

Cochylini (Lepidoptera: Tortricidae) of Canada

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Abstract. Eight genera and 52 species of *Cochylini* are recorded and discussed. Ten species (*Phalonidia ontariana*, *Ph. memoranda*, *Platphalonidia albertae*, *P. dangi*, *P. imitabitis*, *Aethes heleniana*, *Ae. mymara*, *Cochylis avita*, *C. dormitoria*, *C. bucera*) are described as new. For each species a short diagnosis and illustrations of the genitalia, if the specimen from Canada, are provided. Two genera (*Gynnidomorpha* and *Cochylidia*) are new to the New World, and a few species new to Canada. There are six species Holarctic in distribution and one species common to Nearctic and Neotropical regions.

Key words: *Cochylini*, Canada, revision.

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GENERAL

P r e f a c e. Neither the Canadian nor the Nearctic fauna of *Cochylini* have been revised till now. However, several species have been described or recorded from Canada.

Knowledge concerning the Canadian and Nearctic *Cochylini* is rather poor, especially as concerns the early stages, biology, and repartition of those moths. The modern system has never been applied nor discussed and the known species were usually placed in a few large, old genera such as *Cochylis*, *Phalonia* or *Hysterosia*.

The largest cochyline collection is preserved in the Canadian National Collection, Ottawa and a waste material is deposited in the Natural History Museum, London. In other institutions the *Cochylini* from Canada are scarcely represented.

A c k n o w l e d g m e n t. The author has pleasure in expressing his thanks to the authorities of the Canadian National Collection for a grant, which enabled him to work in Ottawa, and to Dr. P. T. DANG for his kind help during his studies in the tortricine collection. He also thanks the Smithsonian Institution, Washington, and the Natural History Museum, London, for permission to work in their collections. He is highly indebted to Dr. Michael G. POGUE, Washington, for the opportunity to study his notes and the photographs of some type-specimens of the Nearctic *Cochylini*.

T h e m o r p h o l o g y of the Palearctic cochylenes was discussed by RAZOWSKI (1970). The musculature of the male genitalia was studied mainly by KUZNETZOV & STEKOLNIKOV and the review of their papers (in Russian) was made by RAZOWSKI (1981). The immature stages

were treated by SWATSCHEK (1958) who described the chaetotaxy of many species and BRADLEY et al. (1973) who discussed some pupae. Some valuable morphological data concerning the Nearctic fauna were given by POGUE & MICKEVICH (1990).

T h e b i o l o g y of the Canadian and also the Nearctic taxa is practically unknown. Only some data on the occurrence of imagines and certain host plants have been given in the literature. In the Palaearctic subregion the cochyline moths usually fly in one or two generations a year, this being also the case with Canadian representatives. Their food-plants probably belong to the same plant families as those of Palaearctic species which utilize representatives of 27 plant families, with a strong preference for the *Compositae* (RAZOWSKI, 1970, 1991). They also indicate that they are oligophagous and live mainly in flowers, seeds, stems, and roots.

G e o g r a p h i c a l r e p a r t i t i o n. Over 130 species have been described from the Nearctic subregion and some 50 more found in the collections are awaiting publication. That is about 1/3 of the number of species described from the Palaearctic subregion, depending to a certain degree on the differences in the studies in the two subregions. In Canada 52 species have been found and this number is comparable with that of species occurring in the northern part of Central Europe. As concerns genera the proportions are rather similar: 21 in the Palaearctic subregion, 11 in the Nearctic subregion, and 8 in Canada.

The number of the Holarctic species of *Cochylini* is probably greater than in the other tribes of *Tortricidae*. There are 7 such species, viz., *Phtheochroa vulneratana*, *Aethes deutschiana*, *Ae. smeathmanniana*, *Ae. rutilana*, *Cochylidia subroseana*, *Cochylis nana*, and *C. dubitana*. The first two of these may be regarded as boreoalpine species. With the exception of *rutilana*, none of these Canadian species show any difference with from Palaearctic populations.

Most probably the Canadian cochyles are widely spread in the northern part of the subregion as can be seen from their stands in the USA. On the basis of the areas of *C. bucera* or *Ph. felix* it may be supposed that they are much wider than at present realised. The areas of last-mentioned species are exceptionally large, comparable only with one New World species, *Lorita scarificata* (MERYRICK), which occurs both in the Nearctic and Neotropical Region. I does not seem that the species described from Canada are endemic. Certainly their spread is much wider and may extend more south.

