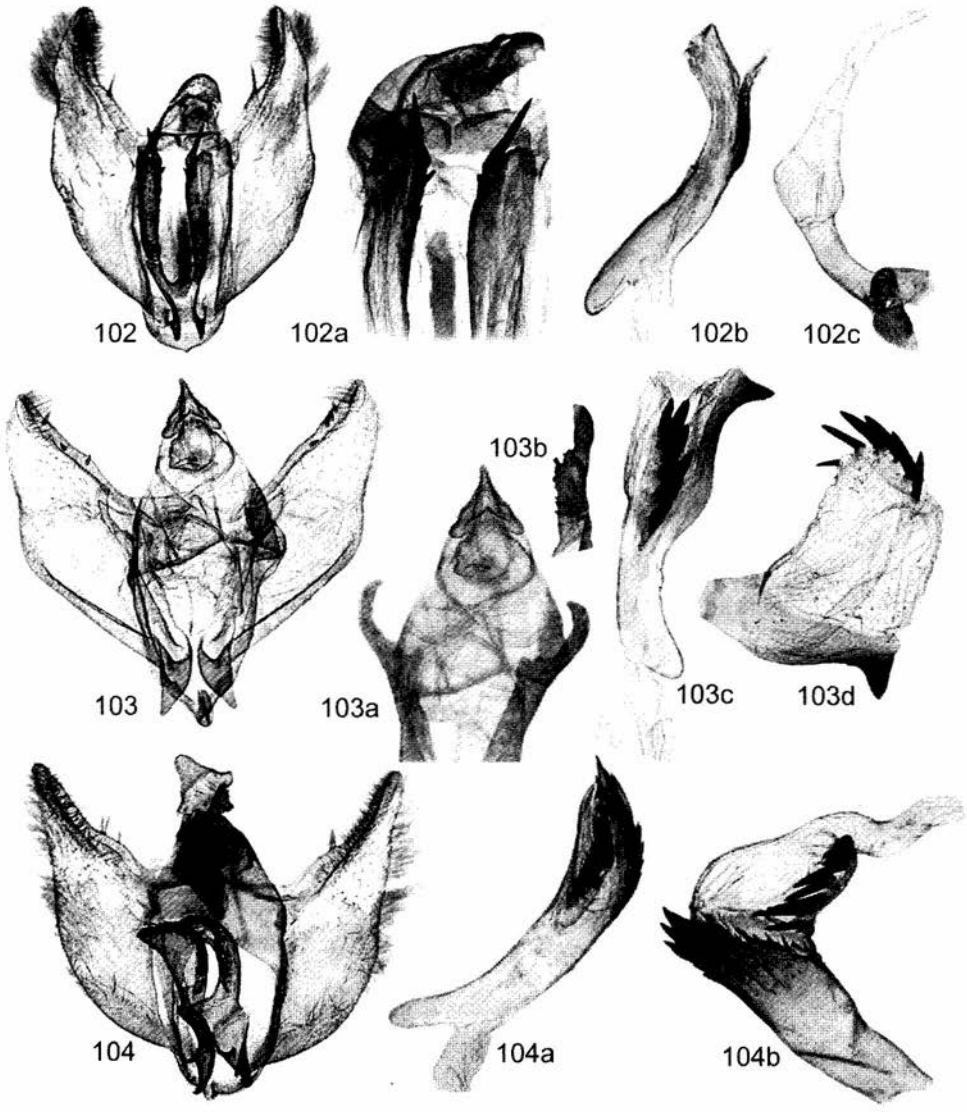

Plate 35. Male genitalia: 102. *Elophos dilucidaria*: Poland, Sudety; 102a. uncus + furca; 102b. aedeagus; 102c. vesica everted; 103. *Elophos vittaria*: Poland, Sudety; 103a. uncus + furca: Poland, Sudety; 103b. furca: Poland, Tatry; 103c. aedeagus; 103d. vesica everted; 104. *Elophos operaria*: Poland, Tatry; 104a. aedeagus; 104b. vesica everted.

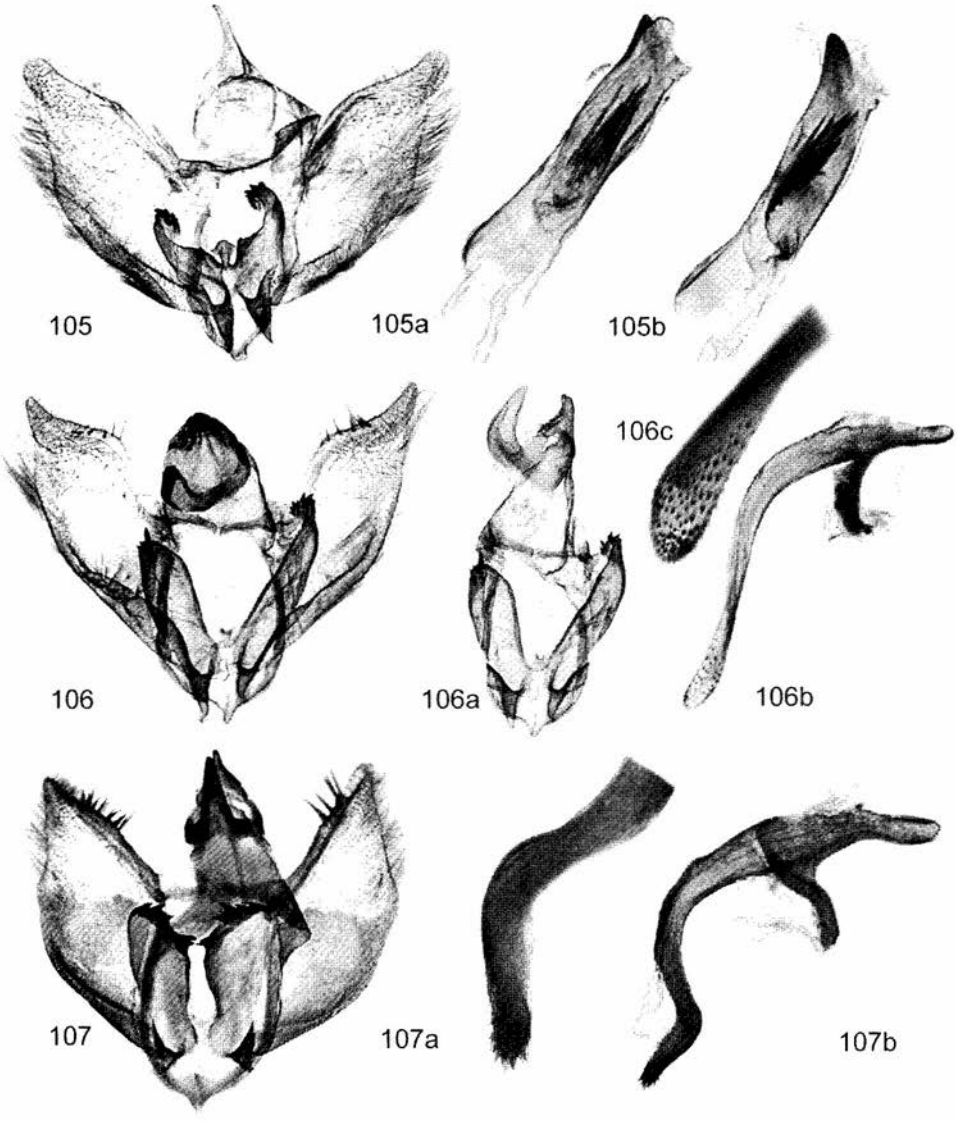

Plate 36. Male genitalia: 105. *Psodos quadrifaria*: Poland, Tatry; 105a. aedeagus; 105b. aedeagus (lateral view); 106. *Glacies canaliculata schwingenschussi*: Poland, Tatry; 106a. uncus + gnathos + juxta; 106b. aedeagus; 106c aedeagus – proximal tip; 107. *Glacies noricana*: Poland, Tatry; 107a. aedeagus – proximal tip; 107b. aedeagus.

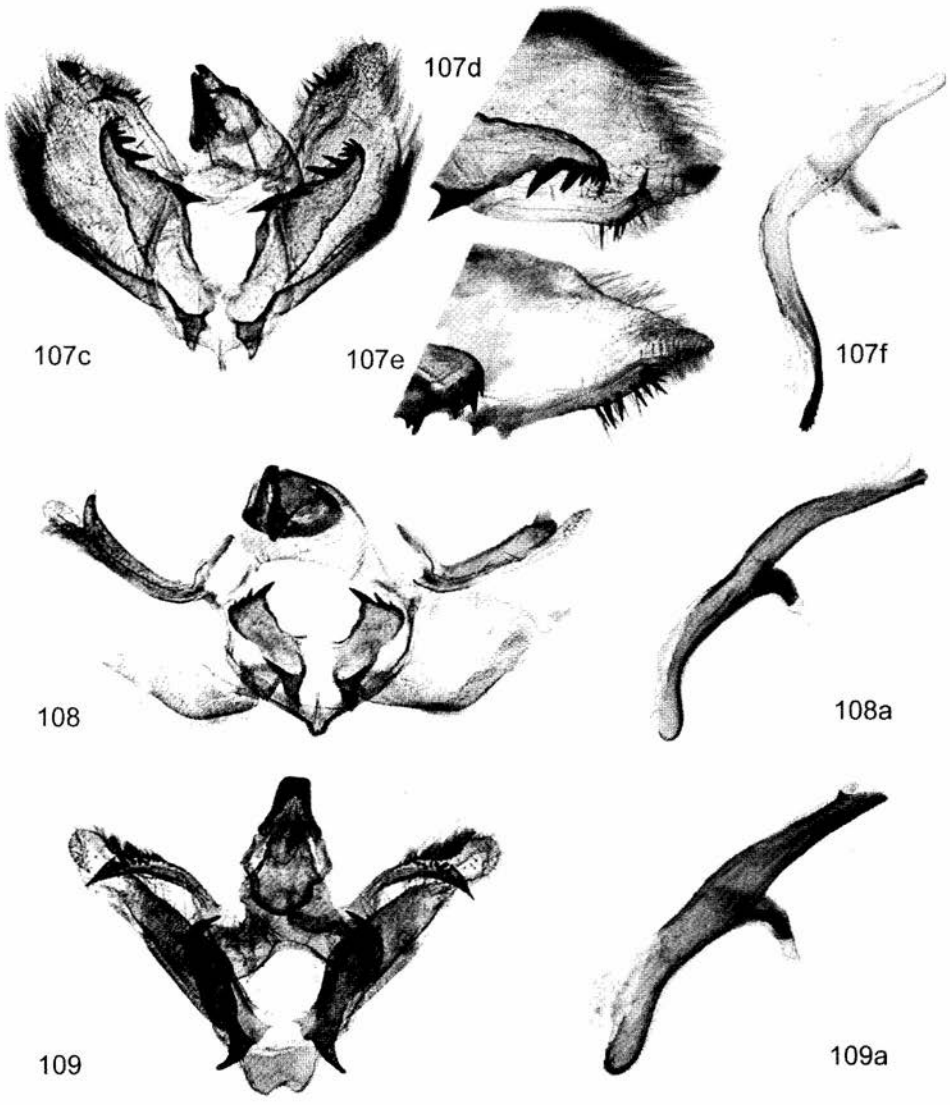

Plate 37. Male genitalia: 107c. *Glacies noricana*: Austria, Styria; 107d. tip of left valva + juxta: Austria, Styria; 107e. tip of left valva + juxta: Poland, Tatra; 107f. aedeagus: Austria, Styria; 108. *Glacies coracina*: Poland, Tatry; 108a. aedeagus; 109. *Glacies alpinata*; Switzerland, Oberengadin; 109a. aedeagus.

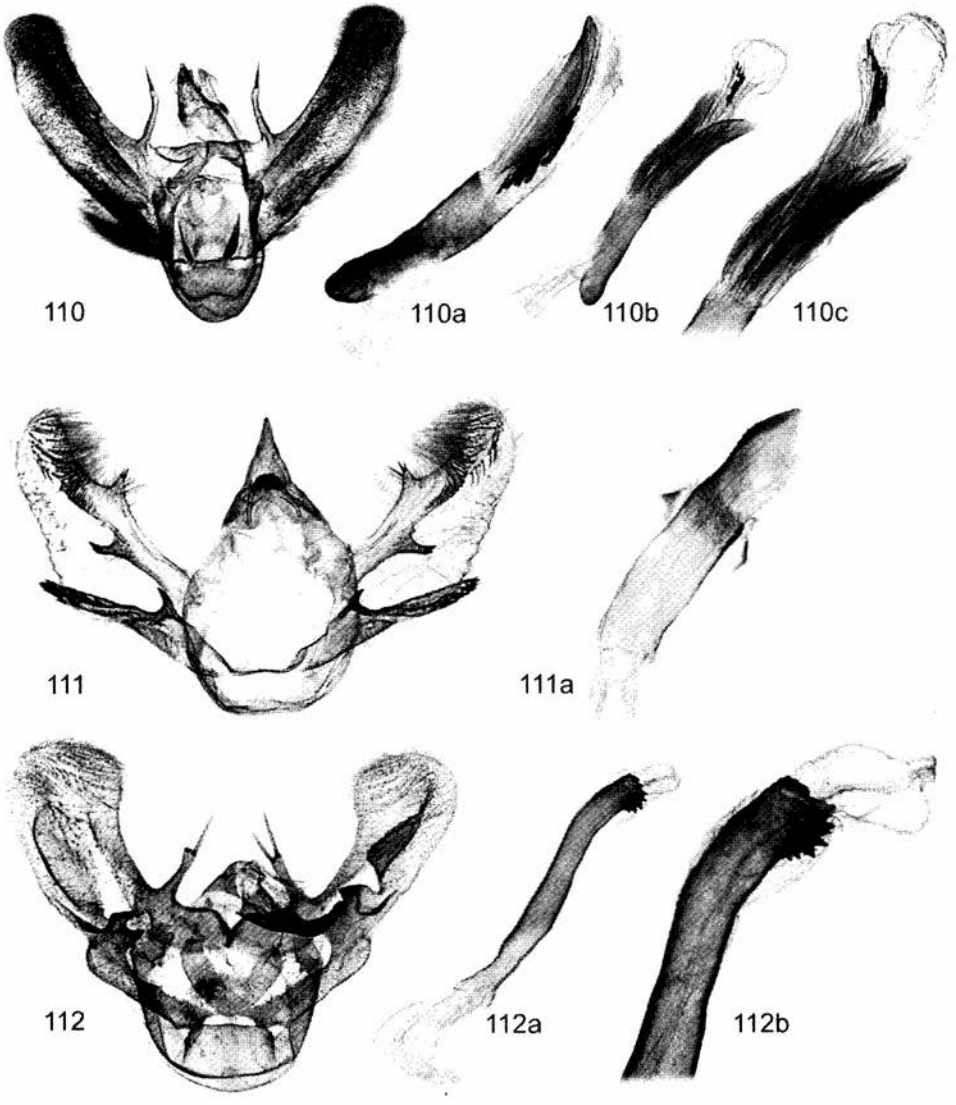

Plate 38. Male genitalia: 110. *Siona lineata*: Poland, Dolny Śląsk; 110a. aedeagus; 110b. vesica semi-everted; 110c. vesica semi-everted; 111. *Chariaspilates formosaria*: Poland, Polesie Lubelskie; 111a. aedeagus; 112. *Aspitates gilvaria*: Germany, Thuringia; 112a. aedeagus; 112b. aedeagus – distal part.

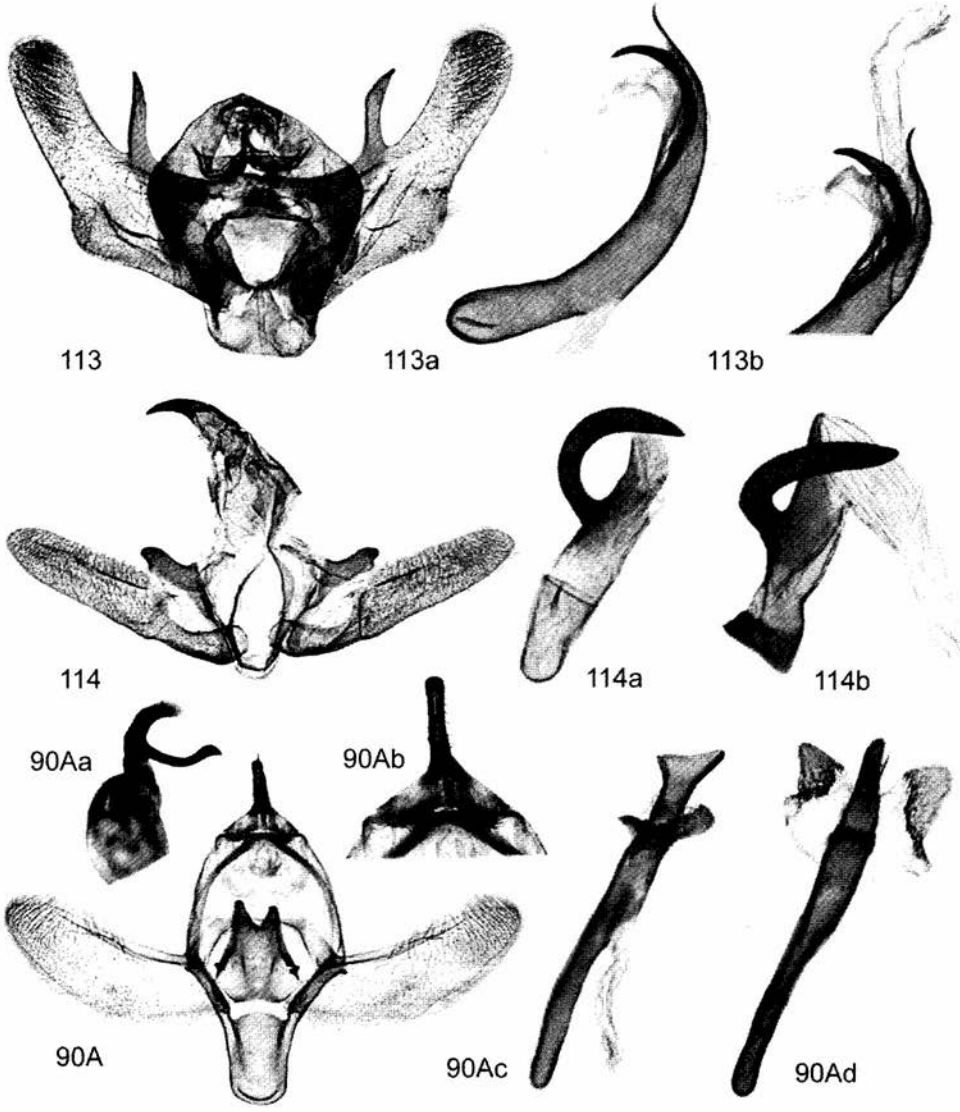

Plate 39. Male genitalia: 113. *Dyscia fagaria*: Poland, Dolny Śląsk; 113a. aedeagus; 113b. vesica everted; 114. *Perconia strigillaria*: Poland, Górny Śląsk; 114a. aedeagus; 114b. vesica everted; 90A. *Theria primaria*: Poland, Dolny Śląsk (?); 90Aa. uncus (lateral view); 90Ab. uncus; 90Ac aedeagus; 90Ad. aedeagus + manica.

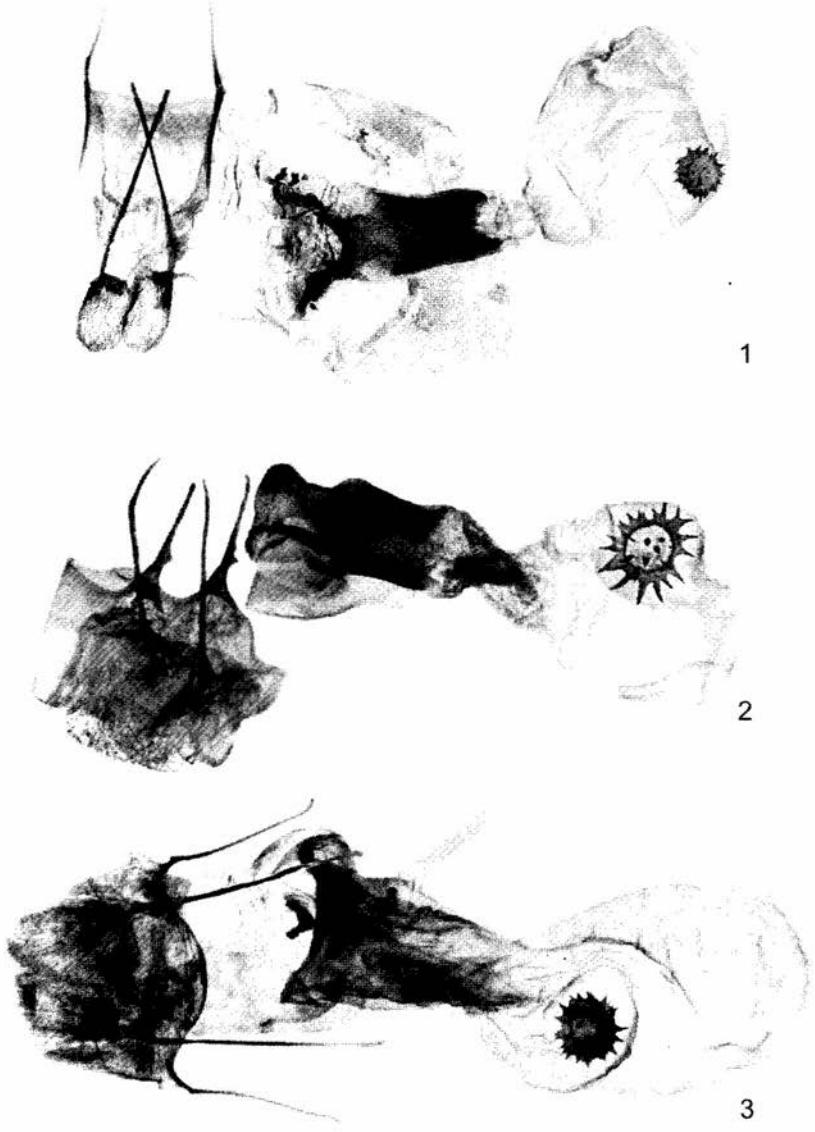

Plate 40. Female genitalia: 1. *Abraxas grossulariata*: Poland, Podkarpacie; 2. *Calospilos sylvata*: Poland, Podkarpacie; 3. *Ligdia adustata*: Poland, Mazury.

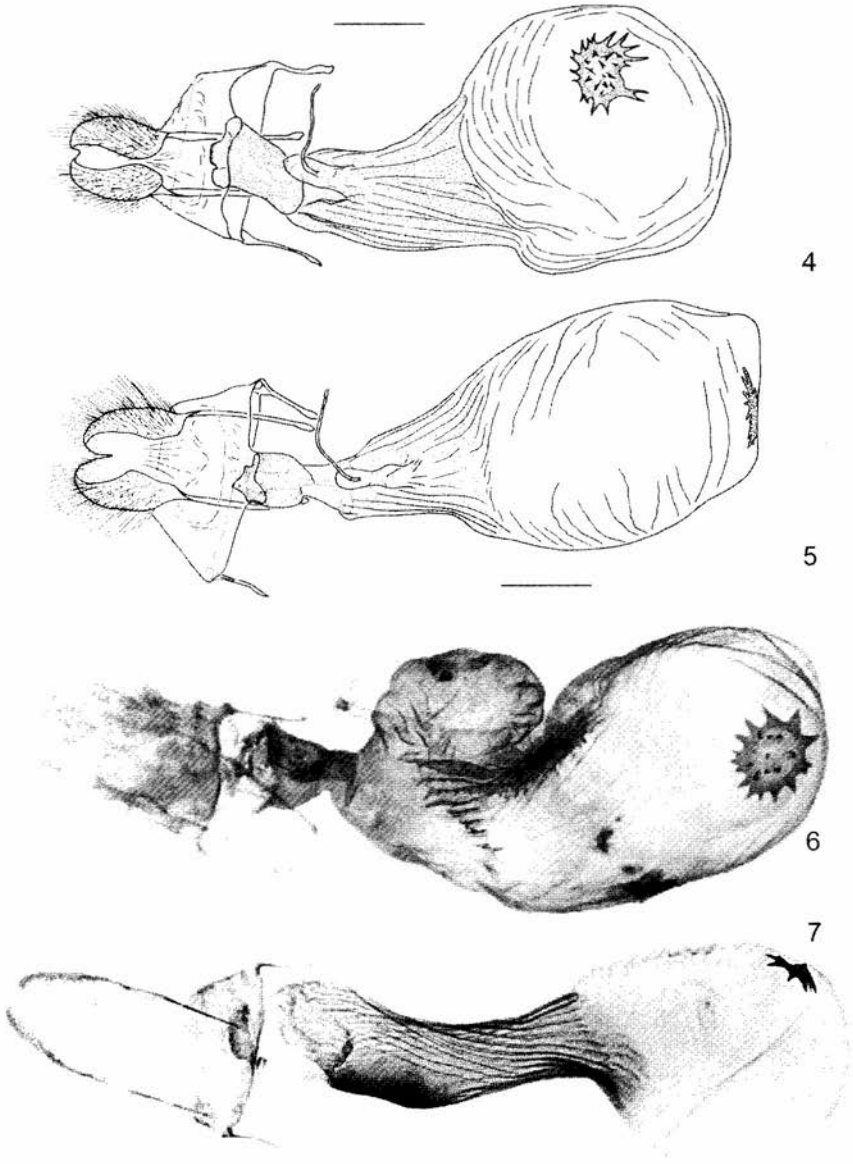

Plate 41. Female genitalia: 4. *Lomaspilis marginata*: Poland, Dolny Śląsk; 5. *Lomaspilis opis*: Poland, Podlasie; 6. *Stegania cararia*: Poland, Wyżyna Lubelska; 7. *Stegania dilectaria*: Turkey, prov. Elazik.

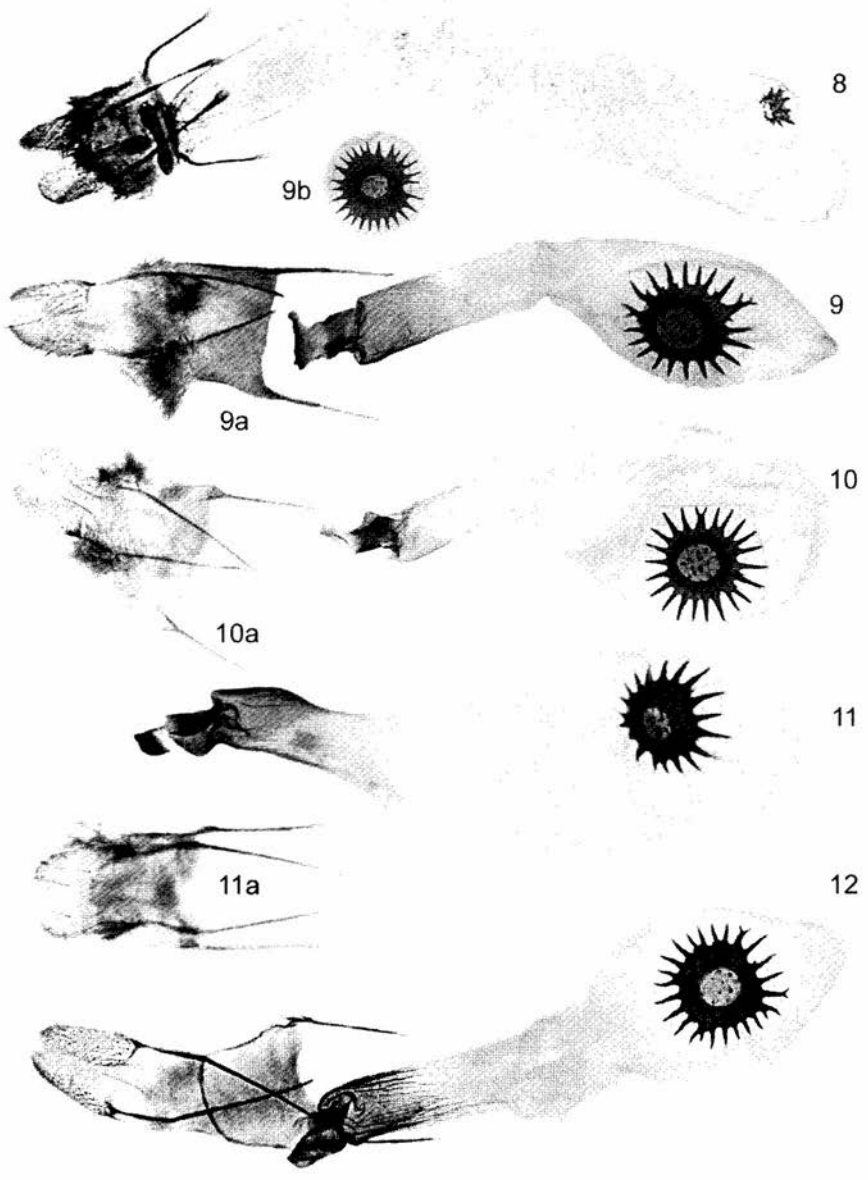

Plate 42. Female genitalia: 8. *Heliomata glarearia*: Poland, Pomorze Zachodnie; 9. *Macaria notata*: Poland, Dolny Śląsk; 9a. ovipositor + apophyses; 9b. signum: Poland, Lubuskie; 10. *Macaria alternata*: Poland, Ziemia Lubuska; 10a. ovipositor + apophyses; 11. *Macaria signaria*: Poland, Dolny Śląsk; 11a. ovipositor + apophyses; 12. *Macaria liturata*: Poland, Ziemia Lubuska.

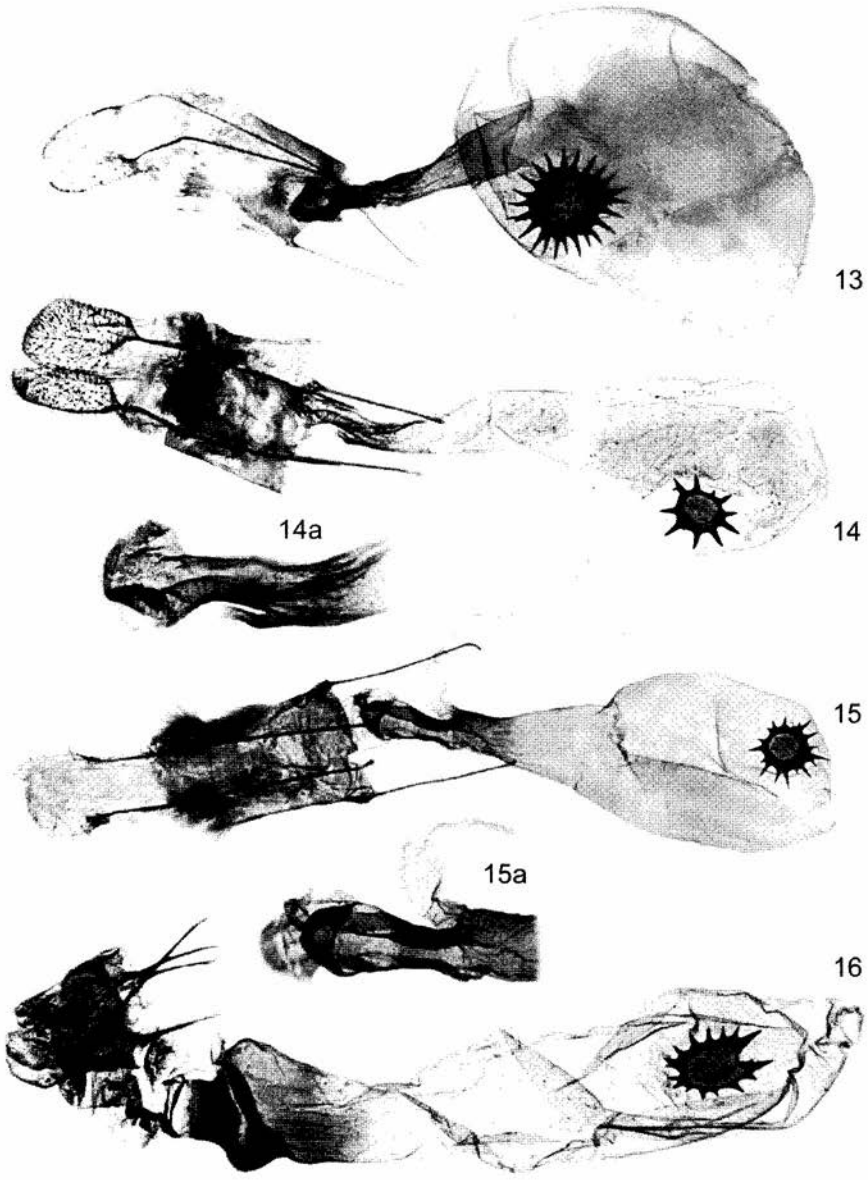

Plate 43. Female genitalia: 13. *Macaria wauaria*: Poland, Podlasie; 14. *Macaria artesiaria*: Poland, Dolny Śląsk; 14a. ductus bursae; 15. *Macaria brunneata*: Poland, Dolny Śląsk; 15a. ductus bursae; 16. *Chiasmia clathrata*: Poland, Kieleckie.

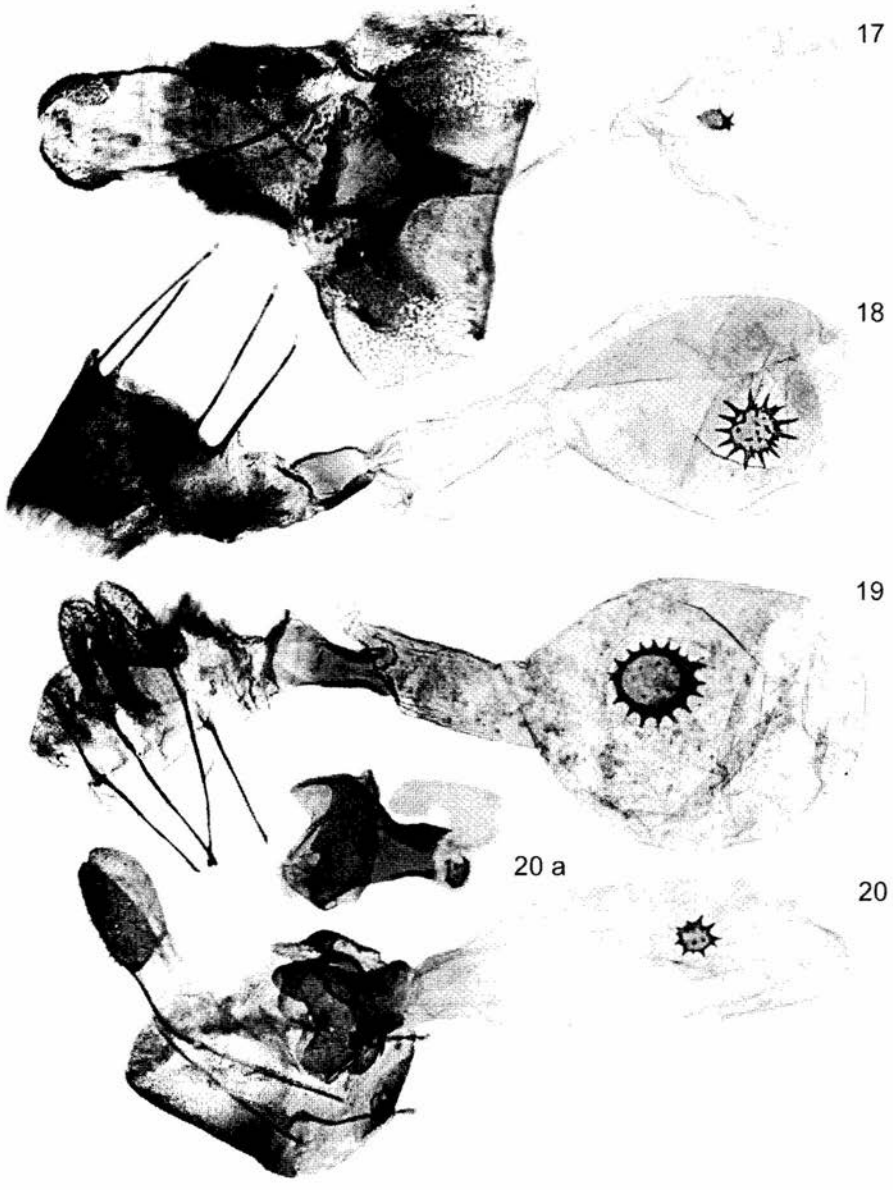

Plate 44. Female genitalia: 17. *Narraga fasciolaria*: Poland, Podlasie; 18. *Isturgia roraria*: Poland, Opolskie; 19. *Isturgia carbonaria*: Poland, Mazowsze; 20. *Isturgia murinaria*: Poland, Kujawy; 20a. antrum.

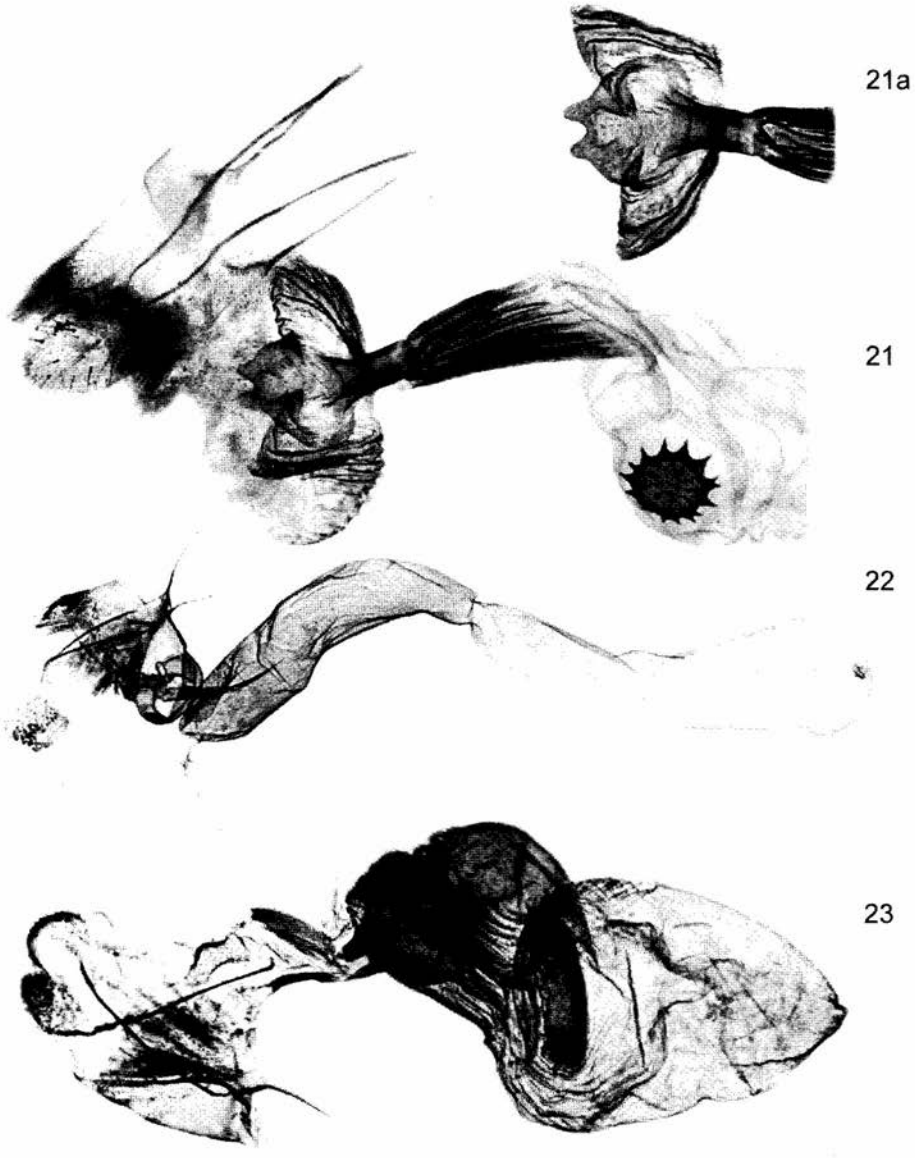

Plate 45. Female genitalia: 21. *Isturgia arenacearia*: Bulgaria, near Varna; 21a. antrum + sterigma; 22. *Cepphis advenaria*: Poland, Dolny Śląsk; 23. *Petrophora chlorosata*: Poland, Dolny Śląsk.

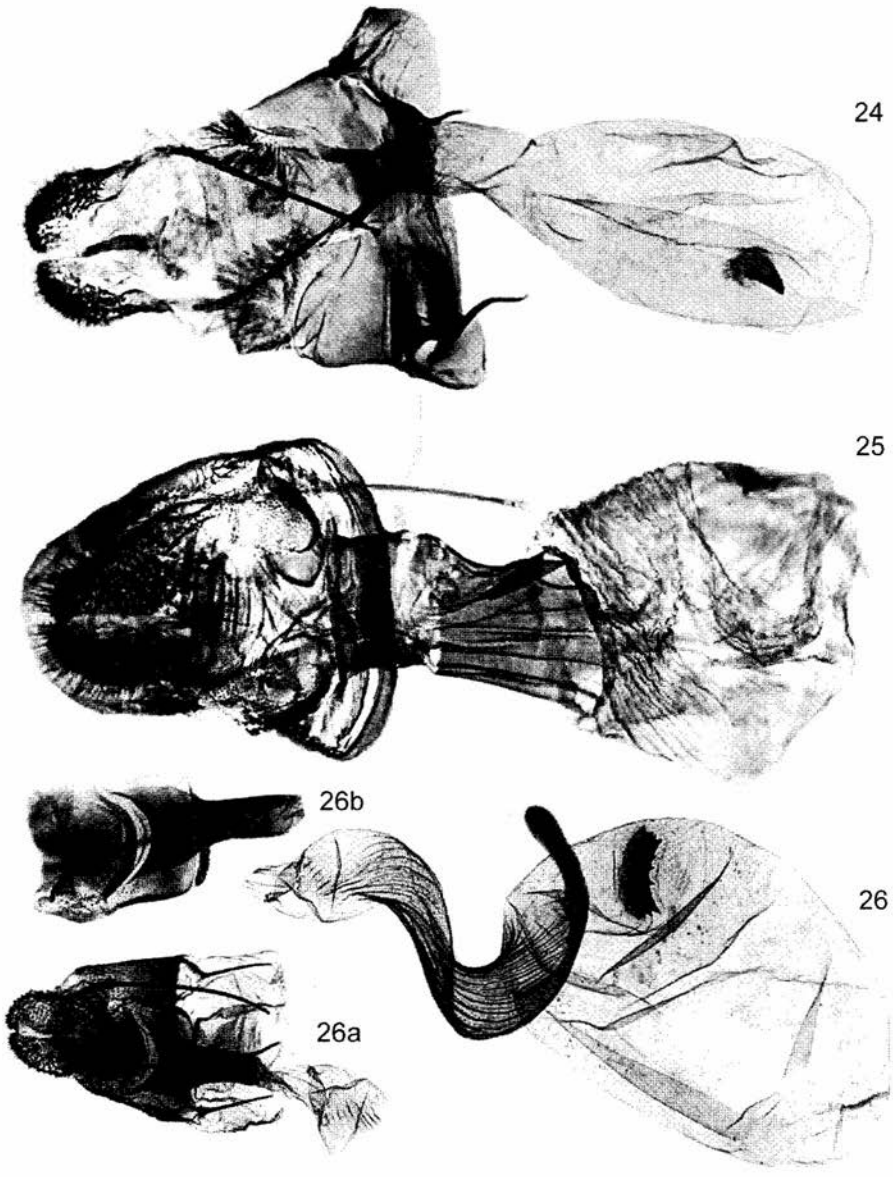

Plate 46. Female genitalia: 24. *Plagodis pulveraria*: Poland, Dolny Śląsk; 25. *Plagodis dolabraria*: Poland, Dolny Śląsk; 26. *Pachycnemia hippocastanaria*: Poland, Dolny Śląsk; 26a. ovipositor + apophyses; 26b. antrum.

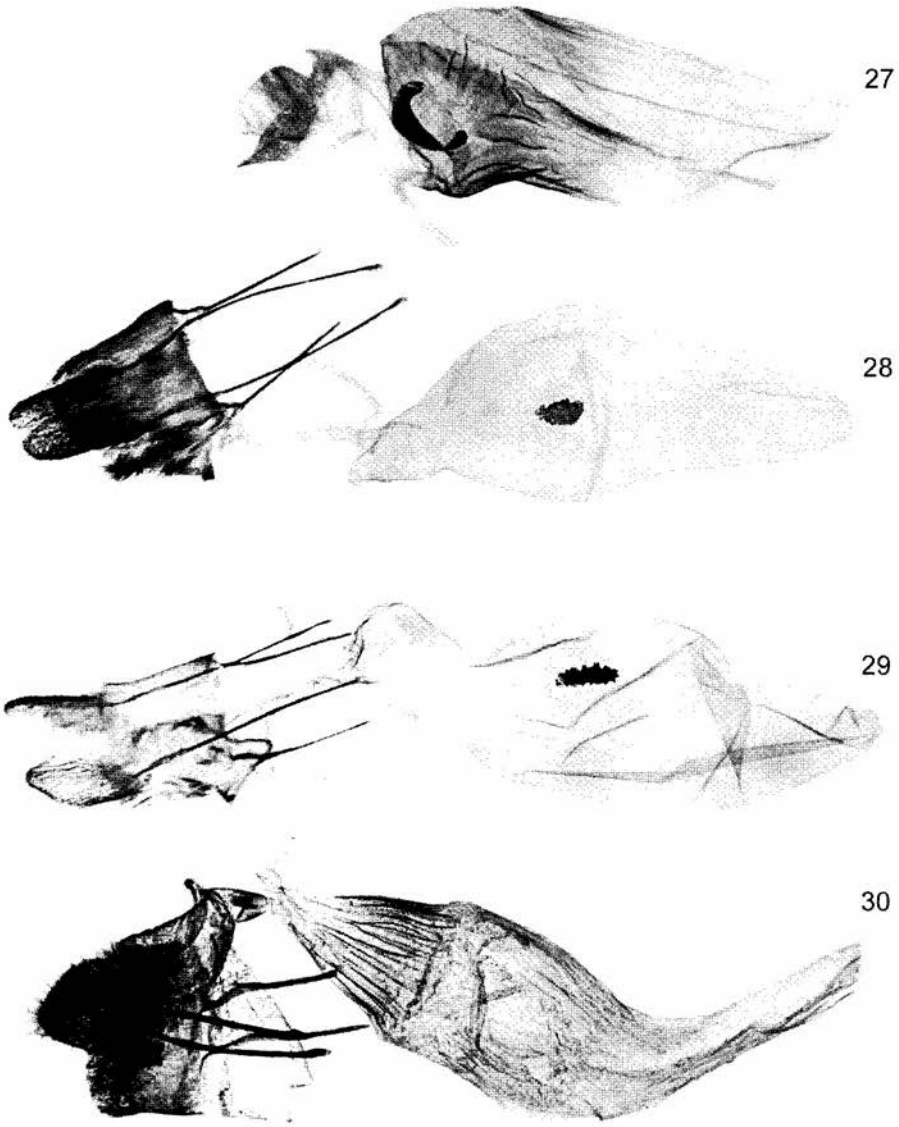

Plate 47. Female genitalia: 27. *Opisthograptis luteolata*: Poland, Dolny Śląsk (ovipositor removed); 28. *Epione repandaria*: Poland, Dolny Śląsk; 29. *Epione vespertaria*; Poland, Podkarpacie; 30. *Therapis flavicaria*: Czech Rep., Moravia.

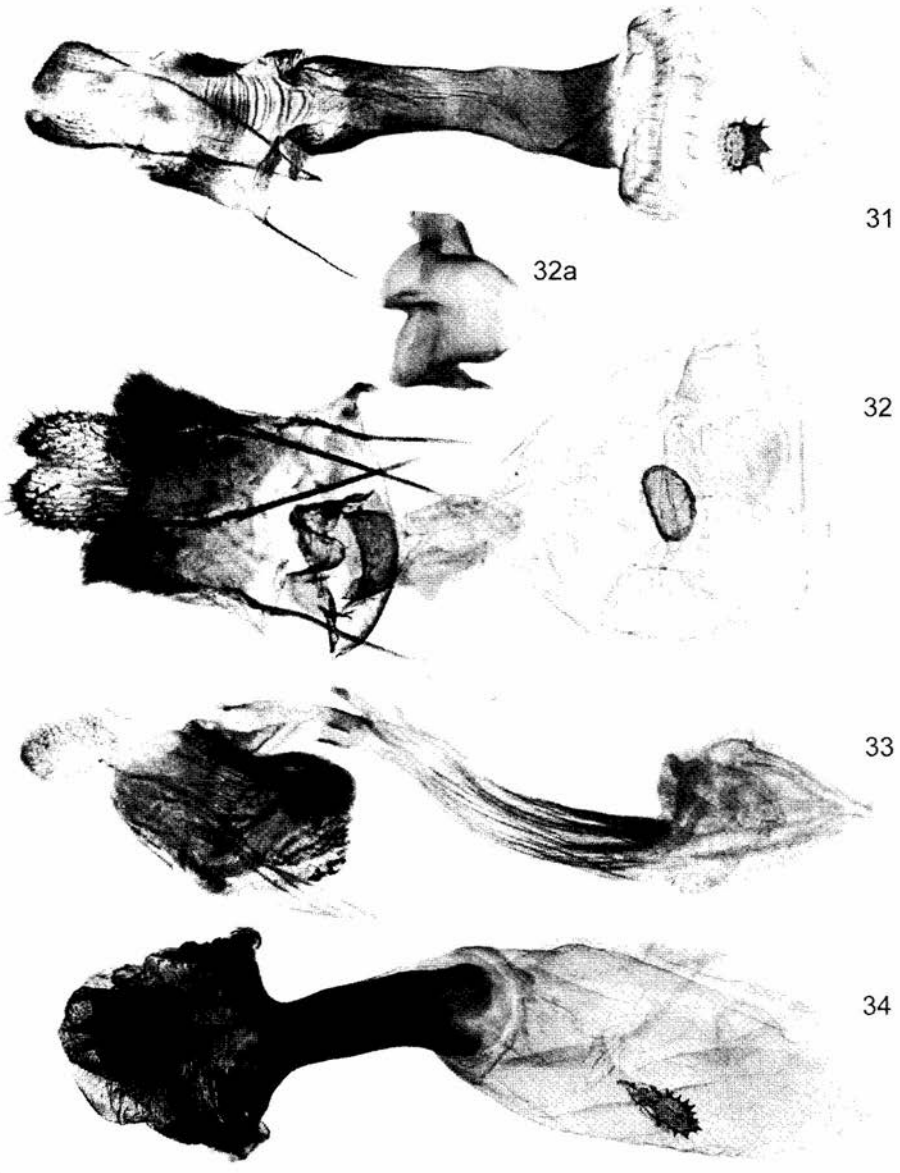

Plate 48. Female genitalia: 31. *Pseudopanthera macularia*: Poland, Dolny Śląsk; 32. *Hypoxystis pluviaria*: Poland, Podkarpacie; 32a. antrum; 33. *Apeira syringaria*: Poland, Dolny Śląsk; 34. *Ennomos autumnaria*: Poland, Dolny Śląsk.

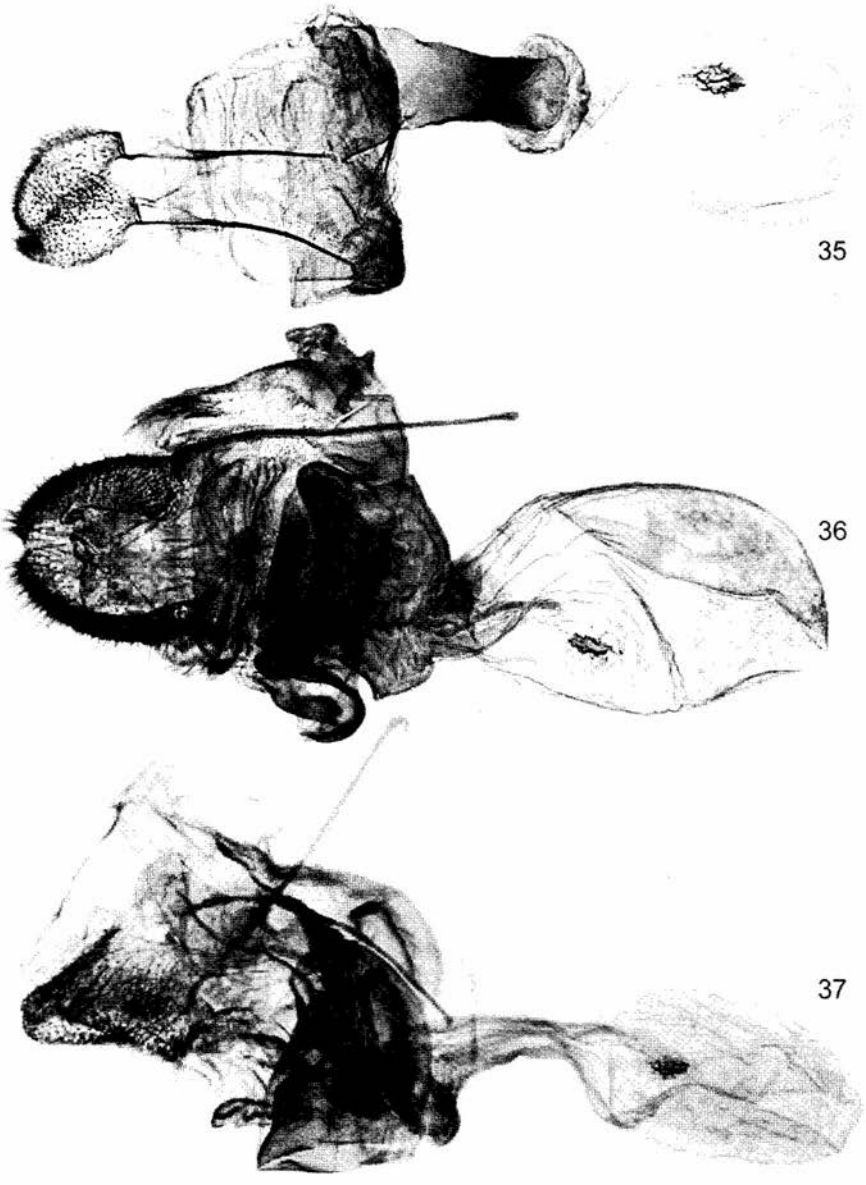

Plate 49. Female genitalia: 35. *Ennomos quercinaria*: Poland, Dolny Śląsk; 36. *Ennomos alniaria*; Poland, Wielkopolska; 37. *Ennomos fuscantaria*: Poland, Podlasie.

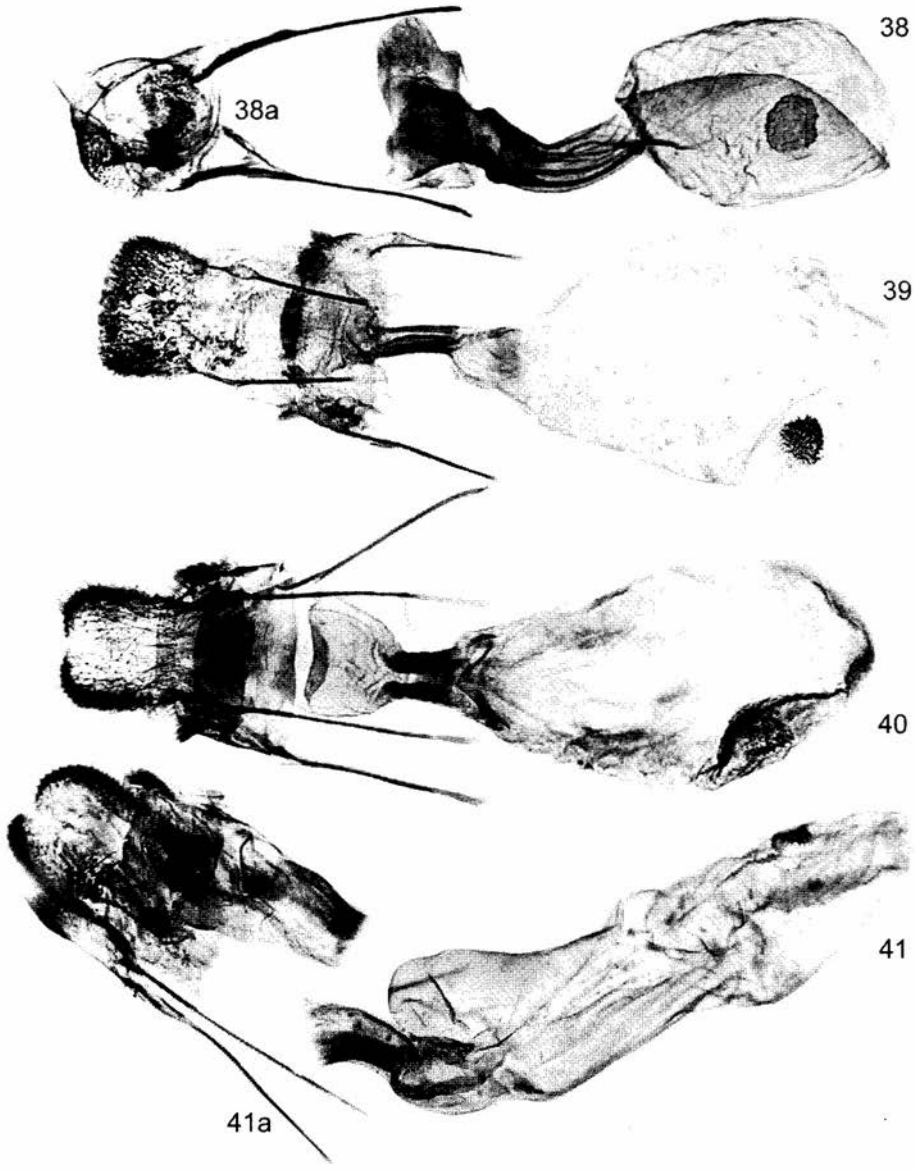

Plate 50. Female genitalia: 38. *Ennomos erosaria*: Poland, Dolny Śląsk; 38a. ovipositor + apophyses; 39. *Selenia dentaria*: Poland, Wielkopolska; 40. *Selenia tetralunaria*: orig. ?; 41. *Selenia lunularia*: Turkey, prov. Ankara; 41a.ovipositor + apophyses.