Unfortunately, it is not possible to utilize some literature data for the zoogeographical analysis as the determinations have not been verified. The distribution data from the USA are based mainly on the materials in the Smithsonian Institution.

As concerns the structure of the genera it is understood that five of genera occurring in Canada are common to the Palaearctic subregion (*Phtheochroa*, *Phalonidia*, *Gynnidomorpha*, *Aethes*, *Cochylidia*, *Cochylis*) and four of them are widely distributed. *Phalonidia*, *Aethes* and *Cochylis* are known in all regions except Ethiopian and Australian, *Phtheochroa* is Holarctic and reaches the northern parts of the Neotropical region; *Gynnidomorpha* and *Cochylidia* are both new to this subregion. Until now these two genera were recorded from the Palaearctic subregion and the northern part of the Oriental region while *Gynnidomorpha* was known also from the Australian region. Two genera, *Henricus* and *Platphalonidia*, are evidently exclusively the New World taxa, with the majority of species occurring in its central part (mainly in Mexico).

S y s t e m a n d p h y l o g e n y. The most recent diagnoses of the tribe were compiled by HORAK (1991), HORAK & BROWN (1991), and RAZOWSKI (1994). This old and certainly monophyletic group is characterized by a few autapomorphies, viz., the distal position of the vein *CuA*₂ in the forewing, the reduction of vein *CuP*, and the shape of the forewing pattern consisting usually of two fasciae parallel to the termen. Other supposed autapomorphies require reassessment, some others are the reductions occasionally found in the remaining tribes of *Tortricidae*. The lack of any synapomorphy with other tribes makes the affinities of *Cochylini*

obscure. The generic system is still far from definite, hence the present author continues to use that of 1987 discussed in 1994.

Some species regarded in this paper as "unplaced" will be included in new genera whose descriptions being prepared by M. G. POGUE. Their names have already been used by POGUE & MICKEVICH, 1990.

NOTES AND ABBREVIATIONS

The holotypes of the newly described species are deposited in the Canadian National Collection, Ottawa, if not stated otherwise.

The figures given in the descriptions of the labial palpus indicate the proportion of its total length to the diameter of the eye and the description of coloration concerns the lateral surface of the palpus.

CNC – Canadian National Collection, Ottawa

G. S. – genitalia slide

NHML – Natural History Museum London

SI – Smithsonian Institution, Washington

SYSTEMATIC PART

Phtheochroa STEPHENS

Phtheochroa STEPHENS, 1819, Syst. Cat. Br. Insects, 2: 191. Type-species: [*Tortrix*] *rugosana* HÜBNER, [1799], designated by monotypy. – *Idiographis* LEDERER, 1859, Wien. ent. Mschr., 3: 242. Type-species: *Tortrix centrana* HERRICH-SCHÄFFER, 1851, by monotypy. Palearctic. – *Propira* DURRANT, 1914 [in] WALSINGHAM, Biol. cent.-am., Lepid. Heterocera, 4: 297. Type-species: *Tortrix schreibersiana* FRÖLICH, 1828, by subsequent designation (FERNALD, 1908: 185). Palearctic. – *Trachysmia* GUENÉE, 1845, Annls Soc. ent. Fr., (2) 3: 164. Type-species: *Sericoris duponcheliana* COSTA, 1847, by subsequent designation (Desmarest, 1857: 223, then by FERNALD, 1908: 30). Palearctic. – *Arce* JOANNIS, 1919, Annls. Soc. ent. Fr., 88: 18. Type-species: *Cochylis sulphurana* GUENÉE, 1845, by monotypy. Palearctic. – *Hysterosia Parahysterosia* RAZOWSKI, 1960, Polskie Pismo ent., 30: 298. Type-species: *Cochylis simoniana* STAUDINGER, 1859, by original designation and monotypy. Palearctic. – *Hysterosia durrantia* RAZOWSKI, 1960, ibid.: 290; invalid, type-species not designated. – *Hysterosia* auct. not STEPHENS, 1852 (not available, type-species not mentioned). – RAZOWSKI, 1970: 114, 63 (as *Hysterosia*); 1987: 154; 1994: 126, redescrptions.