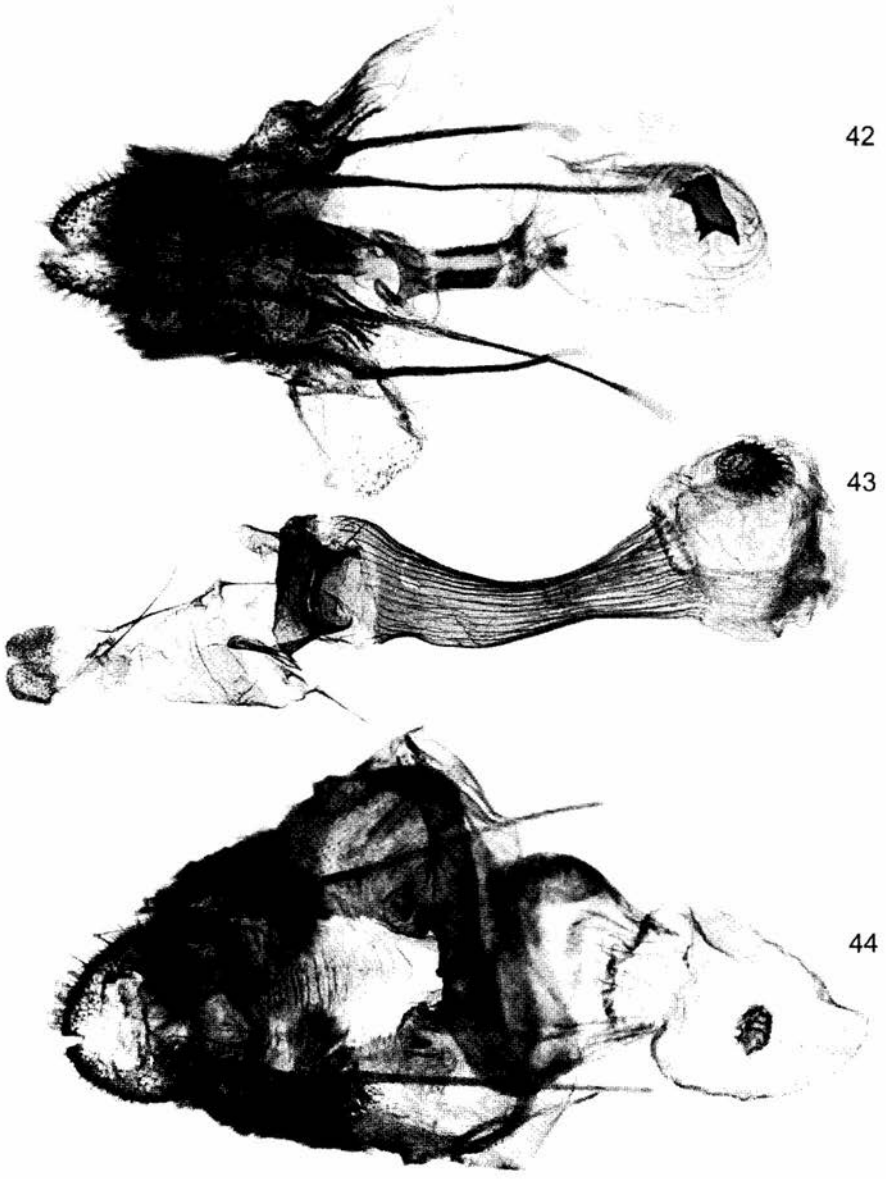

Plate 51. Female genitalia: 42. *Artiora evonymaria*: Poland, Wielkopolska; 43. *Odontopera bidentata*: Turkey, Góry Pontyjskie; 44. *Crocallis tusciaria*: Croatia, Dalmatia.

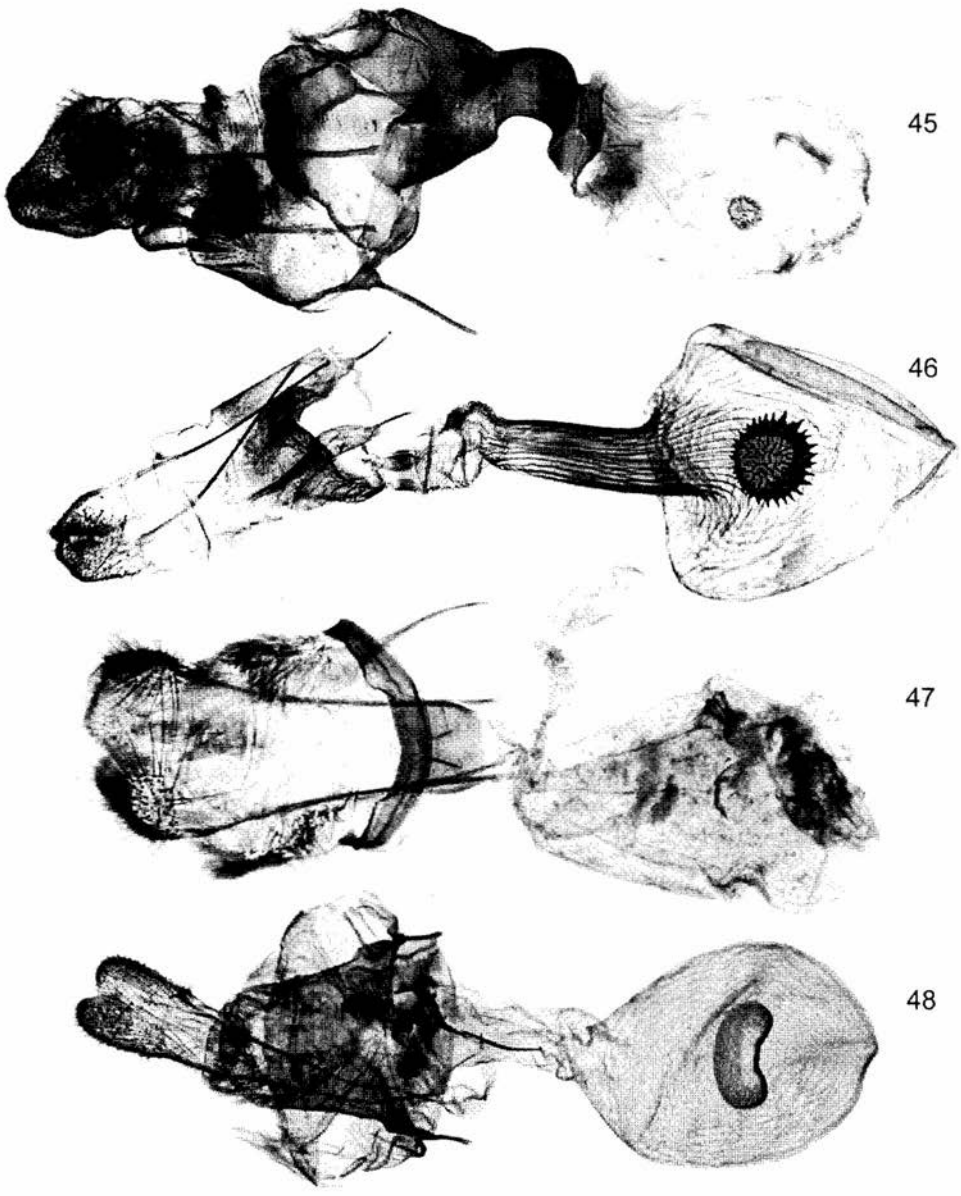

Plate 52. Female genitalia: 45. *Crocallis elinguaria*; Poland, Dolny Śląsk; 46. *Ourapteryx sambucaria*: Poland, Wielkopolska; 47. *Colotois pennaria*: Poland, Dolny Śląsk; 48. *Angerona prunaria*: Poland, Wielkopolska.

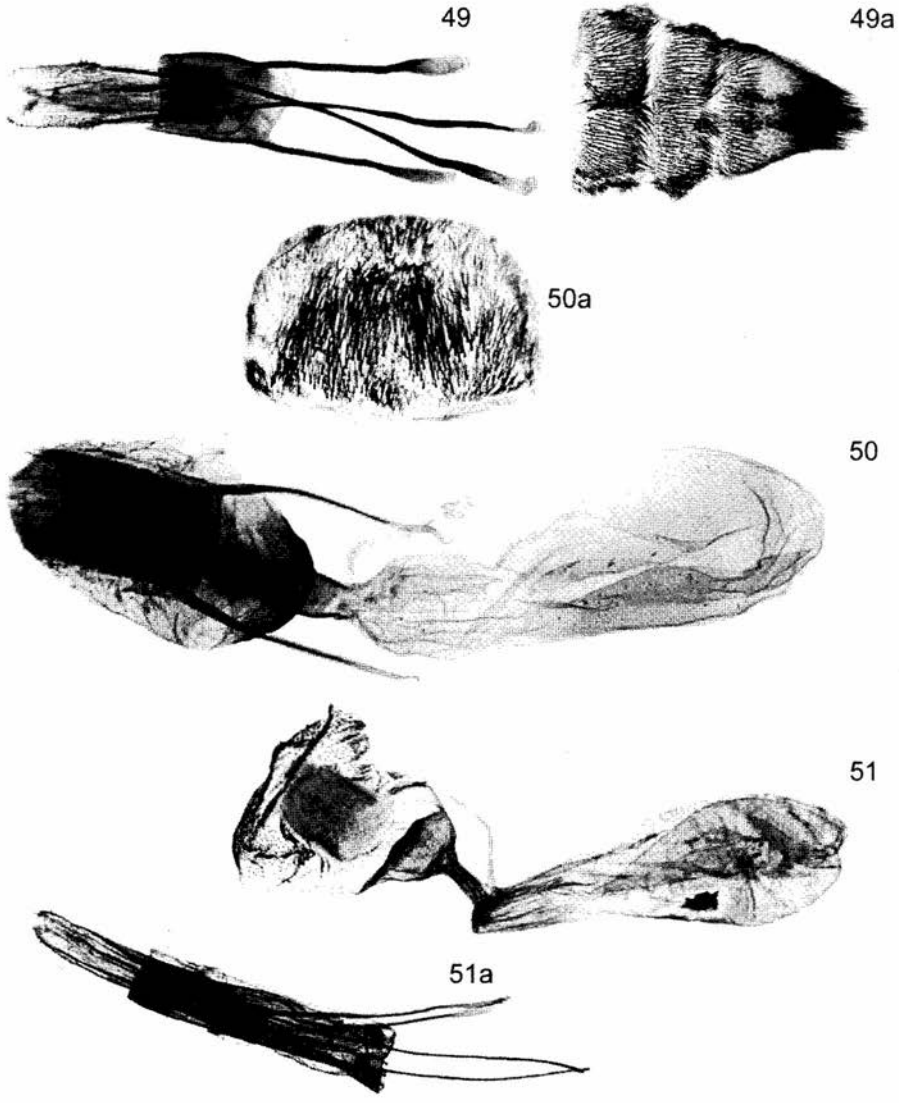

Plate 53. Female genitalia: 49. *Apocheima hispidaria*: Poland, Małopolska, ovipositor + apophyses; 49a. dorsal ctenidia; 50. *Apocheima pilosaria*: orig. ?; 50a. dorsal ctenidia; 51. *Lycia hirtaria*: Poland, Podlasie; 51a. ovipositor + apophyses.

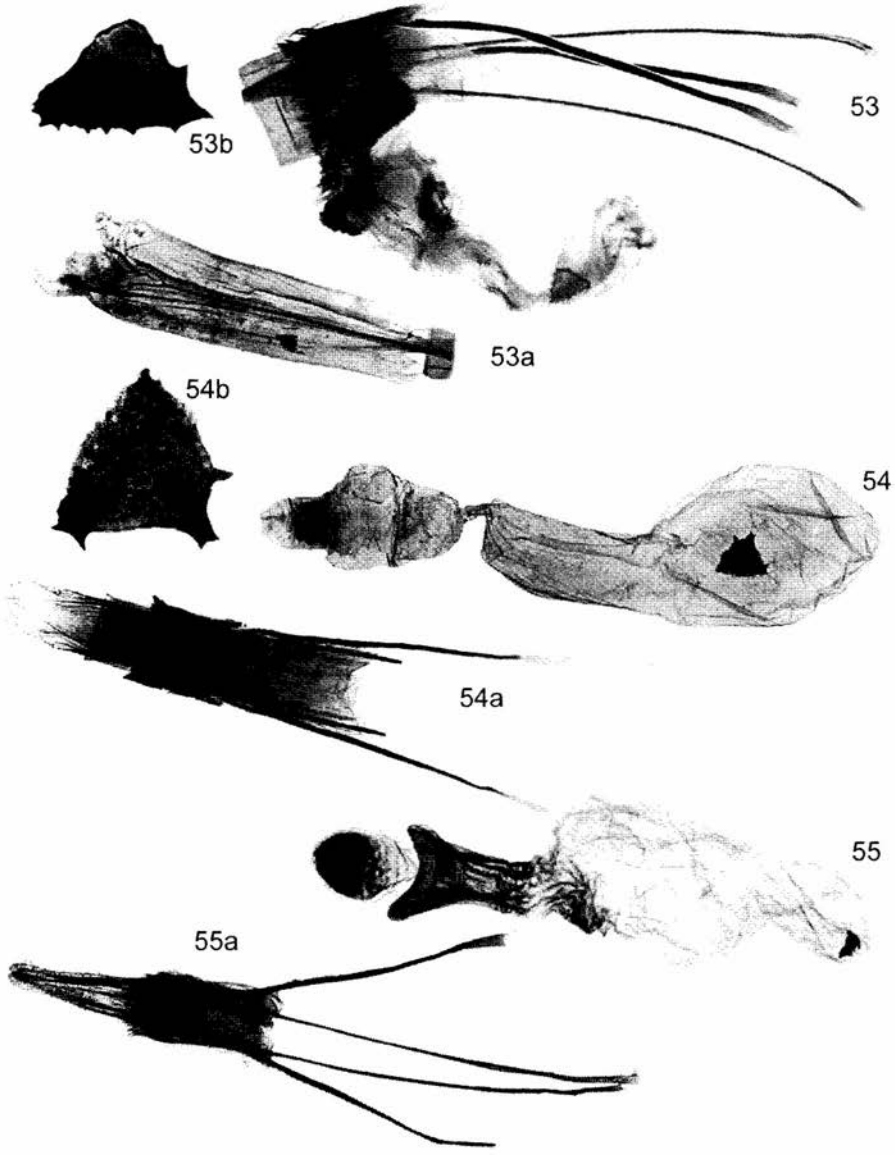

Plate 54. Female genitalia: 53. *Lycia pomonaria*: Poland, Dolny Śląsk; 53a. ovipositor; 53b. signum; 54. *Lycia isabellae*: Poland, Sudety; 54a. ovipositor + apophyses; 54b. signum; 55. *Biston strataria*: Poland, Dolny Śląsk; 55a. ovipositor + apophyses.

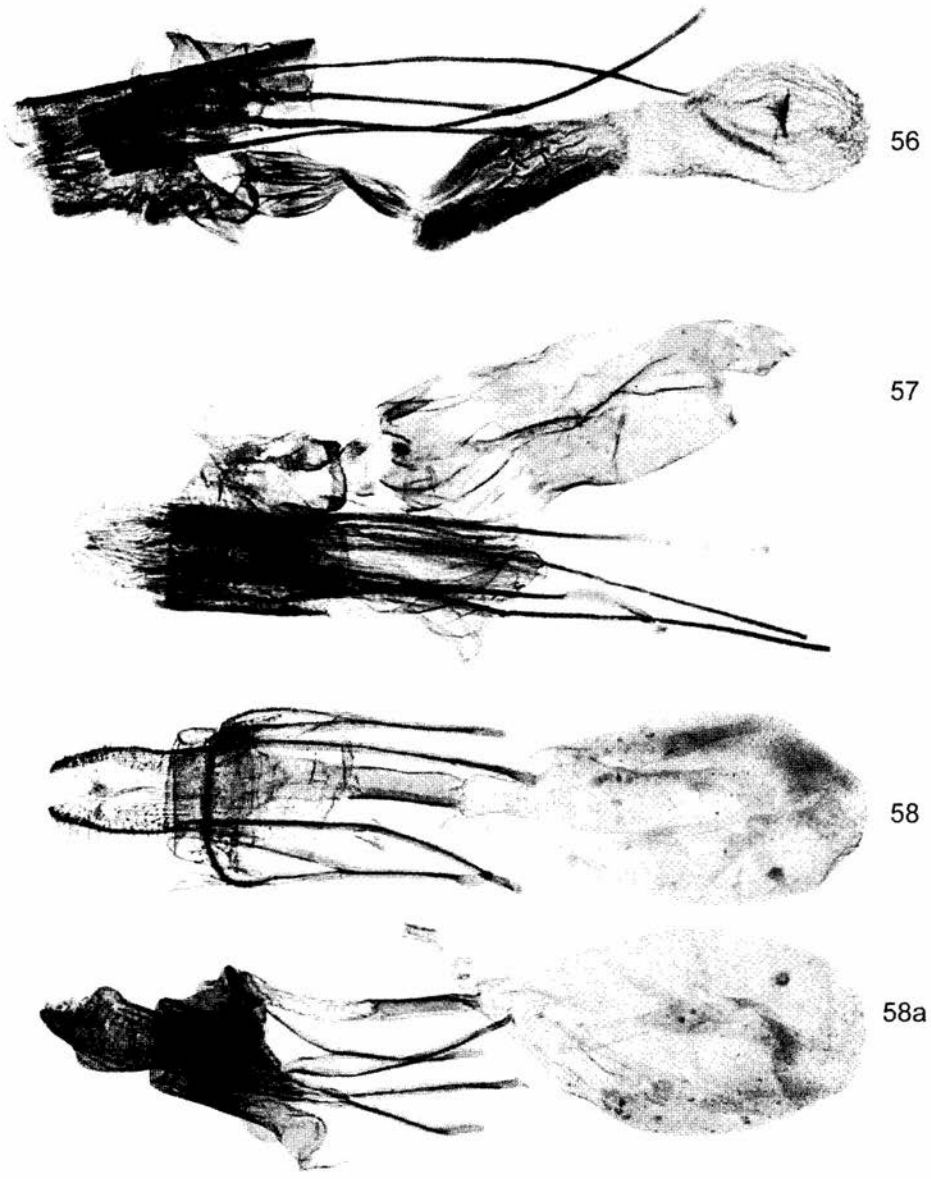

Plate 55. Female genitalia: 56. *Biston betularia*: Poland, Dolny Śląsk; 57. *Agriopis leucophaearia*: Poland, Dolny Śląsk; 58. *Agriopis bajaria*: unknown origin. 58a. lateral view.

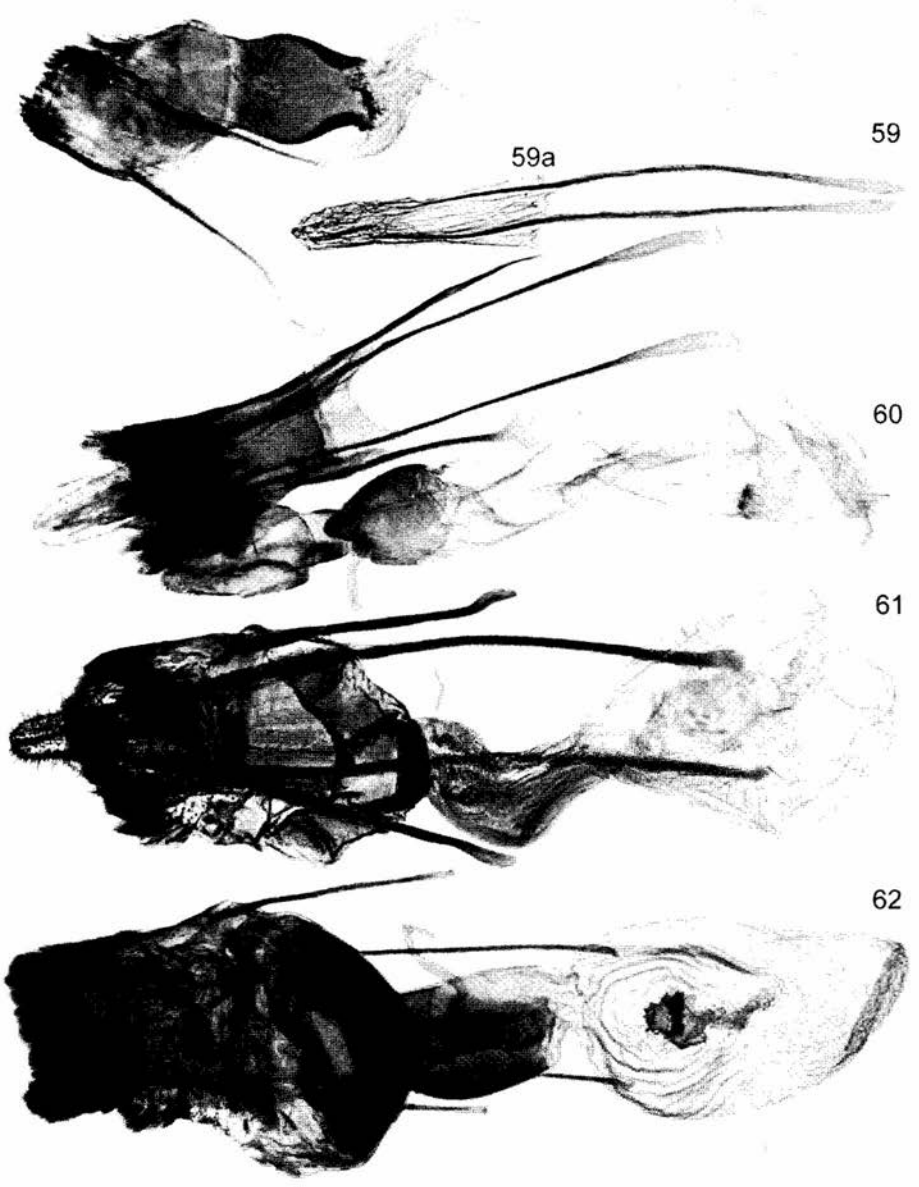

Plate 56. Female genitalia: 59. *Agriopis aurantiaria*: orig. ?; 59a. ovipositor + apophyses posteriores; 60. *Agriopis marginalia*: Poland, Dolny Śląsk; 61. *Erannis defoliaria*: Poland, Dolny Śląsk; 62. *Synopsia sociaria*: Bulgaria, near Burgas.

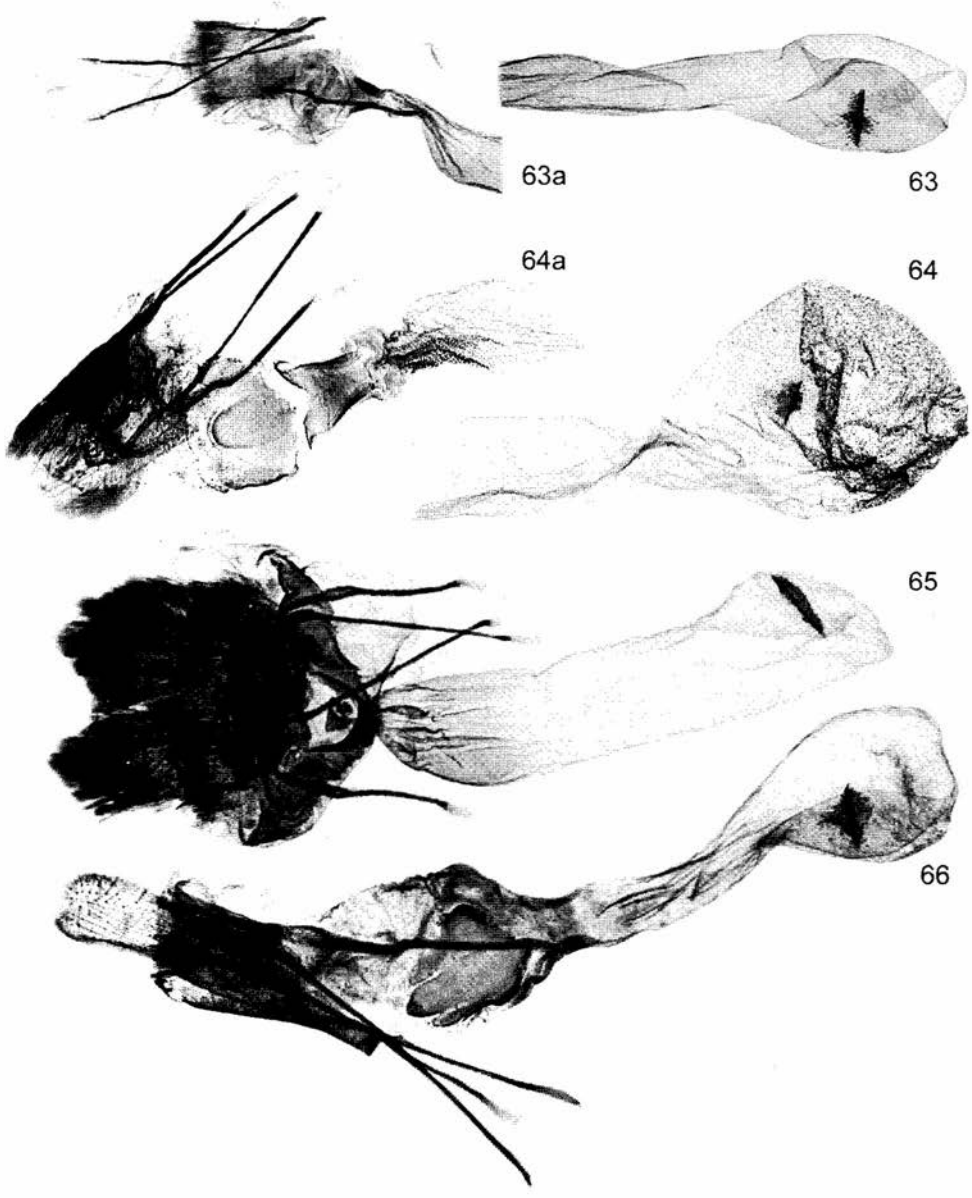

Plate 57. Female genitalia: 63. *Peribatodes rhomboidaria*: Poland, Dolny Śląsk; corpus bursae; 63a. posterior parts; 64. *Peribatodes secundaria*: Poland, Dolny Śląsk; corpus bursae; 64a. posterior parts; 65. *Peribatodes ilicaria*: Mauretania; 66. *Selidosema brunnearia*: Poland, Dolny Śląsk.

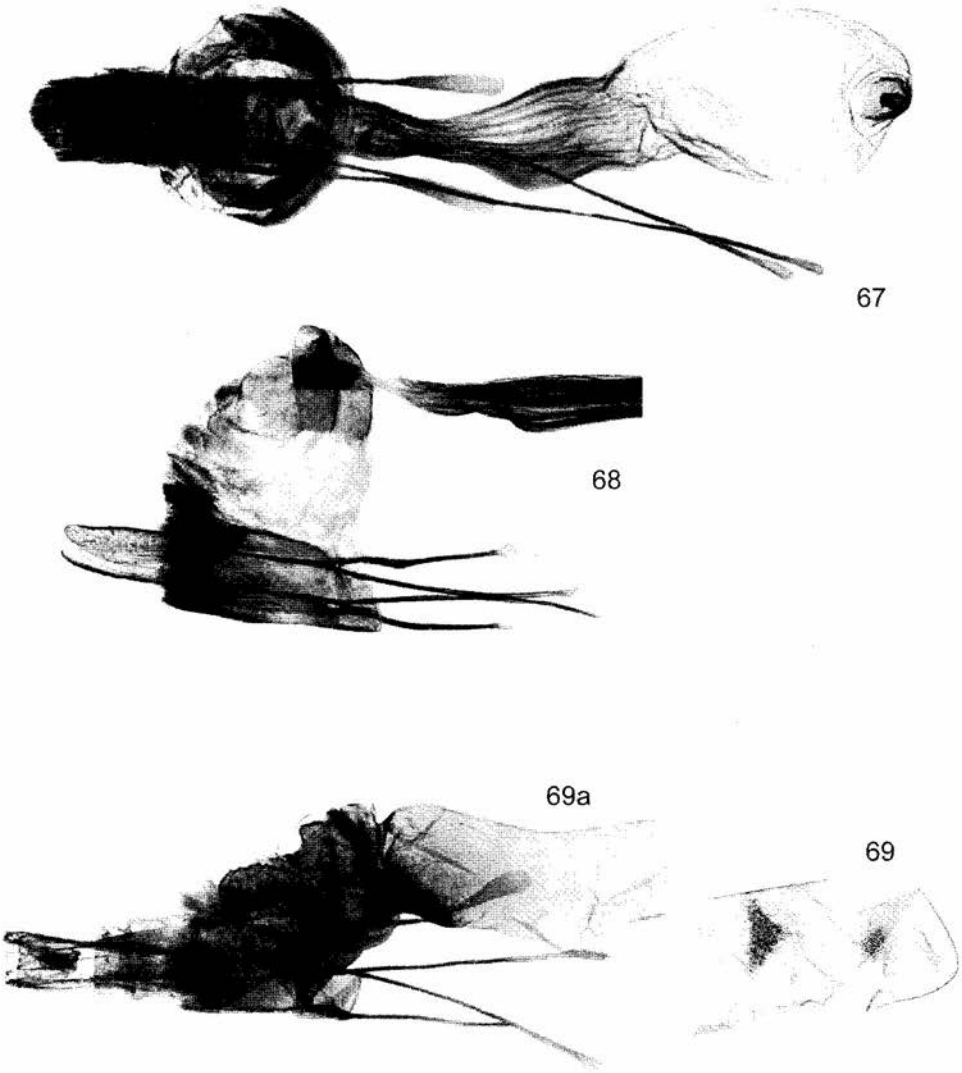

Plate 58. Female genitalia: 67. *Cleora cinctaria*: Poland, Dolny Śląsk; 68. *Deileptenia ribeata*: Poland, Dolny Śląsk; 69. *Alcis bastelbergeri*: Poland, Dolny Śląsk, corpus bursae; 69a. posterior parts.

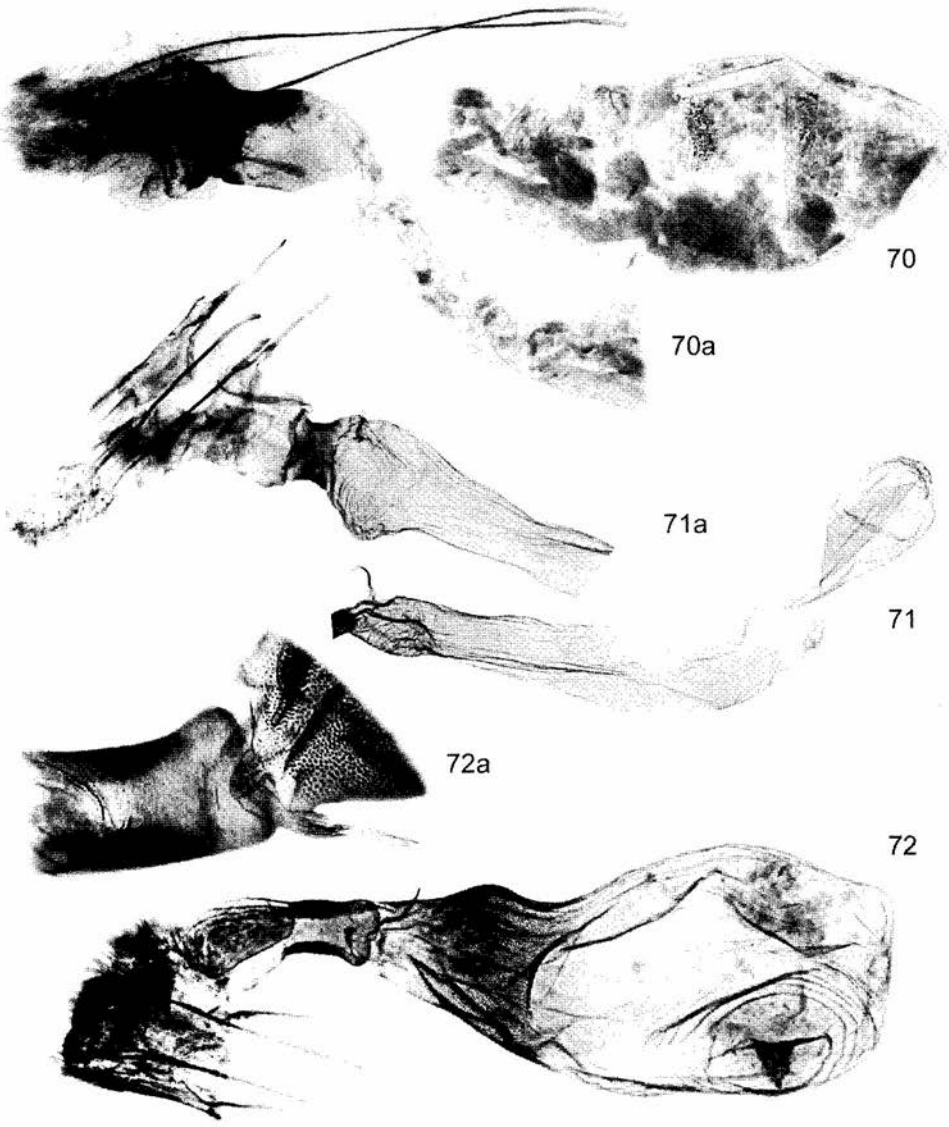

Plate 59. Female genitalia: 70. *Alcis repandata*: Poland, Dolny Śląsk, corpus bursae; 70a. posterior parts; 71. *Alcis jubata*: Poland, Wielkopolska, corpus bursae; 71a. posterior parts; 72. *Arichanna melanaria*: Poland, Podhale; 72a. antrum + ductus seminalis (enlarged).

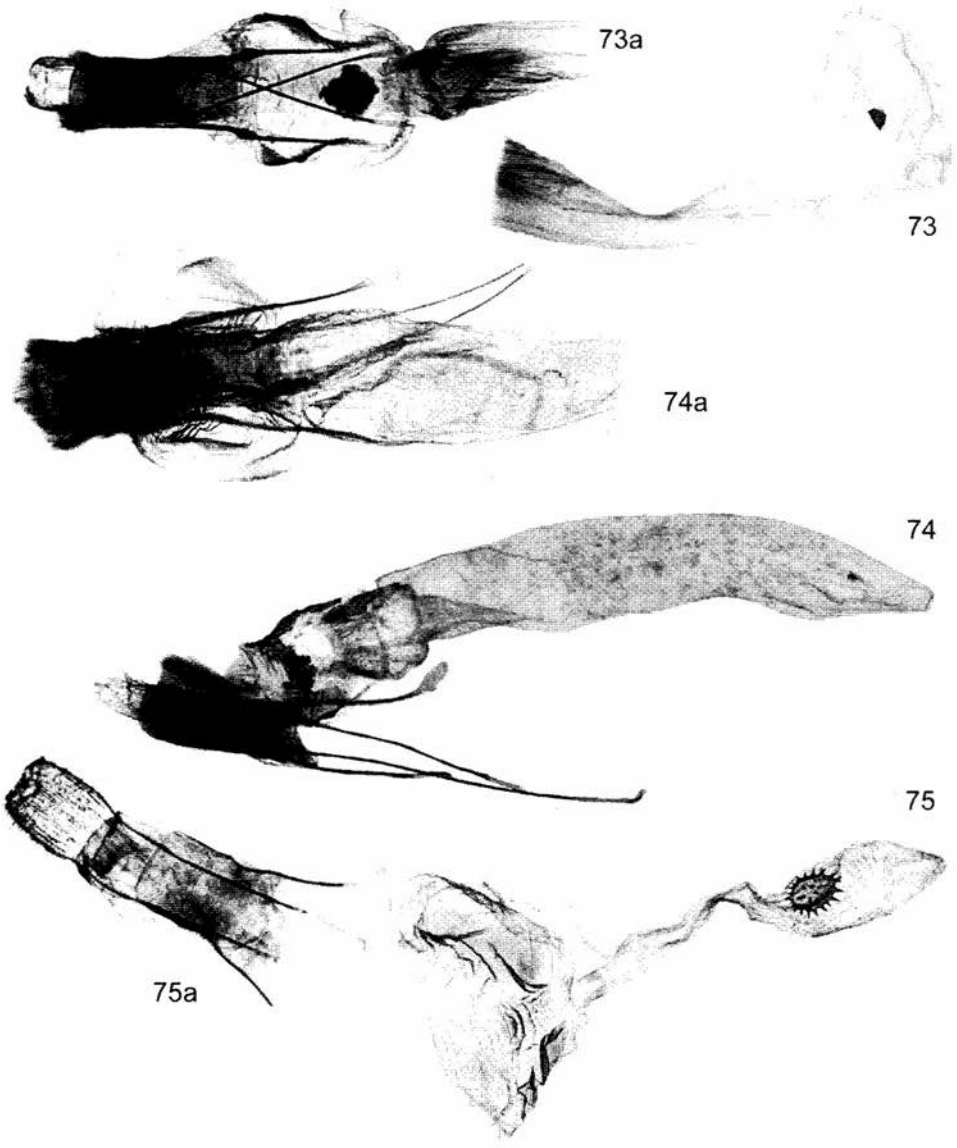

Plate 60. Female genitalia: 73. *Hypomecis roboraria*: Poland, Małopolska, corpus bursae; 73a. posterior parts; 74. *Hypomecis punctinalis*: Poland, Pomorze; 74a. posterior parts; 75. *Fagivorina arenaria*: Germany, Pruss.(?), corpus bursae; 75a. posterior parts.

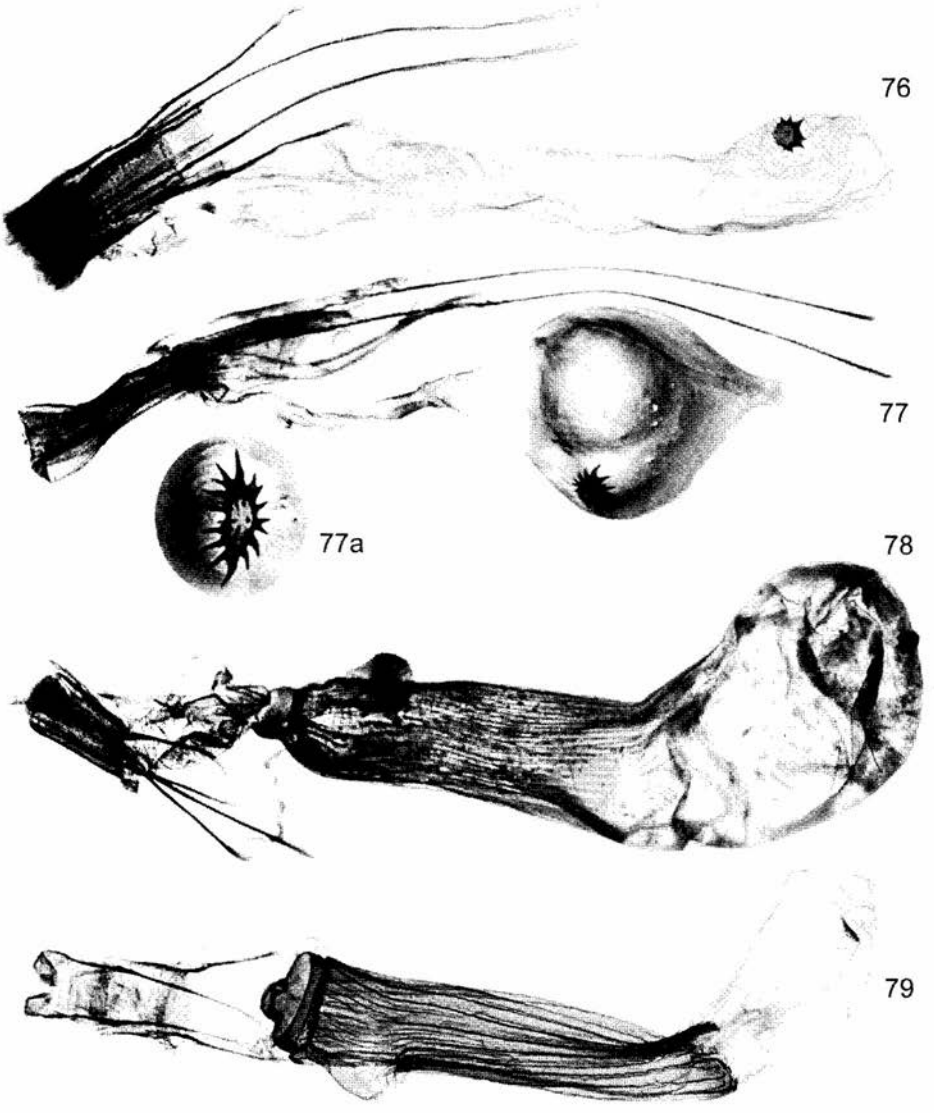

Plate 61. Female genitalia: 76. *Ascotis selenaria*: Austria; 77. *Ectropis crepuscularia*: Poland, Dolny Śląsk; 77a. signum (enlarged); 78. *Paradarisa consonaria*: Poland, Dolny Śląsk; 79. *Parectropis similaria*: Poland, Wielkopolska.

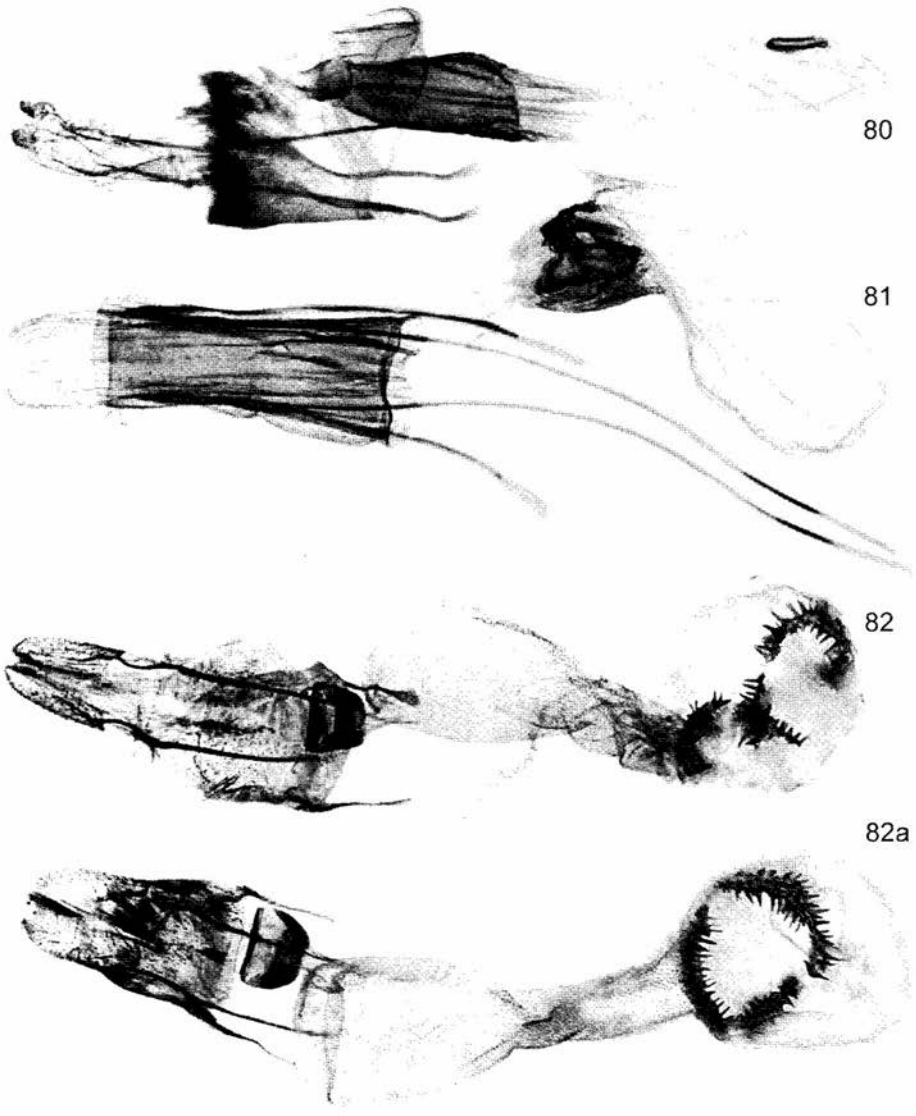

Plate 62. Female genitalia: 80. *Aethalura punctulata*: Poland, Dolny Śląsk; 81. *Ematurga atomaria*: Czech Rep., near Teplice; 82. *Tephronia sepiaria*: Poland, Pomorze; 82a. Hungary, Puszta (opposite view).

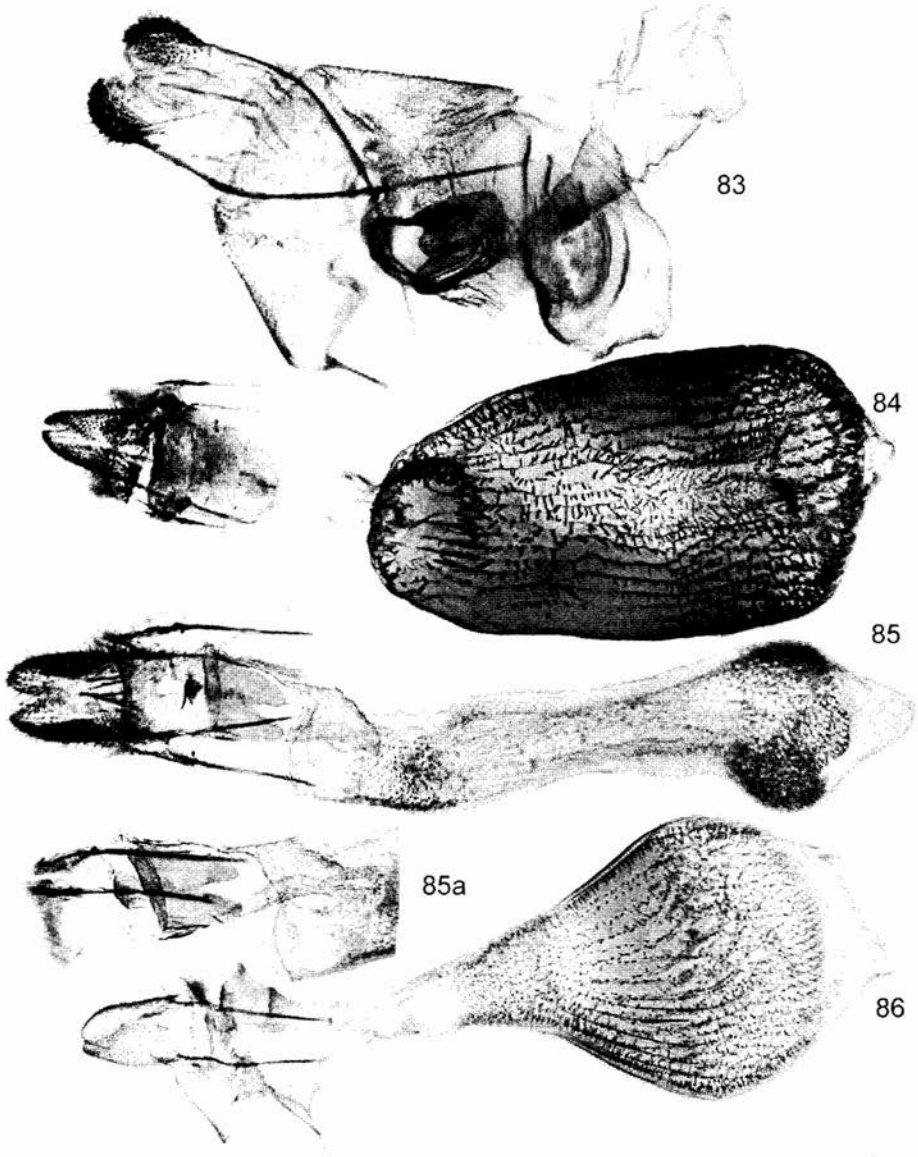

Plate 63. Female genitalia: 83. *Bupalus piniaria*: Poland, Dolny Śląsk; 84. *Cabera pusaria*: Poland, Dolny Śląsk; 85. *Cabera leptographa*: Poland, Podlasie; 85a. antrum + ductus seminalis; 86. *Cabera exanthemata*: Poland, Dolny Śląsk.

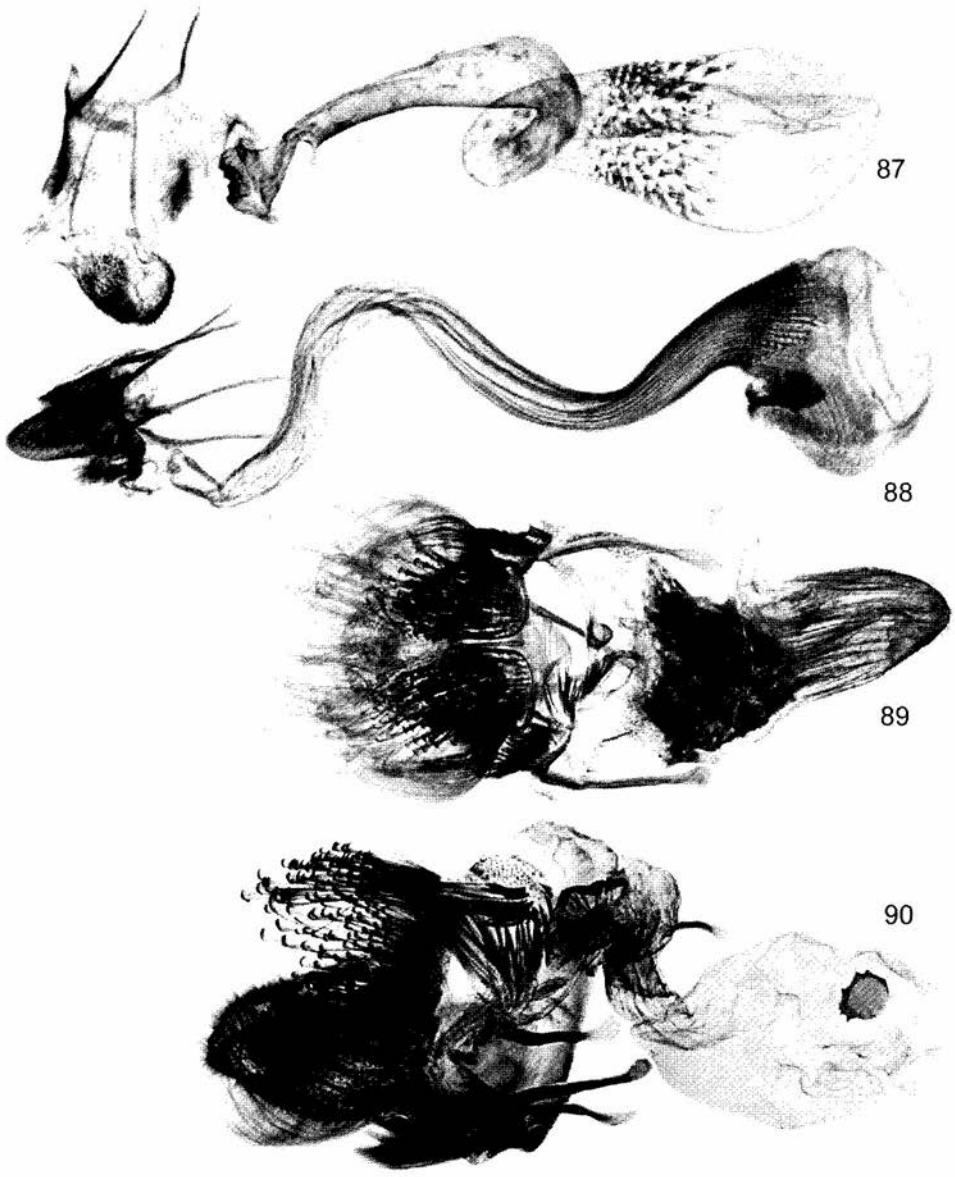

Plate 64. Female genitalia: 87. *Lomographa bimaculata*: Poland, Dolny Śląsk; 88. *Lomographa temerata*: Poland, Dolny Śląsk; 89. *Aleucis distinctata*: Poland, Dolny Śląsk; 90. *Theria rupicapraria*: Poland, Dolny Śląsk.

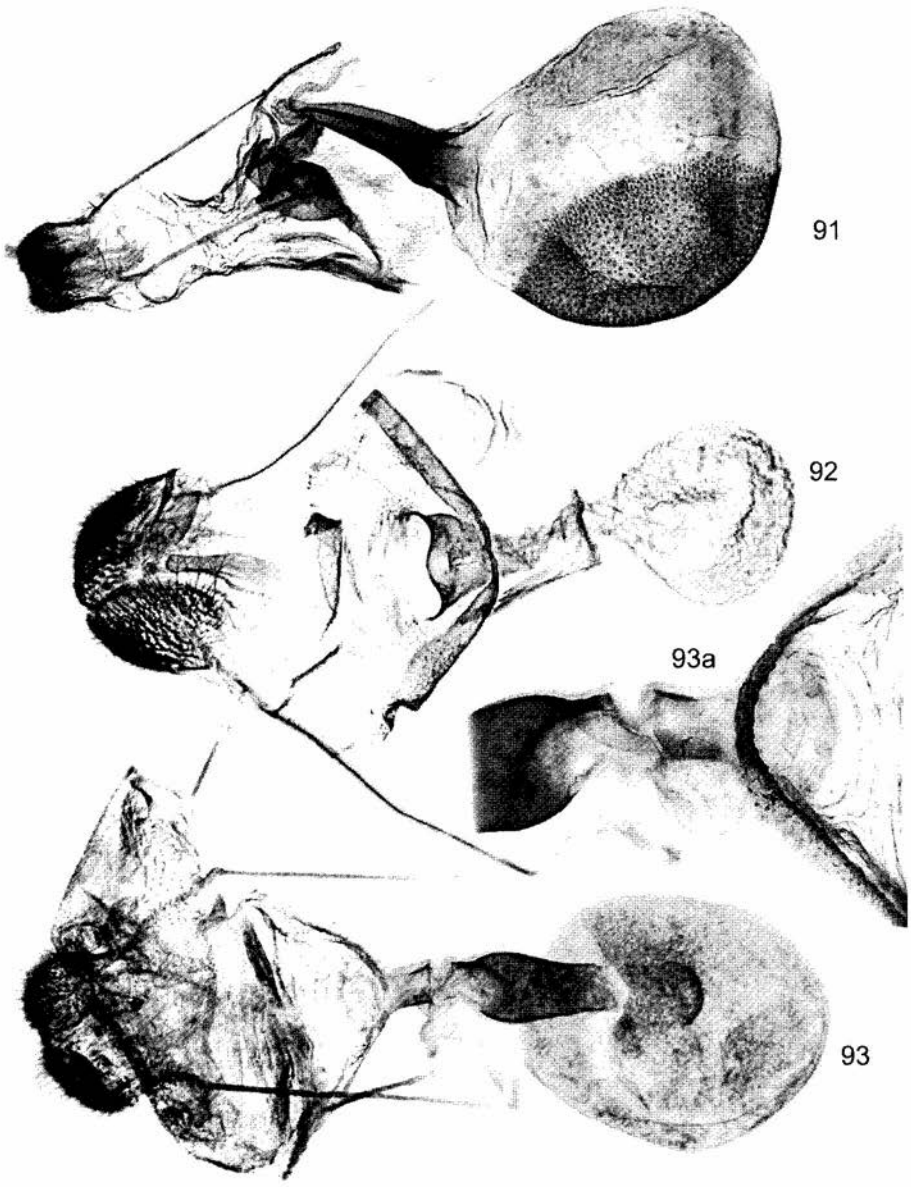

Plate 65. Female genitalia: 91. *Campaea margaritaria*: Poland, Dolny Śląsk; 92. *Campaea honoraria*: Spain, Alicante; 93. *Hylaea fasciaria*: Poland, Dolny Śląsk, 93a. antrum + ductus seminalis.