This genus was discussed by the author (RAZOWSKI, 1991) and its 85 known species were listed; of further 6 unplaced species 2 were transferred to *Henricus* by the same author (RAZOWSKI, 1994). Of 101 species known at present 46 are Palearctic and 23 Nearctic in distribution. There is only one Holarctic species (*Ph. vulneratana*). One transpalearctic species, *Ph. inopiana* (HAWORTH, 1811) has several closely related taxa in North America, 9 of which were mentioned from Canada and represented in the CNC collection. The majority of them differ little from one another, and, moreover, show some external and genital variation. Thus their determinations (except for *aureoalbida* and *fulviplicana*) is almost impossible. An examination of a larger series from the type localities of those taxa will probably solve this problem at some future time. Below, the taxa either described from Canada or those which were found in the collections and fit the original descriptions or seem conspecific with the types of described species are included.

Phtheochroa aureoalbida (WALSINGHAM)

Hysterosia aureoalbida WALSINGHAM, 1895, Trans. ent. Soc. London, 1895: 498. Type-locality: U.S.A.: Colorado: Loweland.

Wingspan 16-19 mm. Costal fold to 1/4-1/3 of male forewing costa. Ground-colour whitish, often with creamy admixture. Pattern rudimentary, ferruginous, consisting of median fascia preserved in mid-portion of wing and subterminal fascia reaching vein M_2 ; often subdorsal suffusion representing basal blotch. Variation: the pattern may be more or less reduced, often completely atrophied.

Male genitalia (Figs 1-4): Uncus slender; median part of transtilla small, slender, rather rounded apically; cornutus slender, half the length of aedeagus.

Female genitalia (Fig. 125): Ovipositor long; distal part of sterigma weakly sclerotized; small, postmedian sclerite in bursa copulatrix.

B i o l o g y and early stages unknown. Moths collected in May and June.

D i s t r i b u t i o n. USA: Colorado, Oregon, Montana, New Mexico, South Dakota and Utah. – Canada (numerous specimens in CNC and NHML): Ontario: Ottawa; Saskatchewan: Cypress Hills near Mapple Creek; Alberta: Rocky Mts, Lethbridge, Waterton Lake, Nordegg, Banff; British Colombia: Pouce Coupe, Kamloops.

Phtheochroa vitellinana (ZELLER)

Conchylis vitellinana ZELLER, 1875, Verh. zool.-bot. Ges. Wien, **25**: 243. Type-locality: USA: Maine or Massachusetts.

Wingspan 14-16 mm. Head and thorax ochreous yellow. Forewing slender, hardly expanding terminally in male, with costal fold brownish or rust; ground-colour yellow to ochreous yellow; pattern dark ochreous brownish, often tinged ochreous orange, consisting of two transverse fasciae edged refractive leaden grey (the median convex, broadest dorsally, subterminal usually reaching tornus) and a dorsal remnant of basal blotch. Fringes concolorous with ground-colour, tinged ochreous at tornus. Hindwing brownish; fringes much paler. Variation: Pattern more or less strongly reduced, some monochrome specimens seen. Forewing ground-colour often pale yellow.

Male genitalia (Figs 5, 6) as in preceding species, but uncus seemingly shorter, aedeagus longer.

Female genitalia (Figs 126, 126) as in *aureoalbida* but distal part of sterigma well developed and corpus bursae almost entirely sclerotized.

B i o l o g y unknown. Canadian moths collected between beginning of June and mid-July.

D i s t r i b u t i o n. Recorded from Canada and USA: New Hampshire, North Dakota. – Canada: New Brunswick: Mer Blue, Waiweg; Prince Edward Island: Stanhope, Alberton, Dalway House and Barkley Beach (Canadian National Park). Nova Scotia: Parrsboro; Quebec: Knowlton, Kazubazua, Norway Bay; Ontario: Blackburn, Thunder Bay, Ottawa, Constance Bay, Parry Sound Mt.; Saskatchewan: South Arm, Last Mountain Lake, Christopher Lake; Manitoba: Aweme, Ninette, Marmont, Riding Mt.