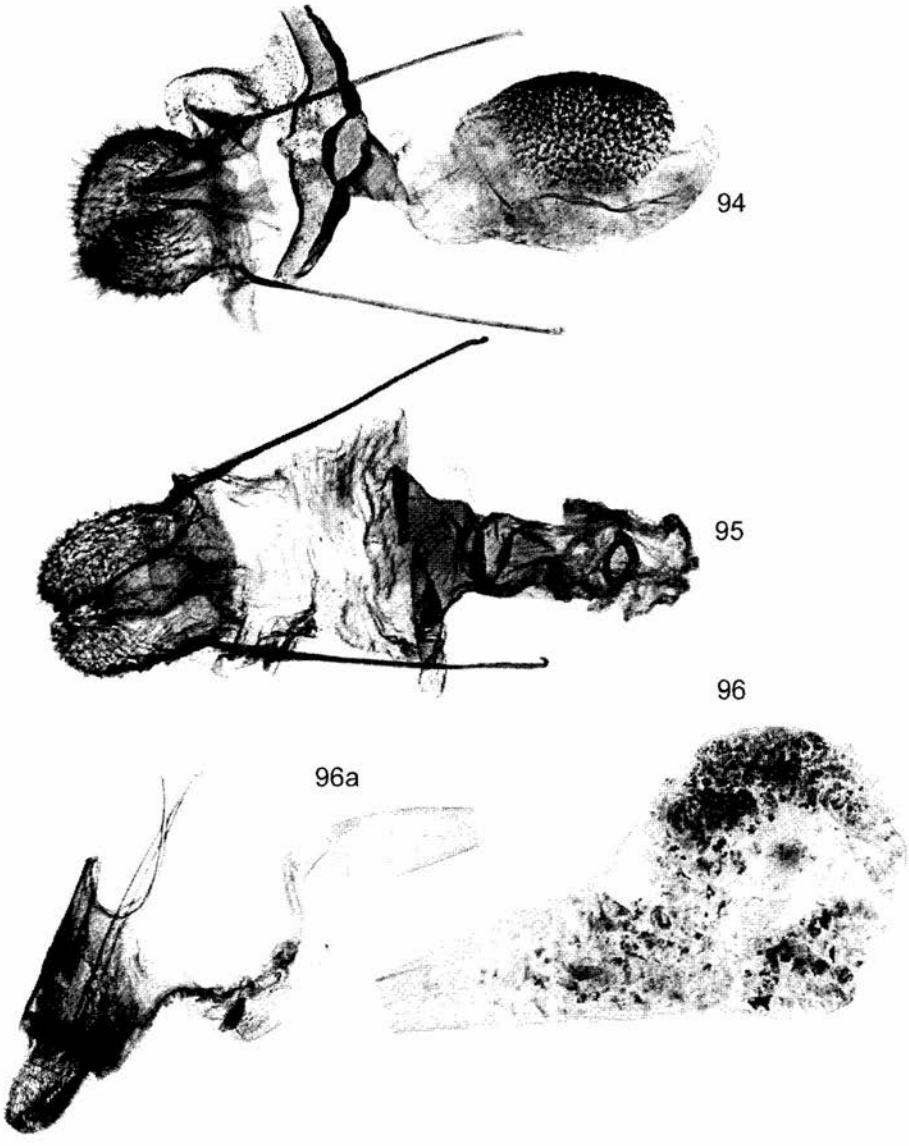

Plate 66. Female genitalia: 94. *Pungeleria capreolaria*: Poland, Tatry; 95. *Cleorodes lichenaria*: Austria; 96. *Gnophos furvata*: orig. ?, corpus bursae; 96a. posterior parts.

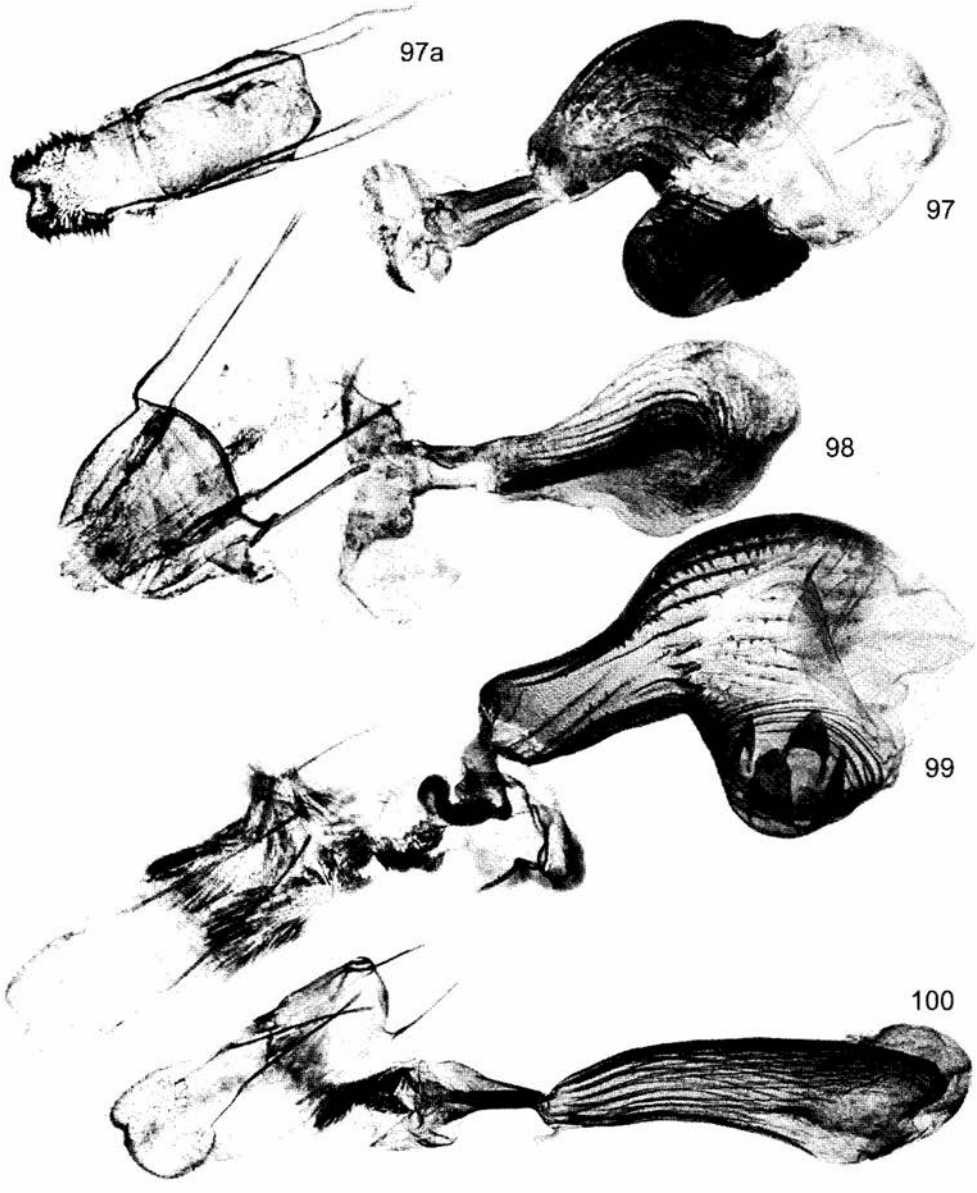

Plate 67. Female genitalia: 97. *Charissa obscurata*: Poland, Dolny Śląsk, corpus bursae; 97a. posterior parts; 98. *Charissa ambiguata*: Poland, Górny Śląsk; 99. *Charissa pullata*: Poland, Śląsk; 100. *Charissa glaucinaria*: Poland, Tatry.

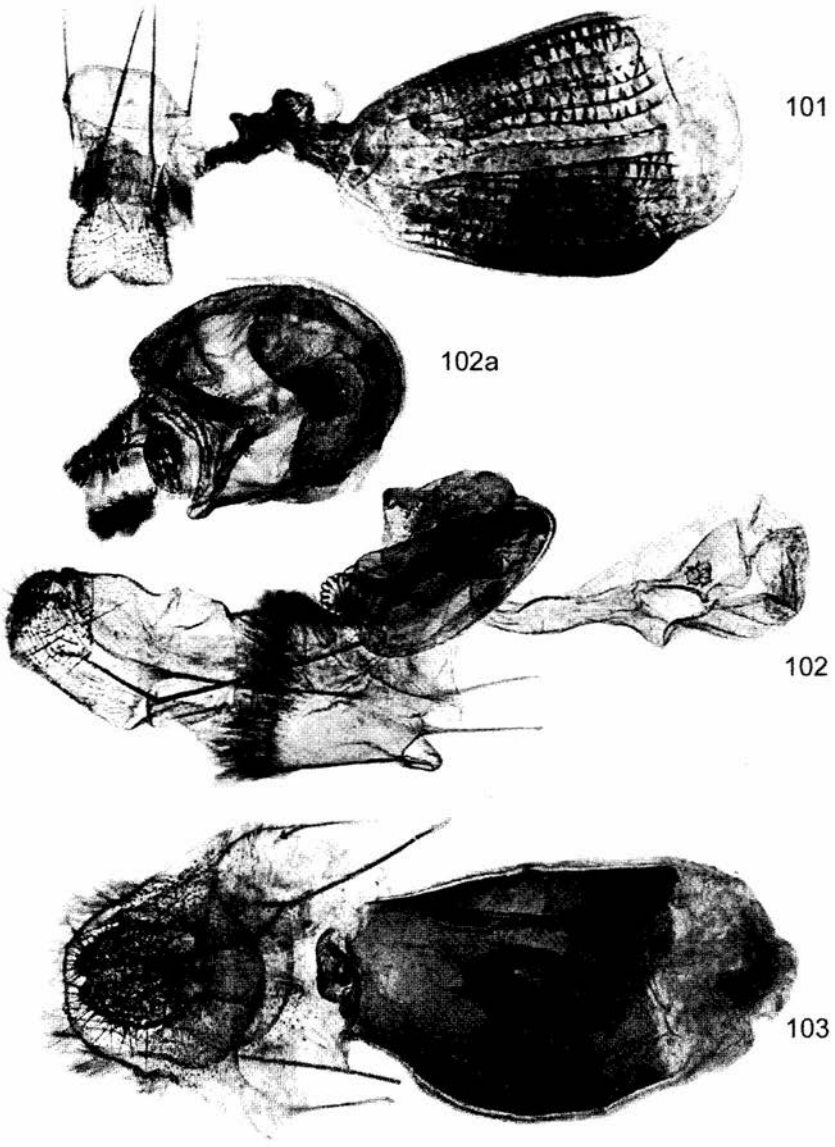

Plate 68. Female genitalia: 101. *Charissa intermedia*: Poland, Małopolska; 102. *Elophos dilucidaria*: Poland, Dolny Śląsk; 102a. antrum (ventrally, enlarged); 103. *Elophos vittaria*: Poland, Dolny Śląsk.

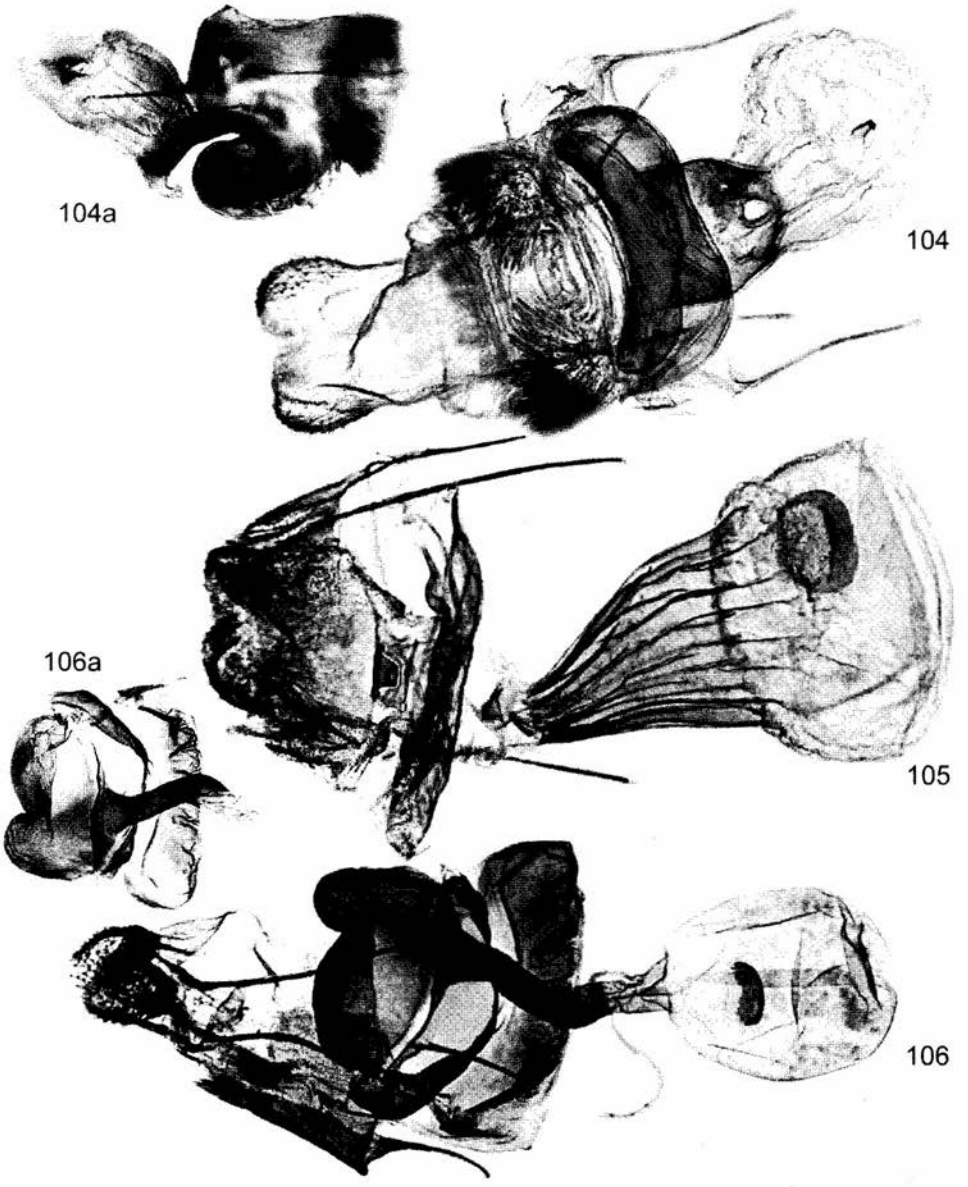

Plate 69. Female genitalia: 104. *Elophos operaria*: orig. ?; 104a. antrum (laterally, enlarged); 105. *Psodos quadrifaria*: Poland, Tatry; 106. *Glacies canaliculata*: Poland, Tatry; 106a. lamella postvaginalis + antrum (opposite view, reduced).

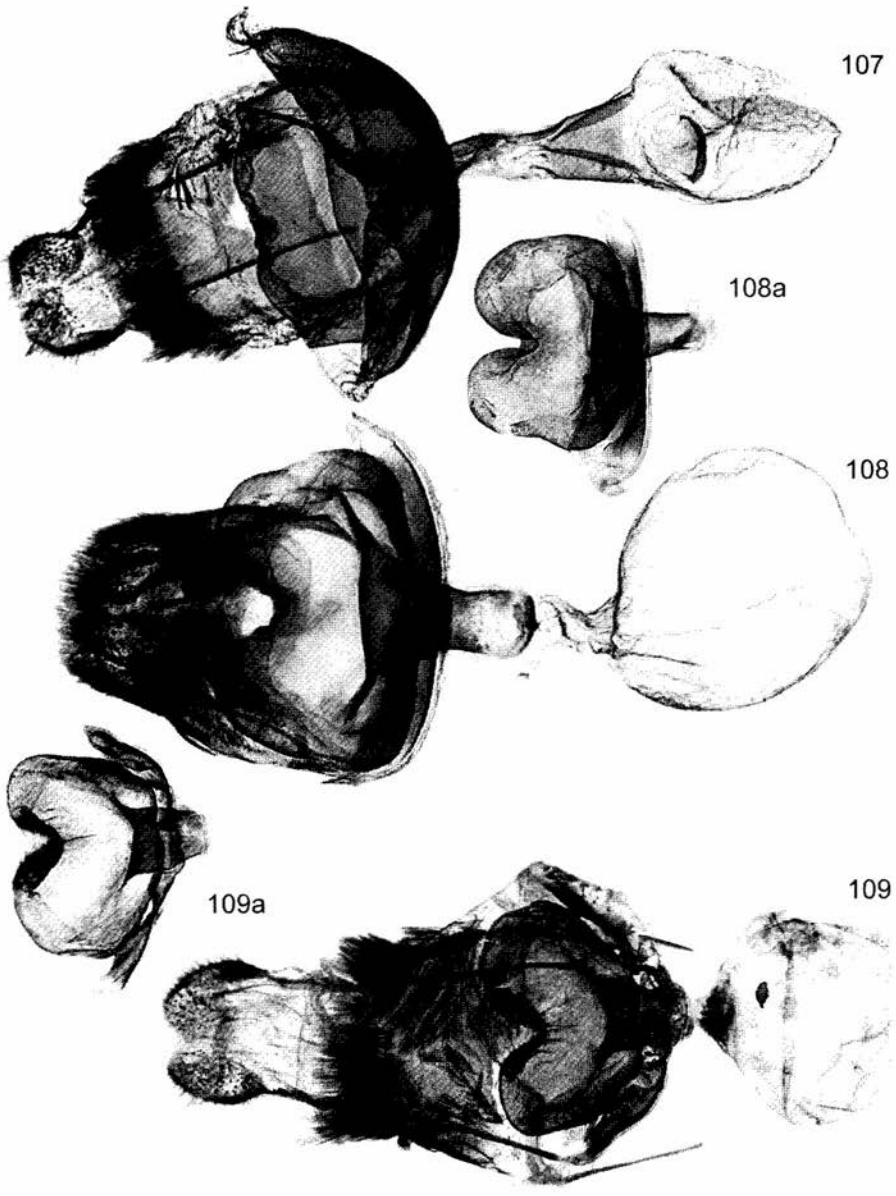

Plate 70. Female genitalia: 107. *Glacies noricana*: Austria, Styria; 108. *Glacies coracina*: Italy, Stelvio; 108a. lamella postvaginalis: Finland, Utsjoki; 109. *Glacies alpinata*: Poland, Dolny Śląsk; 109a. lamella postvaginalis.

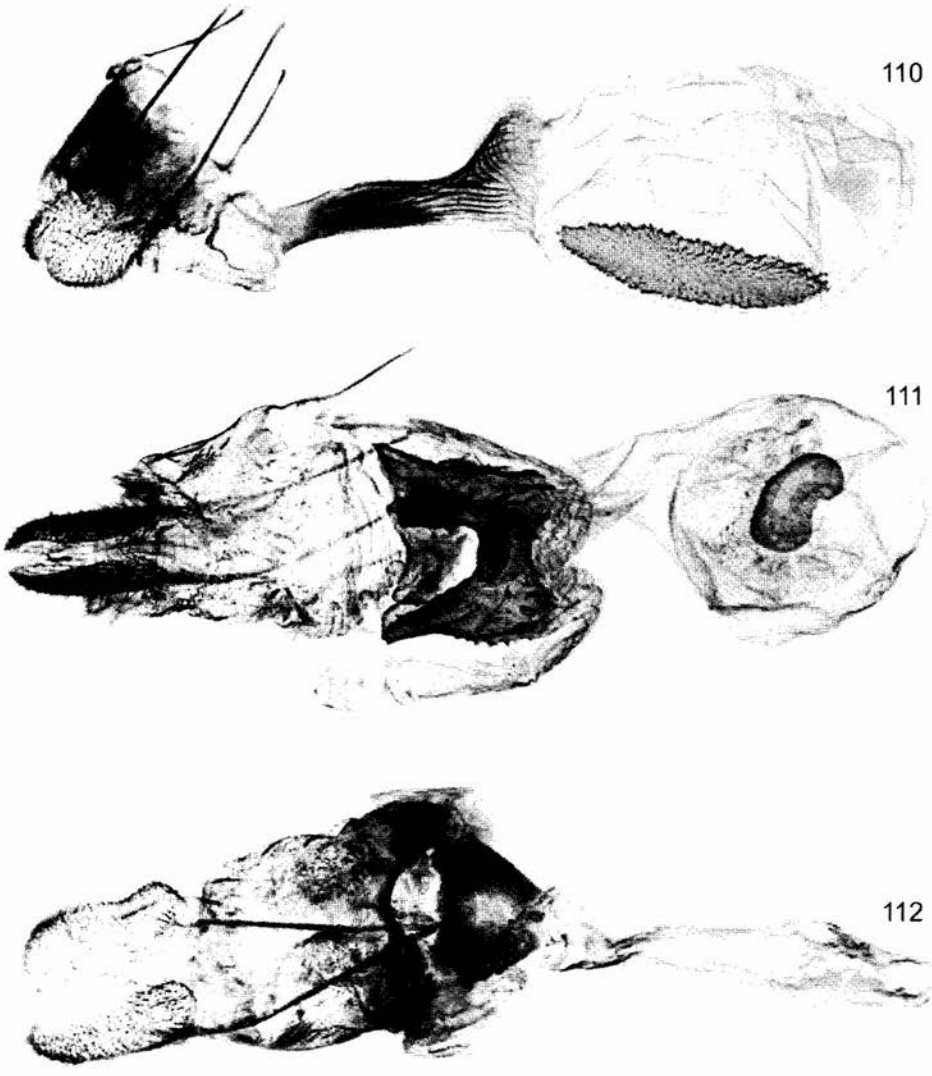

Plate 71. Female genitalia: 110. *Siona lineata*: Poland, Dolny Śląsk; 111. *Chariaspilates formosaria*: Poland, Podlasie; 112. *Aspitates gilvaria*: Czech Rep., Česky Kras.

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Plate 72. Female genitalia: 113. *Dyscia fagaria*: Poland, Dolny Śląsk; 114. *Perconia strigillaria*: Poland, Górny Śląsk.

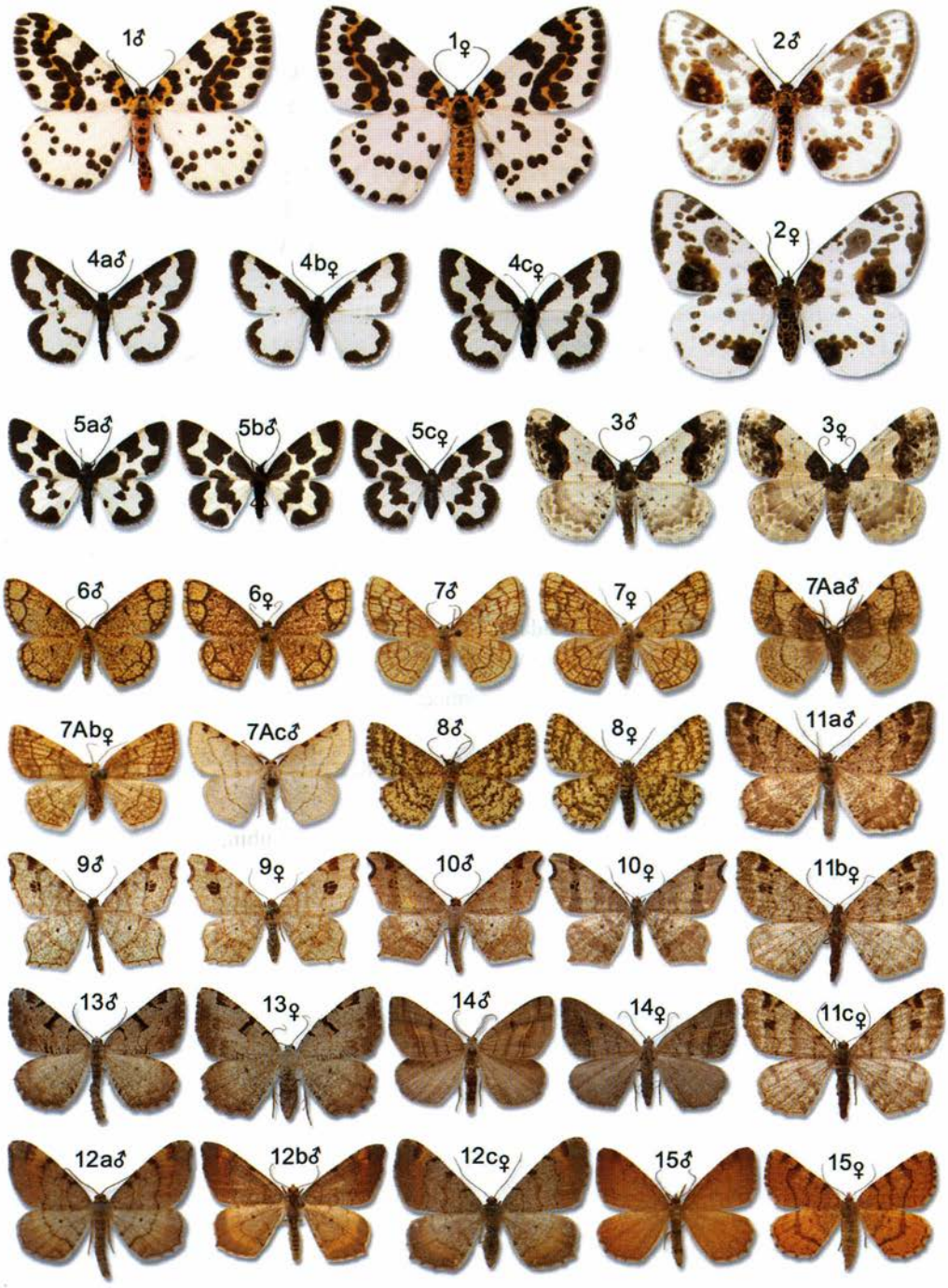
COLOUR PLATES

PLATE I

1. *Abraxas grossulariata* – ♂ PL Pieniny, Podskalnia Góra, 17 VI 2007, leg. AM; ♀ PL Bagieniec k. Świdnicy, 16 V [19]97, ex l., leg. JM
2. *Abraxas sylvata* - ♂ PL Suwalski P.[ark] K.[rajobrazowy], Turtul, 2 VII 1997, leg. JB; ♀ PL Okrągłe, 19 VI 1988, leg. JB
3. *Ligdia adustata* – ♂ PL Macoszyn, LB.[Lubelskie], 20 V 2005, leg. AM; ♀ PL Prawików n/Odrą, 1 V 1993, leg. AM
4. *Lomaspilis marginata* – a. ♂ PL Tatry, Dol.[ina] Strążyska, 1100 m, 8 VI 1997, leg. JB; b. ♀ PL Toruń, 10 V 1994, leg. JB; c. ♀ PL Macoszyn UTM FB79, 27 V 2003, leg. MH
5. *Lomaspilis opis* – a. ♂ PL Puszcza Borecka, 7 VI 1994, leg. JB; b. ♂ PL Mostki ad Staszów, 6 VI 1990, leg. K. Pałka; c. ♀ PL Puszcza Borecka, 13 VI 1994, leg. JB
6. *Stegania cararia* – ♂ PL Czarny Bryńsk, DD19, 11 VII 2005, leg. JB; ♀ PL Woźniki, 10 VI 1998, leg. DŁ
7. *Stegania dilectaria* – ♂ SK Stražske, 22 VI 1991, leg. Z. Tokár; ♀ SK Oreské, 30 VII 1991, leg. Z. Tokár

7A. *Stegania trimaculata* – a. ♂ D Mark Brandenburg, Herzfelde, 15 V 2009, leg. JG; b. ♀ D Mannheim, coll. MP UWr.; c. ♂ D Mark Brandenburg, Königs-Wüsterhausen, 6 IX 2007, leg. JG & AM