Phtheochroa fulvificana (WALSINGHAM)

Idiographis fulvificana WALSINGHAM, 1879, Illustr. Lepid. Heterocera, **4**: 26, pl. 66, figs 2,3. Type-locality: USA: Colorado: Shasta Co.: Hatchet Creek. – *Hysterosia homonana* KEARFOTT, 1907, Canad. Ent., **39**: 84. Type-locality: USA: Nevada: Verdi. – *Hysterosia refuga* MEYRICK, 1912, Entomologist's Monthly Mag., **48**: 35, unjustified replacement name for *Hysterosia homonana*. – *Hysterosia komonana* KEARFOTT, 1907, Can. Ent., **39**(4): 121. Type-localities: USA: California: Santa Clara Co.: Alma, Utah: Stokton. – *Hysterosia fermentata* MEYRICK, 1912, ibid.: 36, unjustified replacement name for *Hysterosia komonana*. – *Hysterosia canariana* BARNES & BUSCK, 1920, Contr. Nat. Hist. Lepid. N. Am., **4**: 218, pl. 28, fig. 6. Type-locality: USA: Arizona: White Mts.

Wingspan 22-26 mm. Male forewing broader and more expanding posteriorly than in the two preceding species. Ground-colour yellow-ochreous with darker suffusions. Pattern yellow-brown,

usually tinged ochreous, consisting of traces of basal blotch, interrupted medially median fascia and subtriangular subterminal fascia with straight anterior edge. Some small spots may occur at costa and termen. Fringes concolorous with ground-colour. Hindwing brownish grey, with paler fringes. Variation as in *vitellinana*, in monochrome specimens costal fold of male brownish.

Male genitalia (Figs 7, 8): The Canadian specimens characterise with thick cornutus. That of the type of *fulviplicana* is much slender and somewhat longer and in paratype of *canariana* it is slightly longer than in *fulviplicana*. These differences may be of infraspecific importance. The median part of transtilla is in all of them broad, slightly concaving apically.

Female genitalia of the Canadian specimen hardly differ from those of *fulviplicana*.

B i o l o g y. The Canadian examples were collected in June and July, and only those from Yukon in July and August.

D i s t r i b u t i o n. Known from USA: Arizona and California (type of *komonana*). – Canada. Saskatchewan: Christopher Lake, Saskatoon; Alberta: Banff, Waterton Lake, Nordegg; British Columbia: Fernie, Mt. McLean, Keremoes; Yukon: Dawson, Whitehorse.

Phtheochroa terminana (BUSCK)

Hysterosia terminana BUSCK, 1907, J. N.Y. ent. Soc., **15**(1): 33. Type-locality: USA: Pennsylvania: Pittsburgh. – *Hysterosia merrickana* KEARFOTT, 1907, Can. Ent., **39**(2): 59. Type-locality: USA: Pennsylvania: New Brighton.

Wingspan 20-22 mm. Head and thorax brownish, palpus darker, forewing ground-colour brownish cream, strigulation brown, pattern dark brown in form of large subapical blotch darkest and convex proximally; dorso-basal pattern in form of weak, oblique fascia; weak remnant of median fascia at middle of costa. Fringes concolorous with ground-colour, basal and median line brownish. Hindwing brownish cream, strigulated brownish grey; fringes paler. Variation: Coloration more or less dark; shape of proximal edge of subapical blotch varying from distinctly convex to gently convex medially.

Male genitalia hardly differing from those in *riscana*, with slightly smaller cornutus. Female also similar. Types not compared.

B i o l o g y unknown.

D i s t r i b u t i o n. USA: Pennsylvania. Some localities mentioned in the original description are in Maine, Cincinnati, Ohio and Illinois (moths not examined). – Canada. About 10 examples not exactly fitting the above description are from Quebec (Meach Lake), Ontario (Ancaster) and Manitoba (Aweme) in CNC.

R e m a r k. As the status of this species is not clear and the determination of the Canadian examples is uncertain I do not include it in the fauna of this country.

Phtheochroa riscana (KEARFOTT)

Hysterosia riscana KEARFOTT, 1907, Can. Ent., **39**(4): 122. Type-localities: USA: New Jersey: Essex County Park and Pennsylvania: Glenburn. – *Hysterosia vineta* MEYRICK, 1912, Entomologist's Monthly Mag., (2)**23**: 35, unjustified replacement name for *Hysterosia riscana* KEARFOTT.