8. *Heliomata glarearia* – ♂ PL rez.[erwat] Zbocza Płutowskie, CE20, 9 VI 2001, leg. JB; ♀ PL rez.[erwat] Zbocza Płutowskie, CE20, 18 V 2002, leg. AM
9. *Macaria notata* – ♂ PL rez.[erwat] Las Piwnicki, 16 V 1994, leg. JB; ♀ PL rez.[erwat] Las Piwnicki, 16 V 1994, leg. JB
10. *Macaria alternata* – ♂ PL Wrocław, 16 V 1990, leg. AM; ♀ PL rez.[erwat] Sobowice, FB66, 21 VI 2006, leg. JB
11. *Macaria signaria* – a. ♂ PL Puszcza Borecka, 22 VI 1994, leg. JB; b. ♀ PL Zakopane, 15 VI 1996, leg. JB; c. ♀ PL Grzędy, Biebrzański P.[ark] N.[arodowy], 16 VI 2004, leg. AM
12. *Macaria liturata* – a. ♂ PL Szklarska Poręba G.[órna], 1 VI 1990, leg. AM; b. ♂ PL Wzgórza Kiełczyńskie, 17 V 1996, leg. AM; c. ♀ PL Toruń, 25 V 1996, leg. JB
13. *Macaria wauaria* – ♂ PL Puszcza Borecka, 7 VII 1994, leg. JB; ♀ PL Bachotek k. Brodnicy, 17 V 1991, ex l., leg AM
14. *Macaria artesiaria* - ♂ PL Kosyń, Polesie Zach.[odnie], 7 VI 1996, leg. AM; ♀ PL Sobibór, Polesie Zach.[odnie], 14-16 VII 2001, leg. AM
15. *Macaria brunneata* – ♂ PL Soldany, 17 VI 1988, leg. JB; ♀ PL Osowiec, 25 VI 1994, leg. JB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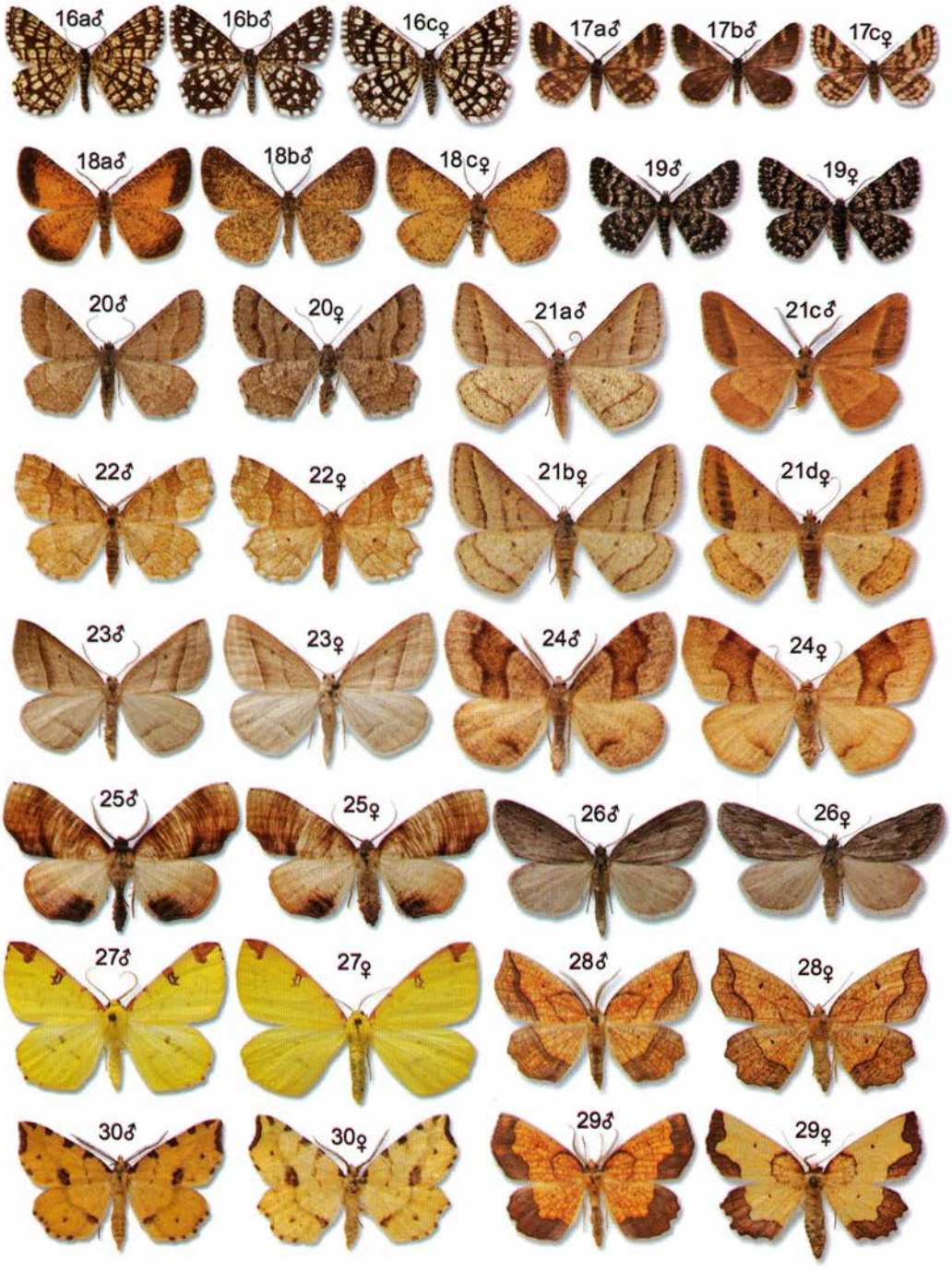
11b♀
13♂
13♀
14♂
14♀
11c♀
12a♂
12b♂
12c♀
15♂
15♀

PLATE II

16. *Chiasmia clathrata* – a. ♂ PL D.[olny] Śląsk, Koźlice ad Lubin, 3-4 V 2002, leg. AM; b. ♂ PL rez.[erwat] Zielone Skałki, 21 VI 1998, leg. AM; c. ♀ PL Wągrowiec, XU45, 16 V 2004, leg. JB
17. *Narraga fasciolaria* – a. ♂ PL Glinki, 24 V 1994, leg. JB; b. ♂ PL D.[olny] Śląsk, Brzezia Łąka, 7 VII 2000, leg. AM; c. ♀ PL Toruń, 1 VI 1990, leg. JB
18. *Isturgia roraria* – a. ♂ PL G.[óry] Opawskie, Pokrzywna, alt. 400m, 25 VIII 2001, leg. AM; b. ♂ PL Józefów, EA30, 27 V 2005, leg. K. Surowiak; c. ♀ PL G.[óry] Opawskie, Pokrzywna, alt. 400m, 25 VIII 2001, leg. AM
19. *Isturgia carbonaria* – ♂ PL Mostówka ad Wyszków, 6 V 2006, leg. AM; ♀ PL Mostówka ad Wyszków, 6 V 2006, leg. AM
20. *Isturgia murinaria* – ♂ PL Toruń– Glinki, 18 V 2002, ex o., leg. AM; ♀ PL Toruń– Glinki, 18 V 2002, ex o., leg. AM
21. *Isturgia arenacearia* – a. ♂ (1 gen.), SK Kašvar, 14 V 1994, leg. Z. Tokár; b. ♀ (1 gen.) SK Komarno, 30 VI 1987, leg. Pastoralis; c. ♂ (2 gen.) PL Hańsk, 26 VII 1997, leg. R. Mazurek; d. ♀ (2 gen.) CZ Pálava, Stolová hora, 2 VIII 1993, leg. J. Liška
22. *Cepphis advenaria* – ♂ PL Ruda Milicka, 8 VI 1992, leg. AM; ♀ PL P.[uszcza] Białowieska, oddz.[iał] 368, 14 VI 1994, leg. AM
23. *Petrophora chlorosata* – ♂ PL Górzyniec, 26 V 1992, leg. AM; ♀ PL Puszcza Borecka, 2 VI 1994, leg. JB
24. *Plagodis pulveraria* – ♂ PL Danowo, 29 V 1988, leg. JB; ♀ PL Budy ad Białowieża, 23 V 2003, leg. AM
25. *Plagodis dolabraria* – ♂ PL D.[olny] Śląsk, Koźlice ad Lubin, 3-4 V 2002, leg. AM; ♀ PL Zawiercie, 25-28 V 1995, leg. AM
26. *Pachycnemia hippocastanaria* – ♂ PL D.[olny] Śląsk, Ławszowa n/ Kwisą, 17-18 V 2003, leg. AM; ♀ PL D.[olny] Śląsk, Ławszowa n/ Kwisą, 17-18 V 2003, leg. AM
27. *Opisthograptis luteolata* – ♂ PL Toruń, ex l. 23 III 1995, leg. JB; ♀ PL Szkl.[arska] Poręba Śr.[ednia], 15 VI 1991, leg. AM
28. *Epione repandaria* – ♂ PL Wrocław-Rędzin, 14 VII 1996, leg. AM; ♀ PL Puszcza Borecka, 23 IX 1993, leg. JB
29. *Epione vespertaria* – ♂ PL Puszcza Borecka, 13 VII 1991, leg. JB; ♀ PL Puszcza Borecka, 29 VII 1994, leg. JB
30. *Therapis flavicaria* – ♂ IR Golestan, 720 m, Golestan Nat.[ional] Park, Tangeh-Gol, 30 VIII 2009, leg. JB; ♀ CZ Moravia, Kobyli, 21 V 2009, leg. J. Unčař


16a♂
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30♀
29♂
29♀

PLATE III

31. *Pseudopanthera macularia* - ♂ PL Puszcza Borecka, 21 V 1983, leg. JB; ♀ PL Budy ad Białowieża, 23 V 2003, leg. AM
32. *Hypoxystis pluviaria* – a. ♂ (2 gen.), PL Radawa, ex o. V 2010, leg. J. Płocica; b. ♀ (2 gen.) PL Radawa, ex o. V 2010, leg. J. Płocica; c. ♂ (1 gen.), PL Józefów, EA30, 3 V 2005, leg. K. Surowiak; d. ♀ PL Czerlonka, Puszcza Biał.[owieska], 4 VII 1979, leg. Z. Śliwiński
33. *Apeira syringaria* – a. ♀ (1 gen.) PL Uliczno ad Dzierżoniów, ex l. 14 VI 1997, leg. JM; b. ♂ (1 gen.) PL Mostki ad Staszów, 18 VI [19]90, leg. K. Pałka; c. ♀ (2 gen.) PL Gałów ad Wrocław, 27 VIII 2010, leg. AM
34. *Ennomos autumnaria* – ♂ PL Puszcza Borecka, 18 VIII 1993, leg. JB; ♀ PL Koło, 30 VII 1980, leg. J. Nowacki
35. *Ennomos quercinaria* – ♂ PL Wrocław – Wojnów, 30 VI 2009, leg. AM; ♀ PL Wrocław – Zalesie, 30 VII 1990, leg. AM
36. *Ennomos alniaria* – ♂ PL D.[olny] Śląsk, Rudno, 29 IX 2000, leg. AM; ♀ PL Mielnik, 18 VIII 1998, leg. DŁ
37. *Ennomos fuscantaria* – a. ♂ PL Markowa EA94, VIII [19]92, leg. J. Mazepa; b. ♂ PL Wrocław-Leśnica, VIII 1980, leg. J. Budzik; c. ♀ PL D.[olny] Śląsk, Milin n/Bystrzycą, 19 VIII 2010, leg. AM

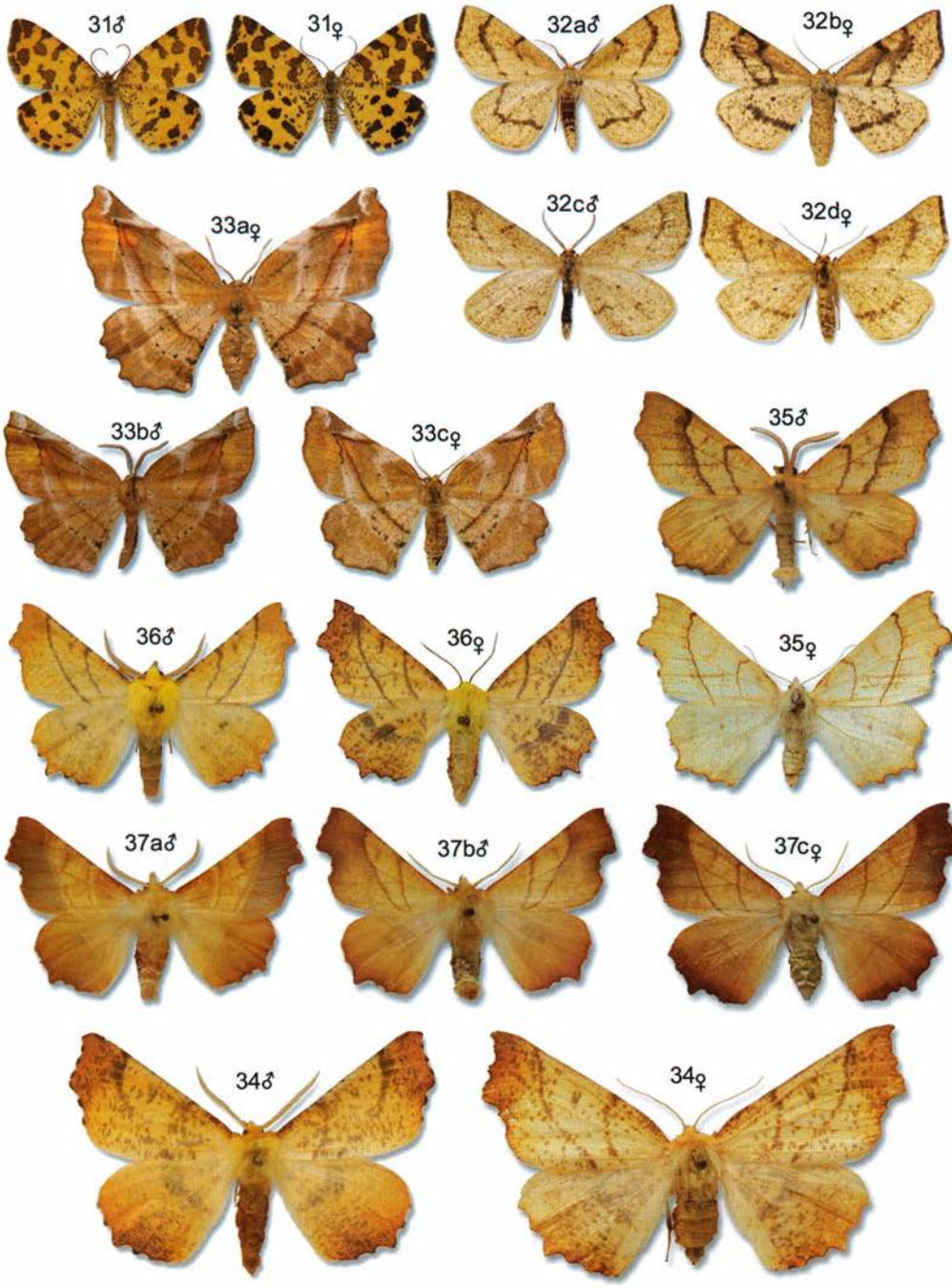
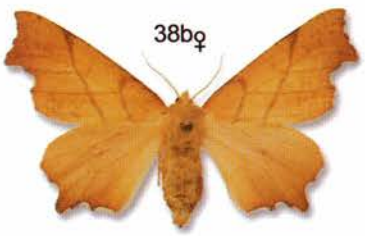

31♂
31♀
32a♂
32b♀
33a♀
32c♂
32d♀
33b♂
33c♀
35♂
36♂
36♀
35♀
37a♂
37b♂
37c♀
34♂
34♀

PLATE IV

38. *Ennomos erosaria* – a. ♂, PL Puszcza Borecka, 25 VII, 17 VIII 1994, leg. JB; b. ♀ PL Stary Wołów, 30 IX 2001, leg. AM; c. ♂ PL Tomisław n/Kwisą, VI 2004, leg. A. HYJEK; d. ♂ PL Tomisław n/Kwisą, VI 2004, leg. A. HYJEK
39. *Selenia dentaria* – a. ♂ (1 gen.), PL Koźlice ad Lubin, 20 IV 2002; b. ♀ (1 gen.), PL Ruda Milicka, 2 V 1992, leg. AM; c. ♀ (1 gen.), PL Koźlice ad Lubin, 3 V 2002; d. ♀ (2 gen.), PL Antoniów, Kotl[ina] Sandomierska, 26 VI 1990, ex l., leg. AM
40. *Selenia tetralunaria* – a. ♂ (1 gen.), PL Puszcza Borecka, e.l. 3 III 1995, leg. JB; b. ♀ PL Sudety, Hala pod Klinem, 5 VII 2006, leg. AM; c. ♂ (2 gen.), PL Puszcza Borecka, 26 VII 1994, leg. JB
41. *Selenia lunularia* – a. ♂ (1 gen.), SK Slavec, Slov. Kras, 28-30 V 1995, leg. JK; b. ♀ (1 gen.), PL Pieniny, Sromowce Niżne – Pawil.[on], 3 VI 2005, leg. R.Wąsala; c. ♂ (2 gen.), PL Pieniny, Macelowa Góra, 29 VIII 1960, leg. E. Palik; coll. ISEZ


38a♂


38b♀


38c♂


38d♂


39a♂

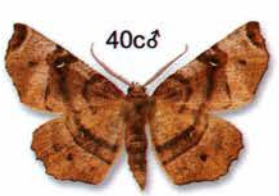

39b♀


39c♀


39d♀


40a♂


40b♀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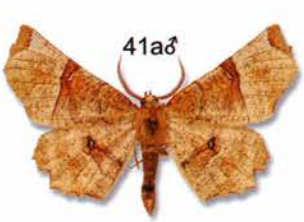
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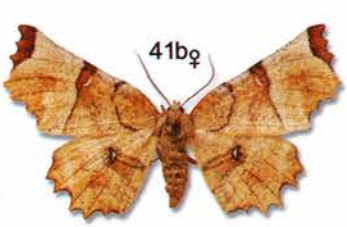

41b♀

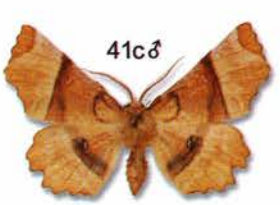
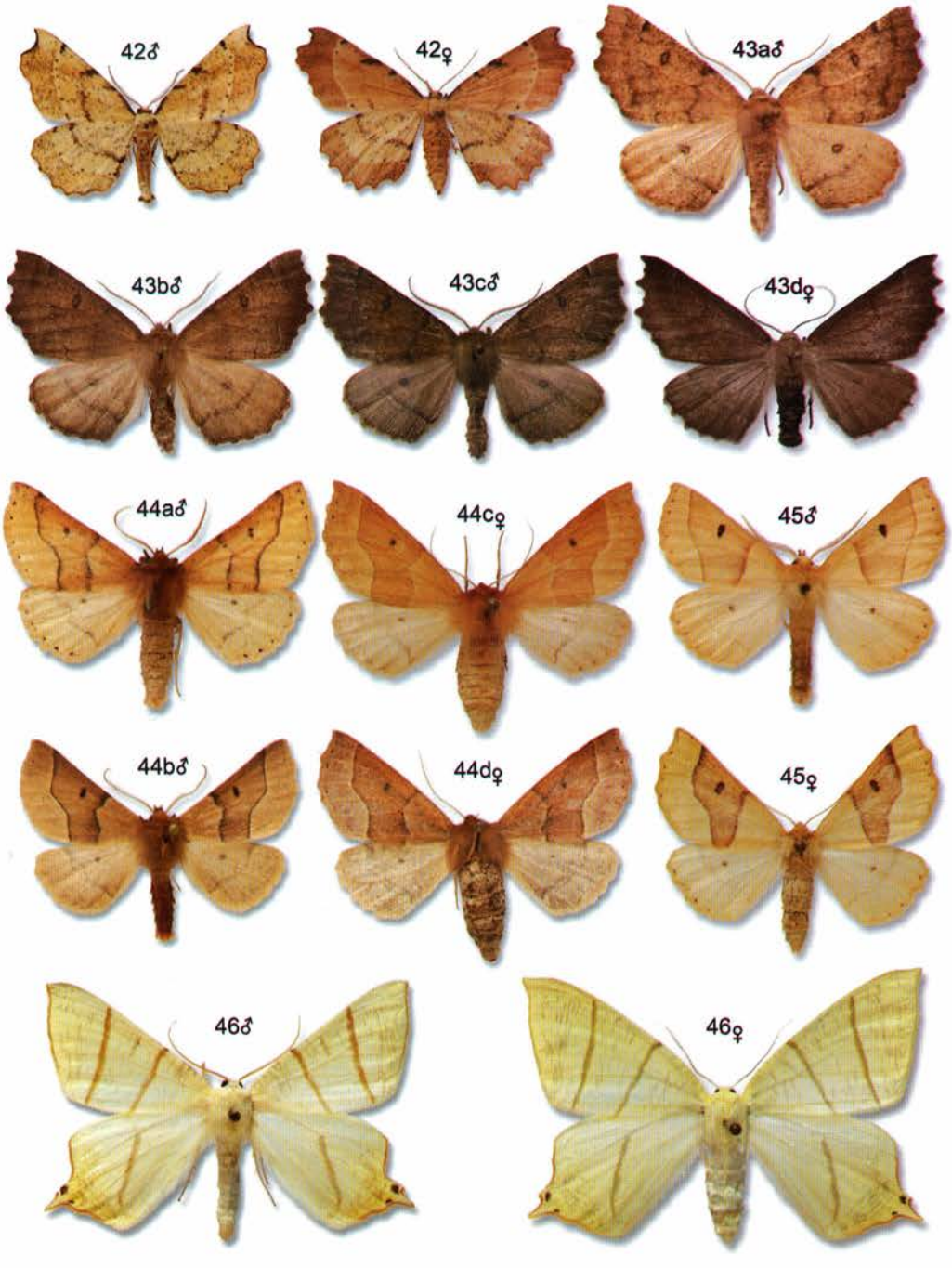

41c♂

PLATE V

42. *Artiora evonymaria* – ♂ PL Kątna ad Wrocław, 16 VIII 1996, leg. AM; ♀ PL Bagieniec ad Świdnica, 9 V [19]97, leg. JM
43. *Odontopera bidentata* – a. ♂ PL Puszcza Borecka, 28 V 1994, leg. JB; b. ♂ PL Jugowice, 8/9 V 2010, leg. JM; c. ♂ PL rez. Las Piwnicki, 16 V 1994, leg. JB; d. ♀ PL Zawiercie, 25-28 V 1995, leg. AM
44. *Crocallis tusciaria* - a. ♂ D Rheinland-Pfalz, Bad Kreuznach, Umg. Traizen, 19 IX 2007, leg. B. Niemeier; b. ♂ BG Arkutino, 19 X 2005, leg. JB; c. ♀ D Süd Kyffhäuser, ex o. 21 IX 1999, leg. G. Kaiter; d. ♀ F Alpes Marit[imes], Saorge env., Vall de Cayros, 30 X 2003, 515m, ex ovo, leg. M. Dvorak
45. *Crocallis elinguaria* – ♂ PL D.[olny] Śląsk, Obiszów ad Głogów, 9 V 2003, ex larva, leg. AM; ♀ PL Tatry, Wlk.[Wielkie] Koryciska, 23 VIII 1996, leg. AM
46. *Ourapteryx sambucaria* – ♂ PL Wrocław-Zalesie, 15 VI 1992, leg. A. Malkiewicz; ♀ PL Wapienne ad Gorlice, 12 VII 2009, ex o., leg. AM


42♂
42♀
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43c♂
43d♀
44a♂
44c♀
45♂
44b♂
44d♀
45♀
46♂
46♀

PLATE VI

47. *Colotois pennaria* – a. ♂ PL Puszcza Borecka, e.l. 9 X 1994, leg. JB; b. ♂ PL rez.[erwat] Jodłowice, 10 X 1995, leg. AM; c. ♀ PL Nowe Rochowice, G.[óry] Kaczawskie, alt. 450 m, 1 XI 1994, leg. AM
48. *Angerona prunaria* – a. ♂ PL Puszcza Borecka, 21 VI 1994, leg. JB; b. ♂ PL Puszcza Borecka, 4 VI 1993, leg. JB; c. ♂ PL Pieniny, Macelowa Góra, 13 VI 1964, leg. E. Palik; d. ♂ PL Hołubla ad Przemyśl, 12 VI 1995, leg. AM; e. ♀ Pogorzała k. Świdnicy, 9 VI 1993, leg. JM; f. ♀ Ławszowa n/Kwisą, 30 V 2002, leg. AM
49. *Apocheima hispidaria* – a. ♂ PL Morzęcin Wlk.[Wielki], Wzg[órza] Trzebnickie, 21 II 1995, leg. AM; b. ♀ PL Wrocław-Leśnica XS36, 26 II 2008, leg. MM; c. ♂ PL Wrocław – Zakrzów, 6 III 2002, leg. AM; d. ♂ PL Wrocław – Zakrzów, 6 III 2002, leg. AM

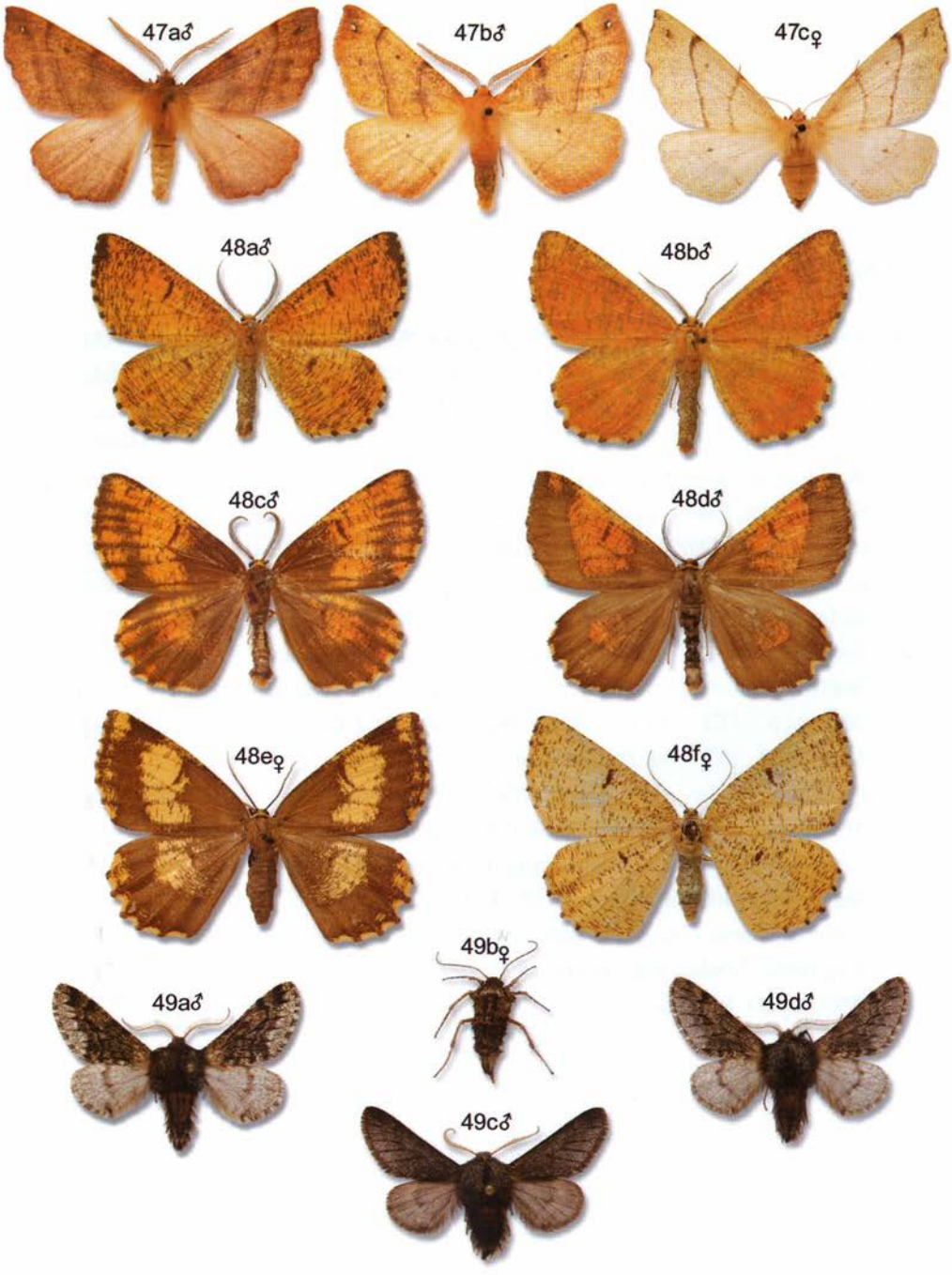
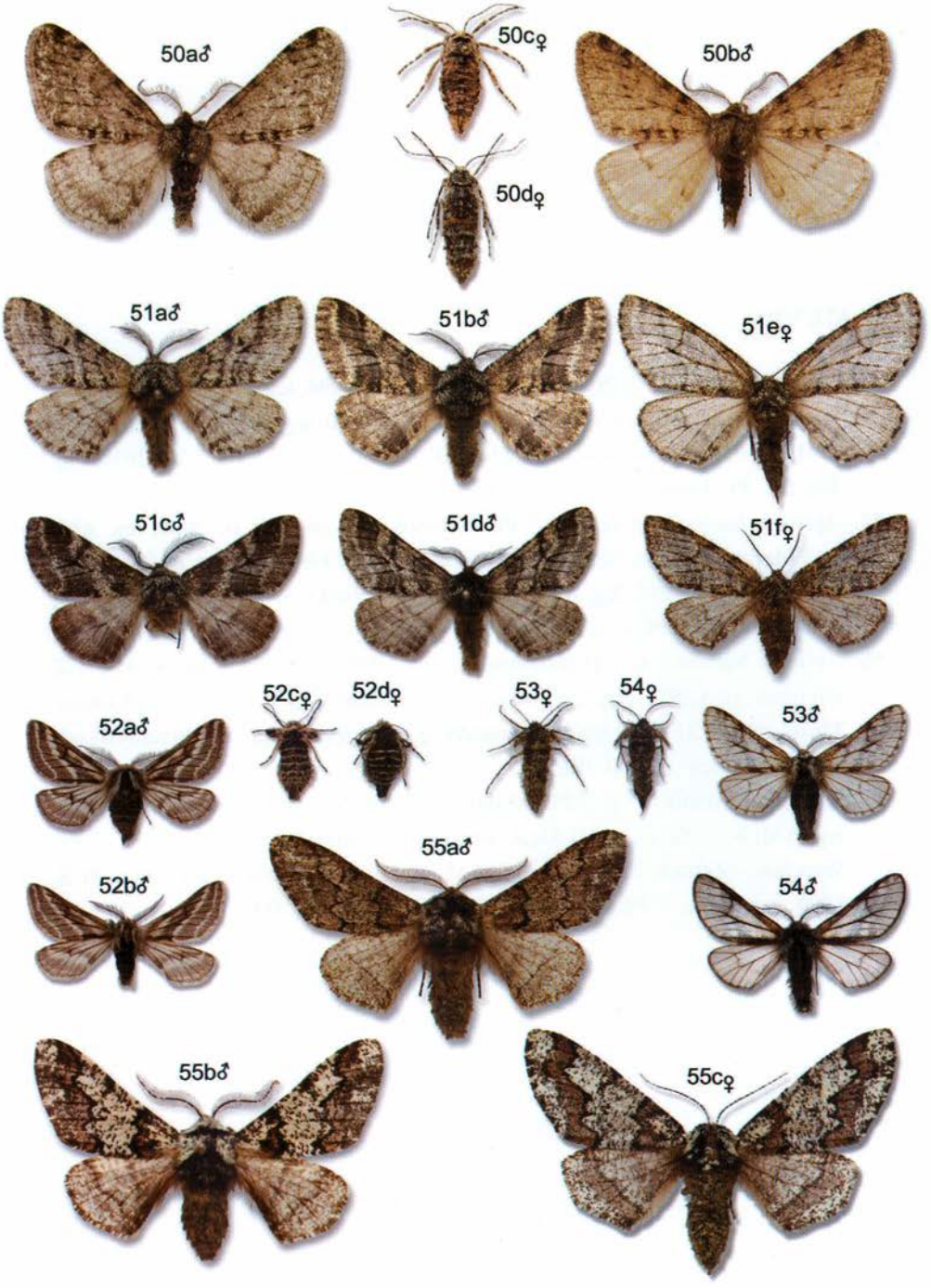