Wingspan 14-20 mm; coloration as in *terminana* but dorso-basal blotch in form of long fascia almost connecting costal remnant of median fascia and subapical blotch convex towards costa, becoming gradually paler towards apex of wing. In female subapical blotch may be reduced to proximal line.

Male genitalia of Canadian examples (Figs 9, 10) rather fit those of Pennsylvania specimens. Cornutus strong, curved, almost as long as aedeagus.

Female genitalia as in figs 128, 129.

B i o l o g y unknown. Dates of collection of Canadian specimens: from end of June to early August.

D i s t r i b u t i o n. USA: Maine, Massachusetts, Mississippi, New Jersey, New York and Pennsylvania. – Canada. About 40 specimens from New Brunswick: Boiestown; Prince Edward Island: Alberton; Nova Scotia: Baddeck, White Port Beach, Petite Riviere; Quebec: Mt. Lyall, Norway Bay, Meach Lake; Ontario: Ottawa, Trenton.

Phtheochroa waracana (KEARFOTT)

Hysterosia waracana KEARFOTT, 1907, Can. Ent., **39**(4): 122. Type-locality: Regina, Assa.[?], Prince Albert. – *Phalonia dicax* MEYRICK, 1912, Entomologist's Monthly Mag., (2)**23**: 35, unjustified replacement name for *Hysterosia waracana* KEARFOTT.

Wingspan 15-19 mm. Externally resembling Palaearctic *Ph. inopiana* (HAWORTH, 1811) and two preceding taxa.

Male genitalia (Figs 11,12) as in *riscana* but apical edge of median part of transtilla slightly more concave. Female genitalia unknown.

B i o l o g y unknown. In Canada moths were collected from mid-June to mid-July.

D i s t r i b u t i o n. Canada (ca 30 specimens in CNC): Saskatchewan: Indian Head; Alberta: Lethbridge, Calgary, Edmonton; British Colombia: Fernie.

Phtheochroa cartwrightana (KEARFOTT)

Hysterosia cartwrightana KEARFOTT, 1907, Can. Ent., **39**(4): 123. Type-locality: Canada: Manitoba: Cartwright.

Wingspan 18-24 mm. Externally resembling two preceding species but head and thorax cream scaled brownish and ground-colour of forewing more olive-ochreous or brownish grey, strigulation brownish; trace of dorso-basal blotch and series of strigulae in apical area browner; costal fold in male brownish.

Male genitalia (Figs 13,14) as in two preceding species; some small differences are in aedaeagus and median part of transtilla.

B i o l o g y unknown. Moths collected in July.

D i s t r i b u t i o n. Canada (ca 20 specimens in CNC). Nova Scotia; Ohio; Manitoba: Aweme; Saskatchewan: Indian Head, Saskatoon.

Phtheochroa vulneratana (ZETTERSTEDT)

Tortrix vulneratana ZETTERSTEDT, 1839, Insecta lapponica: 979. Type-locality: Lapponia. – RAZOWSKI, 1970: 99, *Hysterosia*, redescription.

The Canadian specimens do not differ from the Palaearctic examples. Redescription of female genitalia (Fig. 130): Distal portion of ventral part of sterigma forming two lobes; colliculum with ventro-lateral membranous sack from which extends accessory bursa with long duct; ductus seminalis from beyond middle of corpus bursae, oppositely; sclerites and spinulae as figured.

B i o l o g y. Canadian specimens collected in July and first decade of August.

D i s t r i b u t i o n. Holarctic species. In Palaearctic spread from Fennoscandia and high mountains of Central and Southern Europe (Switzerland, Italy) to Pamir Mts, Alai, Saian, Siberia and Mongolia to Amur Territory. In Japan known from Hokkaido. In Holarctic subregion found in Alaska and mountains of Colorado (POWELL, 1990).

Canada (4 specimens in CNC): Alberta: Lake Louise, Moraine Lake; British Colombia: Mt. Apex, Jasmond.

***Henricus* BUSCK**

Henricus BUSCK, 1943, Bull. S. California Acad. Sci., **38**: 38, replacement name for *Heinrichia* BUSCK. – *Heinrichia* BUSCK, 1939, *ibid.*, **38**: 103. Type-species: *Phtheochroa macrocarpana* WALSINGHAM, 1895, by original designation and monotypy. – *Irazona* RAZOWSKI, 1964, Annls zool. Warsz., **22**(16): 356. Type-species: *Conchylis comes* WALSINGHAM, 1884, by original designation and monotypy. – RAZOWSKI, 1994: 143, redescription.

B i o l o g y. In the temperate zone of America there are two generations yearly. The food plants are oaks and conifers (the data gathered by RAZOWSKI, 1994). Of the Nearctic species only the food plant of *infernalis* is known.

D i s t r i b u t i o n. Known from Guatemala and Mexico (Chiapas).

***Henricus infernalis* (HEINRICH, 1920)**

Commophila infernalis HEINRICH, 1920, Proc. U.S. Nat. Hist. Mus., **57**: 61, pl.2, figs 11,13. Type-locality: USA: New Mexico: Manzano. – *Henricus* (*Commophila*) *brevipalpatus* McDUNNOUGH, 1944, Can. Ent., **76**(8): 155 – **syn.n.** Type-locality: Canada: British Columbia: Clinton.

Wingspan 14-17 mm. Head white, labial palpus 2.5, anterior part of thorax tinged brownish cream. Forewing rather uniformly broad throughout; ground-colour white cream, with darker spots and strigulae and pearl refractive marks. Pattern in form of variably preserved basal blotch, median fascia divided into several spots and subapical blotch uniform or divided into two or three blotches, accompanied by transverse shades and strigulae, all grey, with black or brown-black marks mainly along the edges. Fringes concolorous with ground-colour. Hindwing cream or whitish, strigulated cream or brownish cream on periphery; fringes white, tinged cream at apex.

Male genitalia (Figs 15,16): Socius ovate, broad; sacculus reaching beyond 1/3 of valva, strongly sclerotized dorsally, with small free termination; aedeagus bent, with single termination; three unequal, short cornuti in vesica.

Female genitalia (Fig. 131): Sterigma small, with slender lateral arms broadening basally; surroundings of ostium bursae membranous; ductus bursae short, with a few, weakly sclerotized folds; corpus bursae membranous, armed with numerous short spines; accessory bursa dorsal, originating at base of ductus bursae, ductus seminalis before middle of corpus bursae so.

B i o l o g y. The food plant in New Mexico (after original description) is *Sabina scopulorum*.

D i s t r i b u t i o n. Known from USA: Arizona, Colorado, Nebraska, New Mexico, Texas and Utah. – Canada: 3 females from British Columbia: Clinton in CNC.

***Henricus fuscodorsanus* (KEARFOTT, 1904)**

Commophila fuscodorsana KEARFOTT, 1904, Can. Ent., **36**: 141. Type-localities: Canada: British Columbia: Caslo and USA: "Cal" [ifornia?]: Field Brook.

Wingspan: 18-20 mm. Head whitish, thorax black-brown, ground-colour of forewing white, suffusions and shades grey. Pattern brown-grey, basal blotch fused with dorsal pattern, paler at tornus, a series of three much darker blotches towards middle of wing almost connecting the costal remnant of median fasciae; apical pattern consisting of 2-3 transverse fasciae or strigulae. Fringes concolorous with ground-colour. Hindwing brownish cream with diffuse darker strigulation; fringes cream.

Variation: Dorsal blotch varies from ochreous-brown to blackish, median blotches atrophying, apical pattern may be darker, rather uniform. Refractive marks on dorsum more or less distinct. A yellowish shade near middle of wing.

Male genitalia (Figs 17, 18): Socius large, somewhat extending distally, with inner edge armed with thorns; slender, long process at base of sacculus, dorsally; terminal processes of edeagus broad, almost equally long; one thick cornutus and a bunch of spine-like cornuti present.

Female genitalia (Fig. 132): Ostium bursae protected by a narrow, ring-shaped sclerite extending dorsally as far as to lateral arms of sterigma; ductus bursae long, in distal part membranous, in proximal part with delicate longitudinal folds and some spines; folds and spines on corpus bursae; ductus of accessory bursa dorsal, extending from base of ductus bursae; ductus seminalis subventral, originating near its middle.