47a♂
47b♂
47c♀
48a♂
48b♂
48c♂
48d♂
48e♀
48f♀
49b♀
49a♂
49d♂
49c♂

PLATE VII

50. *Apocheima pilosaria* – a. ♂ PL Wrocław-Wojnów 1-4 IV 2000, leg. AM; b. ♂ PL Wrocław-Wojnów 1-4 IV 2000, leg. AM; c. ♀ PL Kraków, Las Wolski, 6 III 1964, leg. E. Palik; d. ♀ PL Puszcza Borecka, e.l. 11 II 1995, leg. JB
51. *Lycia hirtaria* – a. ♂ PL Wrocław-Wojnów 1-4 IV 2000, leg. AM; b. ♂ PL Osolin, Wzg.[órza] Trzebnickie, 28 IV 1997, leg. AM; c. ♂ f. *hanoviensis*: PL Puszcza Białowieska, Park Narodowy, kw.[adrat] 317, 7 IV 1966, ad luc.[em], Bór mieszany, ex coll. MiZW; d. ♂ PL Sucha Beskidzka CA91, 16 IV 2000, leg. WZ; e. ♀ PL Majówka, 23 IV 1998, leg. DŁ; f. ♀ f. *hanoviensis*: UA Szkło [Shklo] ad Jaworów [Javoriv], 26 IV 1942, leg. ?; coll. ISEZ
52. *Lycia zonaria* – a. ♂ CZ Milovice, 7 IV 1998, leg. Bouma; b. ♂ Oderburg, leg. Nentwig, coll. ISEZ Kraków; c. ♀ D Niedersachsen, Dannenberg, larva: 6 VII 1987, ex o. 19 III 1990, F1, leg. H. Wegner; ex coll. J. Gelbrecht; d. ♀ S Sk[ania], Tollarp, 6 V 1970, leg. H. Elmqvist
53. *Lycia pomonaria* – ♂ PL D.[olny] Śląsk, Wrocław-Wojnów, 1-4 IV 2000, leg. AM; ♀ PL Kraków-Tyniec, 19 III 1982, leg. E. Palik
54. *Lycia isabellae* - ♂ PL Sudety, Trójgarb, alt. 600 m, 28 III 2003, leg. AM; ♀ PL Sudety, Trójgarb, alt. 600 m, 28 III 2003, leg. AM
55. *Biston strataria* – a. ♂ PL Wrocław-Zalesie, 31 III 1992, leg. AM; b. ♂ PL Wzg.[órza] Trzebnickie, Osolin, 28 IV 1997, leg. AM; c. ♀ PL Chotycze, 27 III 1999, leg. D. Wasiluk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51e♀
51c♂
51d♂
51f♀
52c♀
52d♀
53♀
54♀
52a♂
53♂
55a♂
52b♂
54♂
55b♂
55c♀

PLATE VIII

56. *Biston betularia* - a. ♂ PL Puszcza Borecka, 29 V 1994, leg. JB; b. ♂ PL Janików, 9 VII 2010, leg. AM; c. ♂ PL Jugowice, 1 VII 2010, leg. JM; d. ♀ PL Giżycko, 1 VII 1996, leg. J. Buszko; e. ♀, g.[óra] Klin ad Rybnica Leśna, 3 VII 2010, leg. JM; f. ♀ PL Świdnica, e.o. 23 V 1995, leg. JM
57. *Agriopis leucophaearia* – a. ♂ PL Wrocław – Wojnów, 8 III 2009, leg. AM; b. ♂ Morzęcin Wielki, Wzg.[órza] Trzebnickie, 21 II 1995, leg. AM; c. ♂ Wrocław – Zalesie, 2 IV 1992, leg. AM; d. ♂ Morzęcin Wielki, Wzg.[órza] Trzebnickie, 21 II 1995, leg. AM; e. ♀ PL Wrocław – Wojnów, 5 III 2009, leg. AM
58. *Agriopis bajaria* – a. ♂ H Balatonakali, 27 X 1995, leg. Fr. Kopeček; b. ♀ CZ Hroběice, 10 X 1977, leg. V. Vavra c. ♂ D Rheinland-Pfalz, Cochem-Zell, Klotten/ Mosel, ex o. 7 XI 2002, leg. B. Niemeyer; d. ♂ PL Krzywcza, woj. Przemys[kie], 15 X 1977, [leg. ?]; coll. ISEZ
59. *Agriopis aurantiaria* – a. ♂ PL D.[olny] Śląsk, rez.[erwat] Jodłowice, 10 X 1995, leg. AM; b. ♀ PL D.[olny] Śląsk, rez.[erwat] Zimna Woda, leg. AM; c. ♂ PL Wrocław – Zalesie, 6 XI 1993, leg. AM; d. ♀ PL Pogorzała ad Świdnica, 31 X 1994, leg. JM; e. ♂ PL Zagórze Śląskie, 4 XI 2010, leg. JM

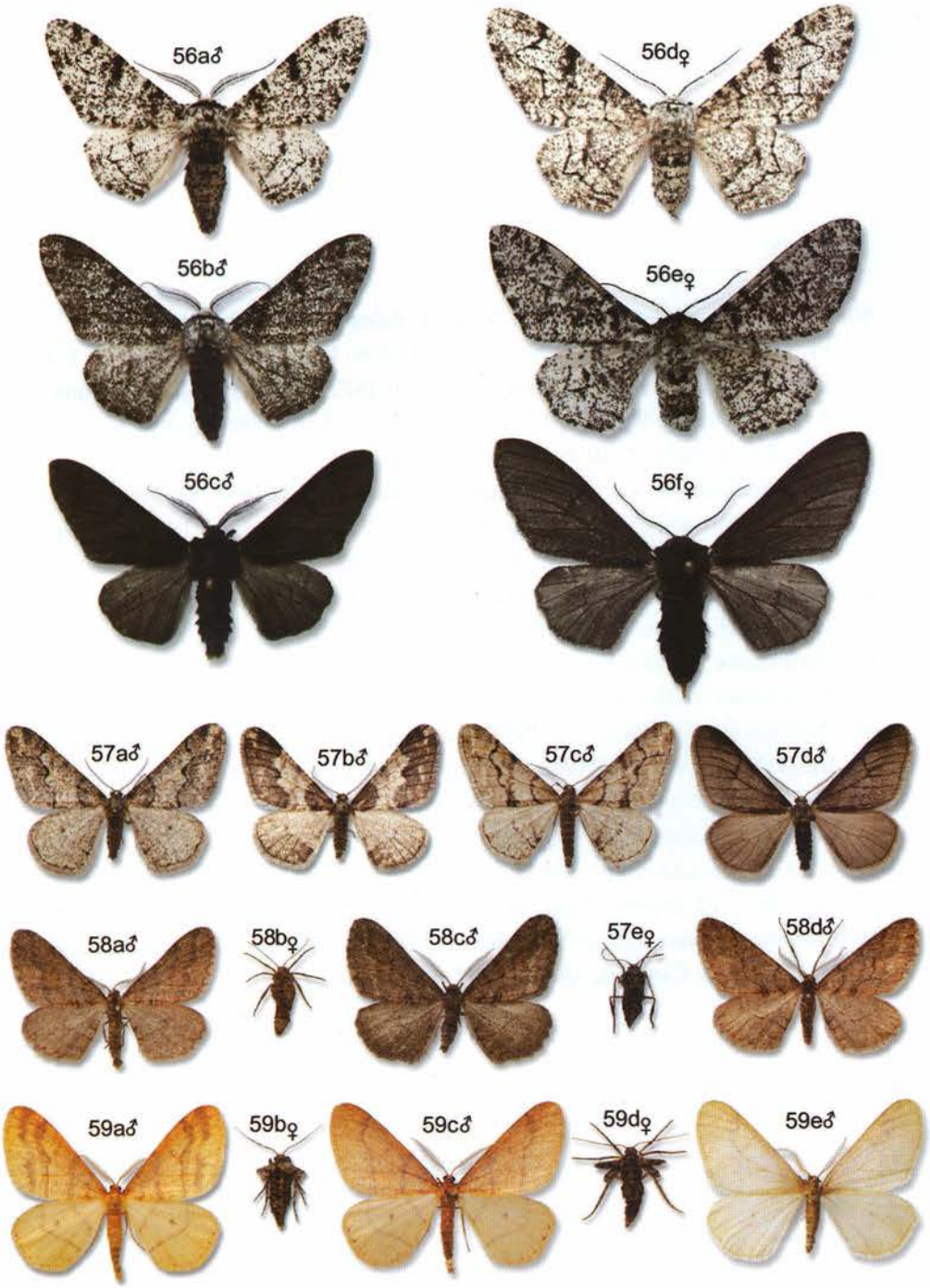
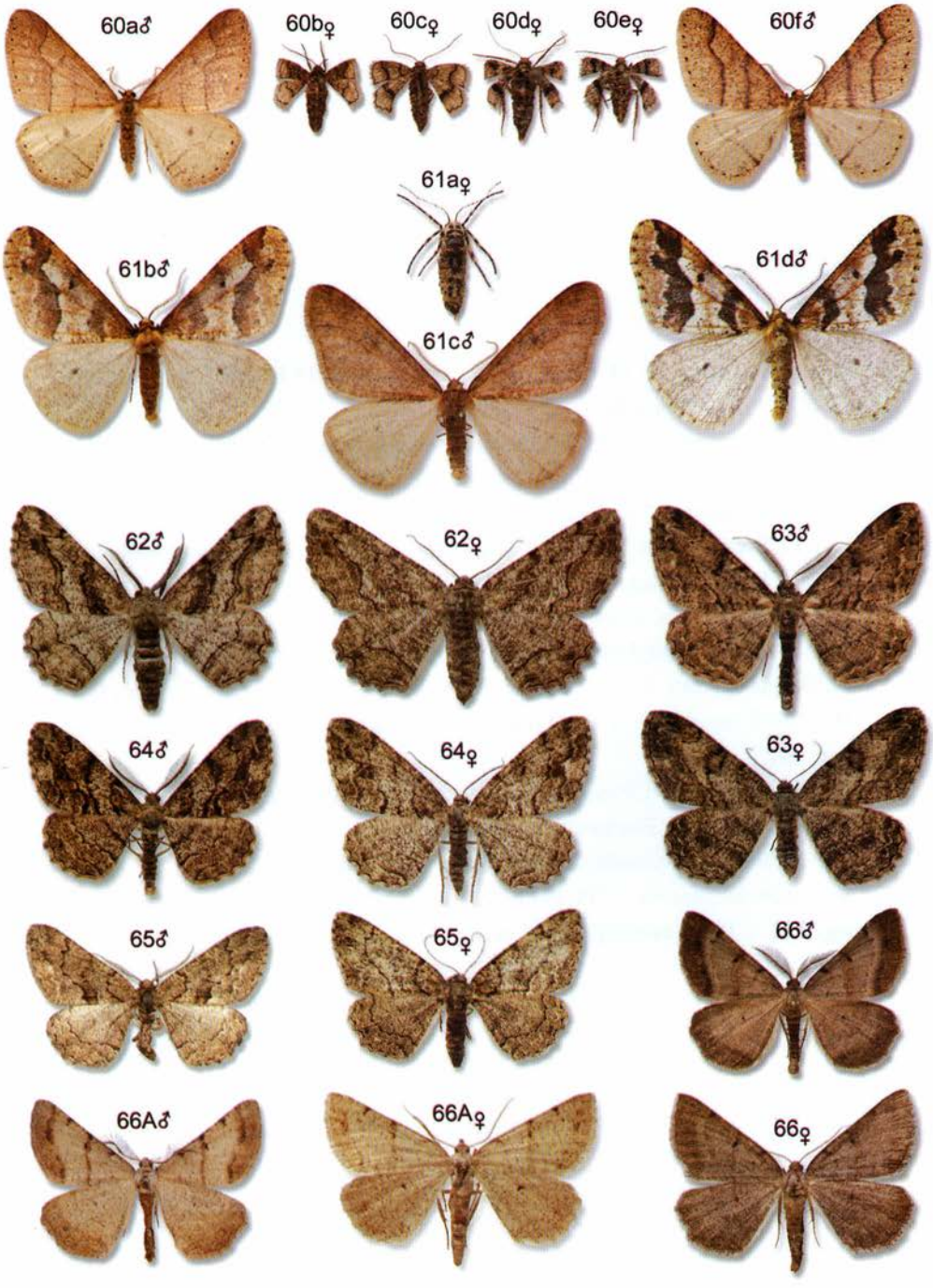

56a♂
56d♀
56b♂
56e♀
56c♂
56f♀
57a♂
57b♂
57c♂
57d♂
58a♂
58b♀
58c♂
57e♀
58d♂
59a♂
59b♀
59c♂
59d♀
59e♂

PLATE IX

60. *Agriopis marginaria* – a. ♂ PL Wrocław-Zalesie, 10 III 1993, leg. AM; b. ♀ PL Oswitz [Wrocław-Osobowice], 10 III 1899, [leg. ?] coll. ISEZ; c. ♀ UA Lwów[Lviv], ex ovo, 27 III 1904, [leg.?] coll. ISEZ; d. ♀ PL Wrocław-Wojnów, 5 III 2009, leg. AM; e. ♀ PL Wrocław-Wojnów, 5 III 2008, leg. AM; f. ♂ PL Wrocław-Wojnów, 11 III 2009, leg. AM
61. *Erannis defoliaria* – a. ♀ PL Puszcza Borecka, e.l. 25 XI 1994, leg. JB; b. ♂ PL Puszcza Borecka, 15 X 1993, leg. JB; c. ♂ PL Wrocław-Zalesie, 1 XI 2006, leg. AM; d. ♂ PL Zagórze Śląskie, 4 XI 2010, leg. JM
62. *Synopsia sociaria* – ♂ BG Schwarzmeerküste, Kranevo bei Varna, e.o. 7 VIII 1984, leg. J. Gelbrecht; ♀ A Wien, [leg.?] coll. ISEZ
63. *Peribatodes rhomboidaria* - ♂ PL Wrocław-Zalesie, 19 VII 1992, leg. AM; ♀ PL Wrocław-Karłowice, 5 IX 2010, e.o., leg. AM
64. *Peribatodes secundaria* - ♂ PL Szklarska Poręba G.[órna], 5 V 1989, ex l., leg. AM; ♀ PL D.[olny] Śląsk, Brzeg Dolny, 11 VIII 1996, leg. AM
65. *Peribatodes ilicaria* – ♂ E Granada, leg.?, coll. MNHU; ♀ E Zaragosa, Los Monegros – Castejon 400 m, 23 V 1996, M. Dvořák
66. *Selidosema brunnearia* - ♂ PL D.[olny] Śląsk, Ławszowa n/ Kwisą, 7 VIII 2002, leg. AM; ♀ PL D.[olny] Śląsk, Wilkocin ad Przemków, 16 VIII 2001, leg. AM

66A. *Selidosema plumaria* - ♂ UA Crimea, Čatyrdah, 18 VIII 1998, leg. A. Oleksa; ♀ UA Crimea, Čatyrdah, 18 VIII 1998, leg. A. Oleksa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60d♀
60e♀
60f♂
61a♀
61b♂
61c♂
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62♂
62♀
63♂
64♂
64♀
63♀
65♂
65♀
66♂
66A♂
66A♀
66♀

PLATE X

67. *Cleora cinctaria* – ♂ PL Giżycko – Twierdza EE48, 18 IV 2001, leg. JB; ♀ PL distr.[ict] Żary, Pietrzyków, 12 V 1998, leg. AK
68. *Deileptenia ribeata* – ♂ PL Szklarska Poręba G.[órna], 5 V 1989, ex l., leg. AM; ♀ PL Białowieski P.[ark] N.[arodowy], 2/ V 2002 ex larva, leg. S. Kuczkowski
69. *Alcis bastelbergeri* – a. ♂ PL Sudety, G.[óry] Kamienne, 28 VII 2010, leg. JM; b. ♀ PL Świdnica, 28 VII [19]94, leg. J. Masłowski; c. ♀ PL Pieniny, Macelowa Góra, 9 VIII 1959, leg. E. Palik; coll. ISEZ
70. *Alcis repandata* – a. ♂ SK Mala Fatra, Stefanova, alt. 700 m, 7-11 VII 1998, leg. AM; b. ♂ PL D.[olny] Śląsk, Jodłowice ad Wrocław, 12 VI 2002, leg. AM; c. ♂ PL Dolina Ojcowa, 11 IV 1989, leg. E. Palik; d. ♀ PL Bieszczady, Wetlina, larva 16 V 1997, leg. AM; e. ♀ PL D.[olny] Śląsk, Jodłowice ad Wrocław, 12 VI 2002, leg. AM
71. *Alcis jubata* – a. ♂ PL Puszcza Białowieska, 12 VII 1976, leg. A. Кокот; b. ♂ PL ok.[olica] Wołowa, Buchwald [Bukowice], 15 VIII 19[06], leg.?, coll. R. Szpor; c. ♀ PL Reinerz [Duszniki Zdrój], 26 VII 1910, coll. ISEZ
72. *Arichanna melanaria* – ♂ PL Podhale, Podczerwone – torfow.[iska], 30 VI 2002, leg. AM; ♀ PL P.[uszcza] Augustowska, Płaska, 3-7 VII 1997, leg. AM

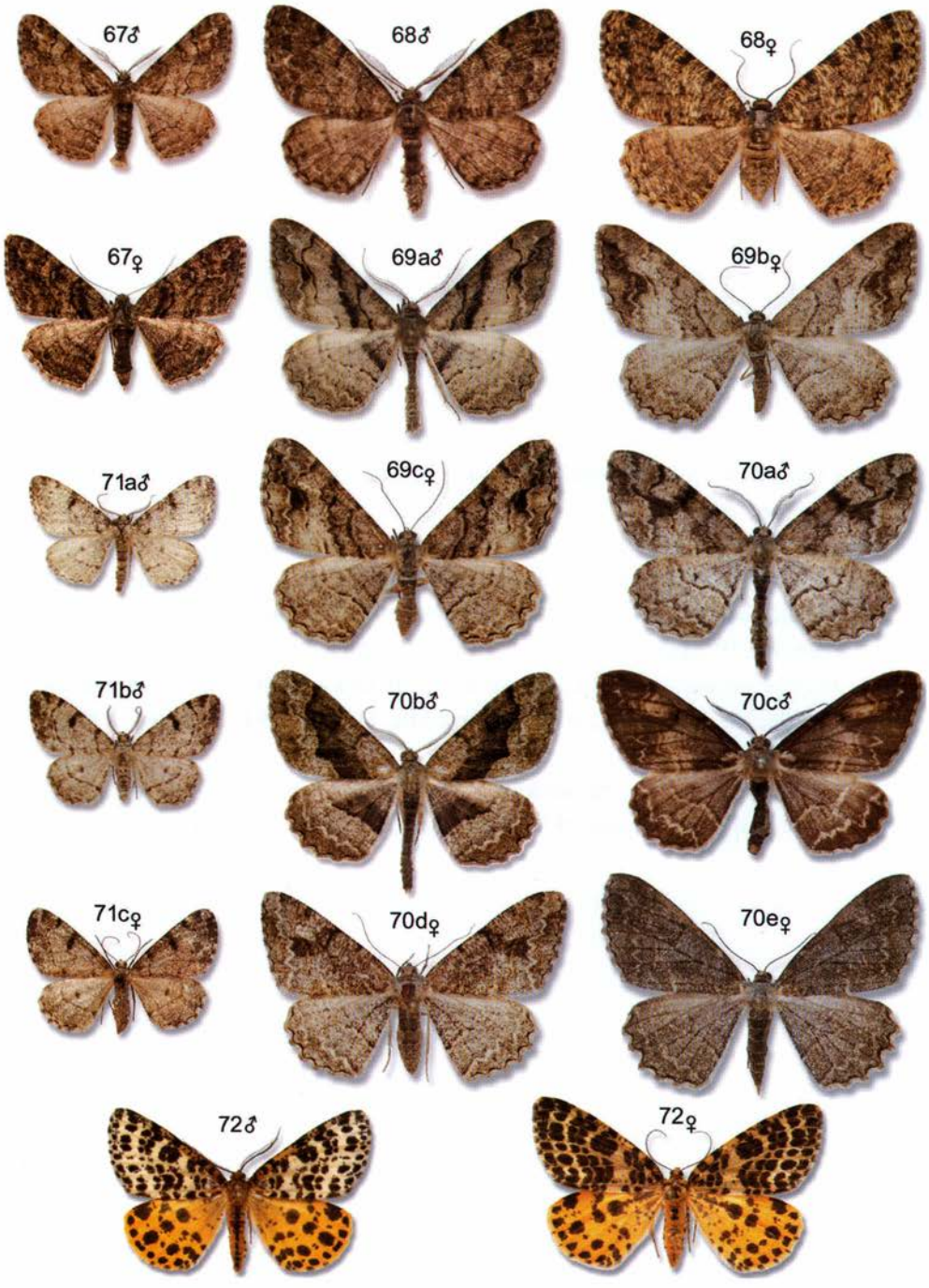

67♂
68♂
68♀
67♀
69a♂
69b♀
71a♂
69c♀
70a♂
71b♂
70b♂
70c♂
71c♀
70d♀
70e♀
72♂
72♀

PLATE XI

73. *Hypomecis roboraria* – a. ♂ PL Puszcza Borecka, 5 VI 1993, leg. JB; b. ♂ PL Chrząstawa k.[oło] Wrocławia, 20 VI 1995, leg. AM; c. ♀ PL Koźlice ad Lubin, ex o., leg. AM
74. *Hypomecis punctinalis* – a. ♂ PL Rezerwat Las Piwnicki, 10 VI 1994, leg. JB; b. ♂ PL Hołubla k.[oło] Przemyśla, 12 VI 1995, leg. AM; c. ♂ orig. ?; d. ♀ PL Hala pod Klinem, 5 VII 2006, leg. AM; e. ♀ PL Stolp [Słupsk], Waldkatze, Pommern [Pomorze], 27 V [19]34, leg. Dr Bannier, coll. MP UWr.
75. *Fagivorina arenaria* – ♂ CZ Moravia occ, Jihlava – Trešl', Roštejn, 670 m, 20 V 1998, leg. M. Dvořak; ♀ CZ Šumava Mts, 1195 m, 3 VII 2006, leg. J. Šumprich
76. *Ascotis selenaria* – ♂ PL Janików D.[olny] Śląsk, 9 VII 2010, leg. AM; ♀ PL Puszczykowo ad Poznań, 24 VI 1964, leg. E. Palik

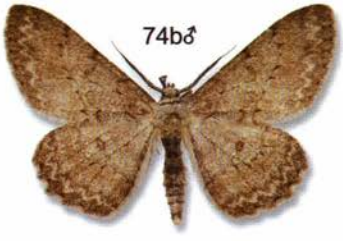

73a♂


73c♀


73b♂


74a♂


75♂


74b♂


74d♀


75♀


74c♂


74e♀

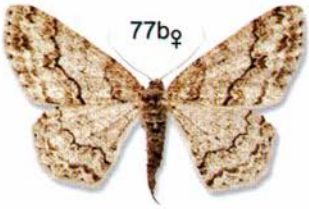

76♂

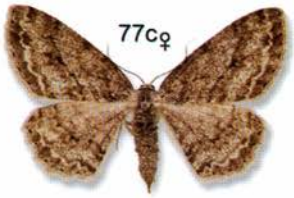

76♀

PLATE XII

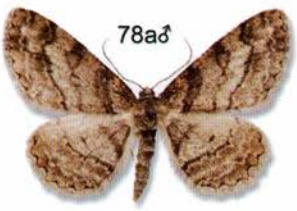
77. *Ectropis crepuscularia* – a. ♂ PL Puszcza Borecka, 2 V 1997, leg. JB; b. ♀ PL Tatry, Droga pod Reglami, Skibówki alt. 900 m, 15 V 1990, leg. AM; c. ♀ PL rez.[erwat] Zimna Woda k.[oło] Zielonej Góry, 10 VIII 1991, ex larva, leg. AM; d. ♂ PL Puszcza Borecka, e.l, 8 VIII 1994, leg. JB
78. *Paradarisa consonaria* –a. ♂ PL Puszcza Borecka, 2 V 1997, leg. JB; b. ♀ PL Karkonosze, Jagniątków, alt. 700 m, 2 VI 1994, leg. AM; c. ♀ PL Karkonosze, Jagniątków, alt. 700 m, 2 VI 1994, leg. AM; d. ♂ PL Karkonosze, Trzy Jawory, alt. 600 m, 18 IV 1990, leg. AM
79. *Parectropis similaria* – a. ♂ PL D.[olny] Śląsk, Wrocław – Rędzin, 19 V 1998, leg. AM; b. ♂ PL Mathesdorf O.S. [Maciejów ad Zabrze], 26 IV [19]28, coll. ISEZ PAN; c. ♂ PL Sudety, rez.[erwat] Wąwóz Lipa, 9 V 2003, leg. AM; d. ♀ PL Ligota Piękna, k.[oło] Wrocławia, 17 VI 1995, leg. AM
80. *Aethalura punctulata* – ♂ PL D.[olny] Śląsk, Ławszowa n/Kwisą, 1-2 V 2002, leg. AM; ♀ PL Osolin, Wzg[órza] Trzebnickie, 23 IV 1995, leg. AM
81. *Ematurga atomaria* – a. ♂ PL Glinki, 25 IV 1994, leg. JB; b. ♂ PL D.[olny] Śląsk, Chrząstawa ad Wrocław, 19 V 2002, leg. AM; c. ♀ PL Prawików, 5 VI 1997, leg. AM; d. ♀ PL Jagniątków, 25 V 1992, leg. AM

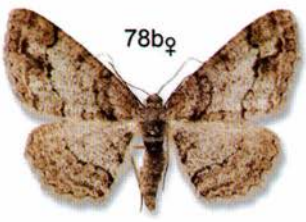

77a♂

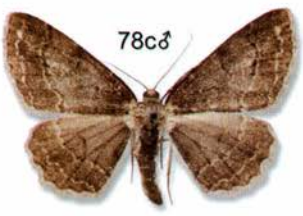

77b♀


77c♀


77d♂


78a♂


78b♀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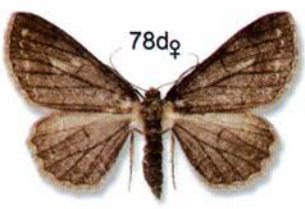
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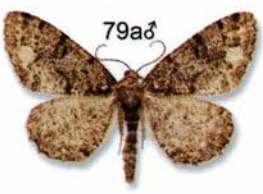
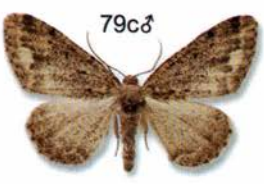
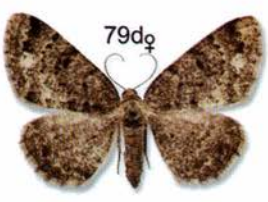
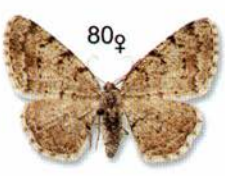

79a♂

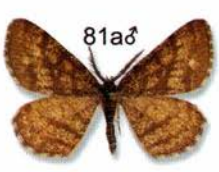

79b♂


79c♂

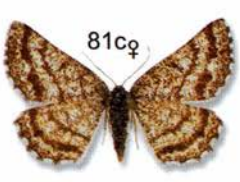

79d♀


80♂


80♀


81a♂


81d♀


81c♀

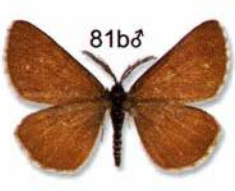
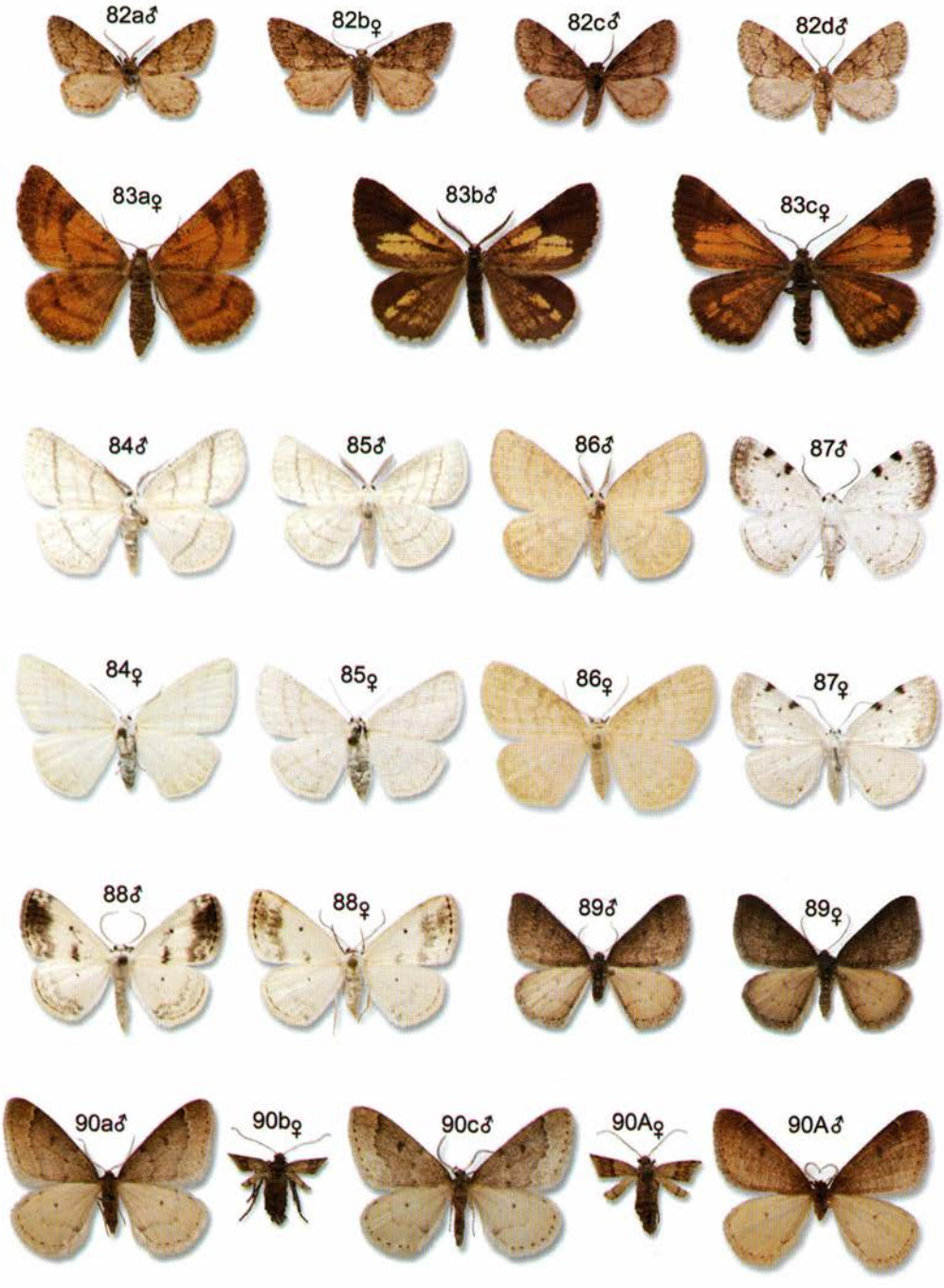

81b♂

PLATE XIII

82. *Tephronia sepiaria* – a. ♂ 1 orig. ?, coll. MNHU Berlin; b. ♀ PL Obernigk [Oborniki Śląskie], coll. ISEZ PAN; c. ♂ PL Breslau [Wrocław], 3 VII 1859, coll. MP UWr.; d. ♀ PL Stettin [Szczecin], [leg.] Bütt[ner], 25 VII [18]75, coll. MNHU
83. *Bupalus piniaria* – a. ♀ PL Góra Śl.[ąska], 21 V 1994, leg. AM; b. ♂ PL Iława, 27 V 1997, leg. J. Buszko; c. ♀ PL Dolina Cieszowska, 10 V 2010, leg. JM
84. *Cabera pusaria* – ♂ PL okol.[ice] Stobrawy, OP[opolskie], V 2008, leg. AM; ♀ PL Kotowice k.[oło] Wrocławia, 8 VI 1991, leg. AM
85. *Cabera leptographa* – ♂ PL Dolina Biebrzy – Jałowo, FE55, 7 VII 2005, ex o., leg. A. Malkiewicz; ♀ PL Wojciechów, FB69, 22 VI 2006, leg. JB
86. *Cabera exanthemata* – ♂ PL Danowo, 11 VI 1988, leg. JB; ♀ PL Puszcza Borecka, e.l., 18 IV 1994, leg. JB
87. *Lomographa bimaculata* – ♂ PL Koźlice ad Lubin, 3-4 V 2002, leg. AM; ♀ PL Wrocław – Wojnów, 23 V 2004, leg. AM
88. *Lomographa temerata* - ♂ PL Koźlice ad Lubin, 3-4 V 2002, leg. AM; ♀ PL rez.[erwat] Las Piwnicki, 1-2 VI 1998, leg. JB
89. *Aleucis distinctata* – ♂ PL Lubuskie, rez.[erwat] Pamięcin, 12 IV 2002, leg. AM; ♀ PL Lubuskie, Owczary ad Górzyca, 13 IV 2002, ex o., leg. AM
90. *Theria rupicapraria* – a. ♂ PL Morzęcin Wielki, Wzg.[órza] Trzebnickie, 21 II 1995, leg. AM; b. ♀ PL Rudna ad Lubin, 20 II 2002, leg. AM; c. ♂ PL Śleszów ad Jemielno, 8 III 1998, leg. AM

90A. *Theria primaria* – ♂ PL Obernigk [Oborniki Śląskie], F.93, leg et coll. ?, coll. MP UWr.; ♀ orig. ? "T. 04", coll. MP UWr.


82a♂
82b♀
82c♂
82d♂
83a♀
83b♂
83c♀
84♂
85♂
86♂
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84♀
85♀
86♀
87♀
88♂
88♀
89♂
89♀
90a♂
90b♀
90c♂
90A♀
90A♂

PLATE XIV

91. *Campaea margaritata* – a. ♂ CZ Palava, e.l. IX 1995, leg. JB; b.♀ PL Góra Śl.[ąska], 21 V 1994, leg. AM; c. ♀ (2 gen.) PL rez.[erwat] Jodłowice ad Wrocław, 28 VIII 1996, leg. AM
92. *Campaea honoraria* – ♂ GR Harokopio, 24 IV 2009, leg. JB; ♀ F, Dep.[artament] Ardeche, Chapias, 300 m, 9 X 1998, leg. B. Niemeyer
93. *Hylaea fasciaria* – a. ♀ f. *fasciaria*: PL Chrząstawa ad Wrocław, 20 VI 1995, leg. AM; b. ♂ f. *prasinaria*: PL Tatry, 1100 m, Dolina Chochołowska, 23-29 VII 1997, leg. JB; c. ♀ PL Szkl.[arska] Poręba Górna, e.l., 5 V 1989, leg. AM
94. *Pungeleria capreolaria* – ♂ PL Tatry Zach.[odnie], Droga pod Reglami, e.l 15 V 1999, leg. AM; ♀ PL Tatry Zach.[odnie], Droga pod Reglami, e.l 15 V 1999, leg. AM
95. *Cleorodes lichenaria* – ♂ PL Puszcza Białowieska, 3-18 VII 1976, leg. AK, ♀ PL Stettin [Szczecin], 24 VII [18]70, coll. MNHU
96. *Gnophos furvata* – ♂ I Südtirol, Schnalstal, 850 m, 15 VII [19]82, leg. B. Stocker; ♀ SLO Nanos Mts., Podnanos, Strmec top, 800 m, 9 VIII 2001, leg. J. Šumpich

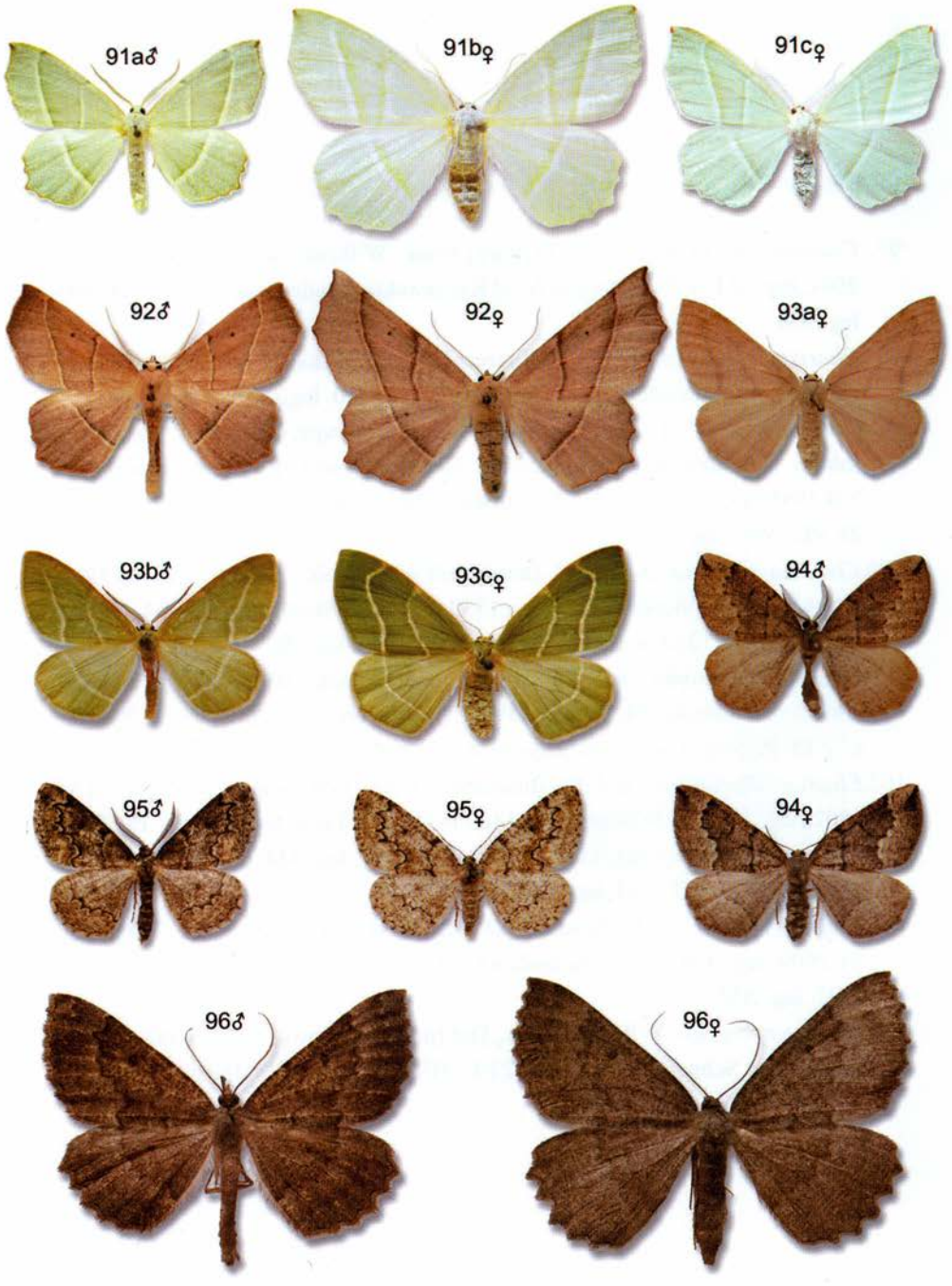
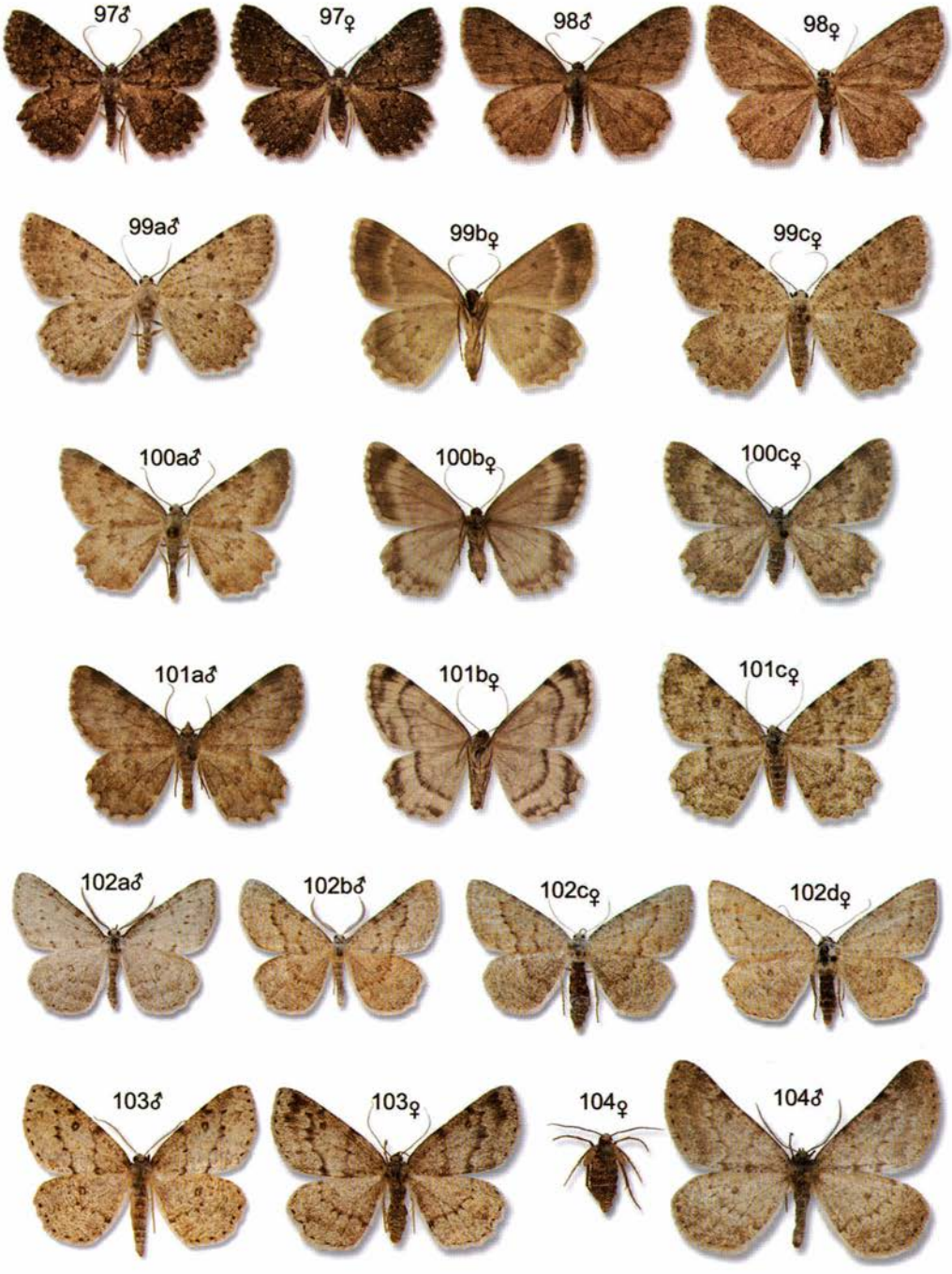

91a♂
91b♀
91c♀
92♂
92♀
93a♀
93b♂
93c♀
94♂
95♂
95♀
94♀
96♂
96♀

PLATE XV

97. *Charissa obscurata* – ♂ PL D.[olny] Śląsk, Wilkocin ad Przemków, 11 VIII 2001, leg. AM; ♀ PL Sudety, G.[óry] Kaczawskie, Grudno, e.o., 29-30 VIII 2005, leg. AM
98. *Charissa ambiguata* – ♂ PL P.[uszcza] Augustowska, Płaska, 3-7 VII 1997, leg. AM; ♀ PL D.[olny] Śląsk, Janików, 9 VII 2010, leg. AM
99. *Charissa pullata* – a. ♂ PL Pieniny, DV57, Długa Grapa, 4 VII 2005, leg. R. Wąsala; b. ♀ underside: PL Rzędkowice, Jura Krak.[owsko] – Częstochowska, 21 VII 1996, leg. AM; c. ♀ PL Rzędkowice, Jura Krak.[owsko] – Częstochowska, 21 VII 1996, leg. AM
100. *Charissa glaucinaria* – a. ♂ PL Tatry, Wielkie Koryciska, alt. 900 m, 25 VII 1997, leg. AM; b. ♀ underside: PL Tatry, 1350 m, Sarnia Skała, 19 VII 1994, leg. JB; c. ♀ PL Tatry, 1350 m, Sarnia Skała, 19 VII 1994, leg. JB
101. *Charissa intermedia* – a. ♂ PL Tatry, Dolina Dudowa, 1100 m, 28 VI 1995, leg. AM; b. ♀ underside: PL Pieniny, DV57, Grabczychy, 4 VI 2005, leg. R. Wąsala; c. ♀ PL Pieniny, DV57, Grabczychy, 4 VI 2005, leg. R. Wąsala
102. *Elophos dilucidaria* – a ♂ PL Bieszczady Mts. FV04, Smerek, 1100 m, 18 VI 2002, leg. JB; b ♂ PL Kobylarz, 1480 m, 18 VII 1994, leg. JB; c ♀ PL Tatry, Pol.[ana] Chochołowska, 1160 m, 22-24 VII 1997, leg. AM; d ♀ PL Bieszczady, Wetlina, 25-30 VII 1994, leg. JK
103. *Elophos vittaria* – ♂ PL Śnieżnik Kł.[odzki], Masyw Młyńska, alt. 700 m., 22 VI 2009, leg. AM; ♀ PL Śnieżnik Kł.[odzki], Międzygórze, alt. 800 m, 17 VI 1992, leg. AM
104. *Elophos operaria* - ♂ PL Tatra Mts., Dol.[ina] Tomanowa, 12 VII 1987, leg. JB; ♀ A Wiener Schneeberg, Rodpilz, 27 VI [19]09, leg.?, coll. MNHU


97♂
97♀
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99a♂
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99c♀
100a♂
100b♀
100c♀
101a♂
101b♀
101c♀
102a♂
102b♂
102c♀
102d♀
103♂
103♀
104♀
104♂

PLATE XVI

105.*Psodos quadrifaria* – ssp. *sudetica*: a ♂ CZ Riesengebirge [Karkonosze], Umg. Schneekoppe [Równia pod Śnieżką], 1200–1400 m, 1 VII 1983, leg. J. Gelbrecht & B. Müller; b ♀ CZ Riesengebirge [Karkonosze], Umg. Schneekoppe [Równia pod Śnieżką], 1200–1400 m, e.o. 25 III 1984, leg. J. Gelbrecht & B. Müller; – ssp. *quadrifaria*: c ♂ PL Tatra Mts., Sarnia Skała, 1350 m, 7 VII 1987, leg. JB; d ♀ PL Tatry, Mnichy Chochołowskie, 1300 m, 29 VI 1995, leg. AM

106.*Glacies canaliculata* – a. ♂ PL Tatry, Ornak, 1900 m, 27 VII 1997, leg. AM; b.♀ PL Tatry, Ornak, 1900 m, 27 VII 1997, leg. AM; c. ♂ PL Tatry, Trzydniowiański Wierch, 1800 m, 29 VII 1997, leg. AM

107.*Glacies noricana* – a. ♂ PL Tatry, Kościelec, 22 VII 1952, leg ?, coll. ISEZ; b. ♂ A Styria, Hochschwab, 1903, leg.?, coll. MNHU; c. ♀ A Styria 20 VII [19]01, coll. MNHU

108.*Glacies coracina* – a. ♂ PL Tatry, Gładkie Upłazińskie DV15, 9 VII 2010, leg. WZ; b ♂ PL Tatry, P.[rzełęcz] Tomanowa, 18 VII 1963, leg. E. Palik; coll ISEZ; c. ♀ PL Tatry, Gładkie Upłazińskie DV15, 9 VII 2010, leg. WZ

109.*Glacies alpinata* – ♂ PL Tatra Mts., Kopa Magury DV25, 1550 m, 18 VI 2002, leg. JB; ♀ PL Tatra Mts., Dolina Jarząbcza, 1700 m, 18 VI 1996, leg. JB

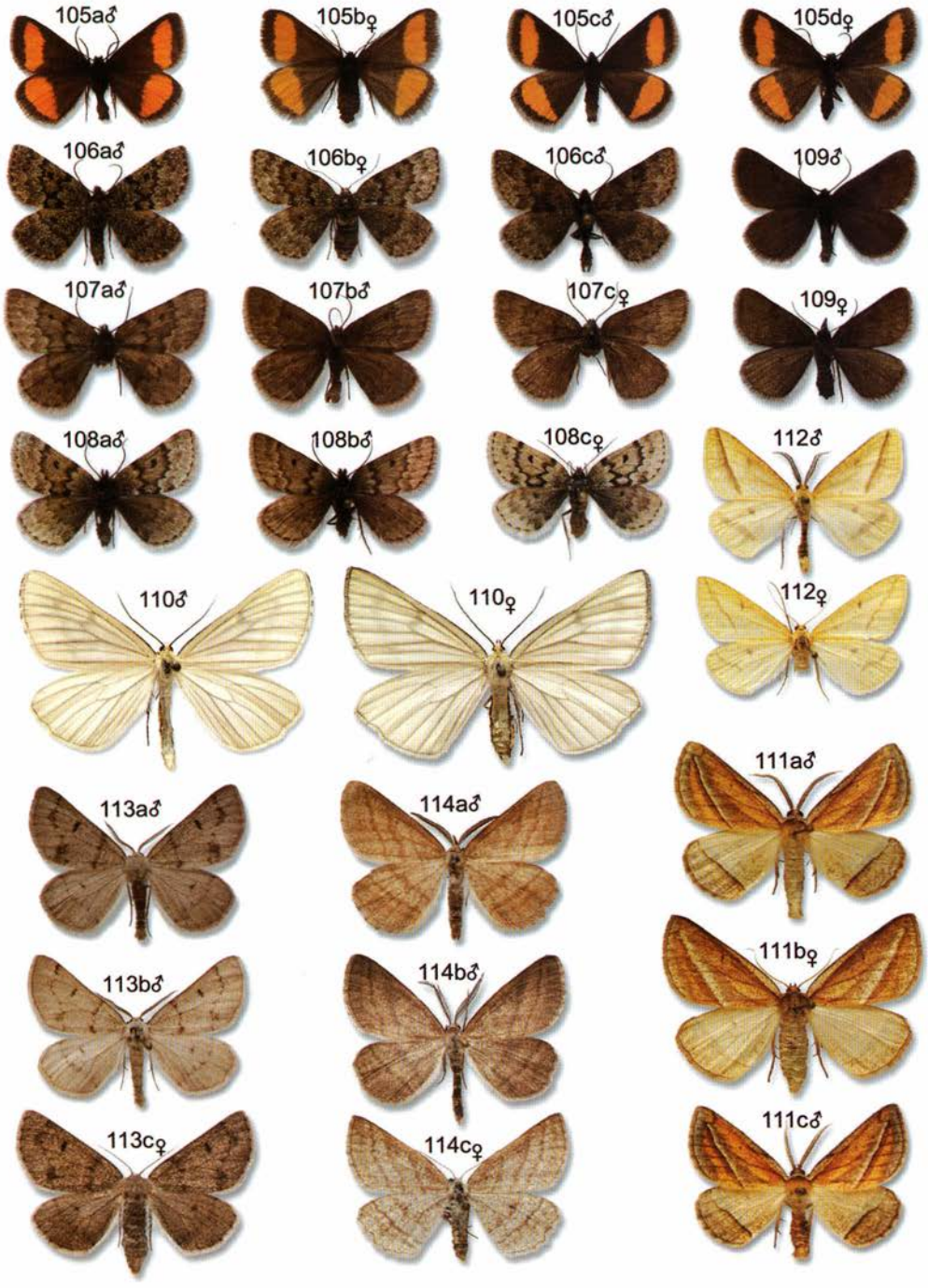
110.*Siona lineata* - ♂ PL Puszcza Borecka, 7 VI 1994, leg. JB; ♀ PL Puszcza Borecka, 5 VI 1994, leg. JB

111.*Chariaspilates formosaria* – a. ♂ PL Jałowo, Biebrzański P.[ark] N.[arodowy], 7 VII 2005, e.o., leg. AM; b. ♀ PL Jałowo, Biebrzański P.[ark] N.[arodowy], 7 VII 2005, e.o., leg. AM; c. ♂ (2 gen.) PL Jałowo, Biebrzański P.[ark] N.[arodowy], 7 VII 2005, e.o., leg. AM

112.*Aspitates gilvaria* - ♂ SK Komarno, 1 VIII 1991, leg. Pastoralis; ♀ CZ Česky Kras, Srbsko, 16 VIII 1993, leg. J. Liška

113.*Dyscia fagaria* – a. ♂ PL D.[olny] Śląsk, Ławszowa n/ Kwisą, 17 V 2003, leg. AM; b. ♂ PL D.[olny] Śląsk, 6 km E ad Leszno Grn.[Górne], 11-12 V 1998, leg. AM; c. ♀ PL D.[olny] Śląsk, 6 km E ad Leszno Grn.[Górne], 11-12 V 1998, leg. AM

114.*Perconia strigillaria* – a. ♂ PL Glinki k/Torunia, 11 VI 1994, leg. JB; b. ♂ PL Bory Dolnośląskie, Tomisław, 9 VI 2006, leg. AK; c. ♀ PL Rubcowo, P.[uszcza] Augustowska, 17 VI 2004, leg. AM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106a♂
106b♀
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107a♂
107b♂
107c♀
109♀
108a♂
108b♂
108c♀
112♂
110♂
110♀
112♀
111a♂
113a♂
114a♂
111b♀
113b♂
114b♂
111c♂
113c♀
114c♀

PLATE XVII

115. *Agriopis leucophaearia* (Den. & Schiff.) ♀, Wrocław (phot. A. Malkiewicz)

116. *Agriopis aurantiaria* (Den. & Schiff.) ♀, Wrocław (phot. A. Malkiewicz)

117. *Lycia isabellae* (Harrison) ♀, Jedlina Zdrój (phot. A. Malkiewicz)

118. *Lycia pomonaria* (Hbn.) ♀, Wrocław (phot. A. Malkiewicz)

119. *Lycia zonaria* (Den. & Schiff.) ♀, Crimea (phot. V. Savchuk)

120. *Erannis defoliaria* (Cl.) ♀, Wrocław (phot. A. Malkiewicz)

121. *Theria rupicapraria* (Den. & Schiff.) ♀, Wołów (phot. M. Matraj)

122. *Apocheima hispidaria* (Den. & Schiff.) ♀, Świebodzice (phot. J. Masłowski)

PLATE XVII

PLATE XVIII

123. *Crocallis elinguaria* (L.) ♀, Rzyki (phot. J. ZIELIŃSKI)

124. *Ourapteryx sambucaria* (L.) ♀, Rymanów Zdrój (phot. A. MALKIEWICZ)

125. *Colotois pennaria* (L.) ♀, Wrocław (phot. A. MALKIEWICZ)

126. *Alcis bastelbergeri* (HIRSCHKE) ♀, Rzyki (phot. J. ZIELIŃSKI)

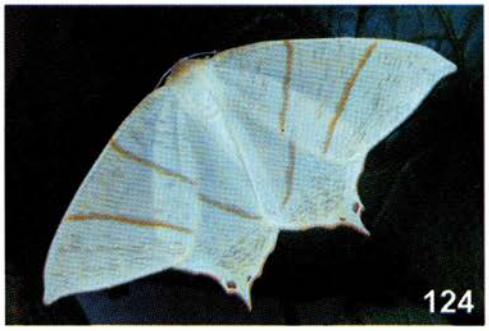
127. *Deileptenia ribeata* (CL.) ♂, Śnieżnik Mt. (phot. A. MALKIEWICZ)

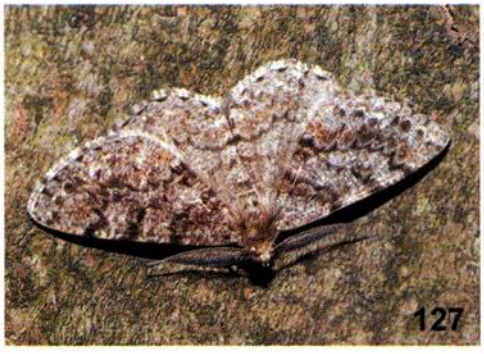
128. *Pungeleria capreolaria* (DEN. & SCHIFF.) ♂, Rzyki (phot. J. ZIELIŃSKI)

129. *Psodos quadrifaria* (SULZER) ♀, Tatra Mts. (phot. J. WENTA)

130. *Elophos vittaria* (THUNB.) ♂, Śnieżnik Mt. (phot. A. MALKIEWICZ)

PLATE XVIII





10. INDEX OF LATIN NAMES OF MOTHS

(tribal, generic, specific and infraspecific names; pages with figures in bold, pages in italics refer to synonyms in the main treatment)