B i o l o g y. No data except for dates of collection of moth: mid-May to 20.VI., one specimen dated 8.VIII. (Garibaldi Peak).

D i s t r i b u t i o n. USA (California, Colorado, Idaho, New Mexico, Oregon and Washington; the determinations not checked). – Canada. British Columbia: Cowichan Lake, Mt. Douglas, Gary Oak (Victoria), Agassiz, Saanish Dist., Diamond Head Trail, Garibaldi Peak.

D i s t r i b u t i o n. **D i s t r i b u t i o n.** Recorded from USA (California, Colorado, Idaho, New Mexico, Oregon and Washington, but the determinations not checked), Guatemala and Mexico (Chiapas). Now recorded from Canada: British Columbia: Cowichan Lake, Mt. Douglas, Gary Oak (Victoria), Agassiz, Saanish Dist., Diamond Head Trail, Garibaldi Peak.

R e m a r k s. I cannot find any genital difference between specimens from Canada and the southern examples, and moreover, the specimens of *Henricus turbulus* (CLARKE, 1968) described from Guatemala (RAZOWSKI, 1994: 96, redescription). The only differing characters are in the forewing pattern (the apical area spotted blackish, dorsum brownish, costal remnants of median blotch and some weak shades in median and postmedian areas grey) but they may be of individual importance (the variation is in this species little known). On basis of the material available I am unable to decide to synonymize this last taxon.

Henricus contrastanus (KEARFOTT, 1907)

Commophila contrastana KEARFOTT, 1907, Can. Ent., **39**(5): 160. Type-locality: Oak Station, Allegheny Co., Pennsylvania and near Haven, Connecticut.

Wingspan 17-22 mm; head whitish, labial palpus 2-3, tinged ochre basally; thorax brown with glossy blackish and ochreous brown places. Forewing broadest postbasally, with costa distinctly convex, apex rounded, termen more oblique in male than in female. Ground-colour white or white cream tinged ochreous near dorsal pattern; this last brownish to olive brown strigulated and spotted black, with bluish refractive places, fused with basal blotch, expanding distally; some black-grey fascia or strigulae in distal third of wing. Fringes concolorous with ground-colour. Hindwing whitish, in anal area occasionally mixed brownish grey; fringes whitish.

Variation: Paler specimens with traces of strigulation or dark specimens with suffused distal part of wing occur.

Male genitalia (Figs 19-20): Inner edge of socius expanding postbasally; median part of transtilla small; dorsal edge of sacculus with minutely spined postbasal prominence; aedeagus extremely large, with lateral lobes equally long, terminating in slender processes; cornutus slightly longer than aedeagus, distinctly bent, accompanied by numerous small spines.

Female genitalia (Fig. 133): Arms of sterigma slender, well sclerotized; colliculum built of thick membrane, with slightly asymmetric ventral prominence at sclerotized part of ductus bursae; this last spined ventro-laterally; right side of corpus bursae sclerotized, extending in very long partially membranous sac; ductus seminalis ventral, originating in proximal portion of corpus bursae; ductus of accessory bursa lateral, originating before colliculum.

B i o l o g y. Canadian moths collected in April and May, one bred from juniper.

D i s t r i b u t i o n: USA: Pennsylvania; in SI several specimens (not examined genitally) also from Arkansas, Georgia, Mississippi, New Jersey, New Mexico and Virginia. – Canada (2 examples in CNC): British Colombia: Victoria.

R e m a r k s. The holotype slightly differ from the Canadian specimens in having asymmetric terminations of the lateral lobes of the aedeagus and much larger spines accompanying it in vesica. Some specimens examined from Texas and California have similar females (strongly bent proximal process of corpus bursae) may be conspecific with *contrastanus*.

Phalonidia LE MARCHAND

Phalonidia LE MARCHAND, 1933, Amat. Papill., **6**: 242. Type-species: *Cochylis affinitana* DOUGLAS, 1846, by original designation, Palaearctic. – *Brevisociaria* OBRAZTSOV, 1943, Mitt. Münch. Ent. Ges., **33**: 96. Type-species: *Cochylis gilvicomana* ZELLER, 1847, by original designation, Palaearctic. – RAZOWSKI, 1970: 197; 1987: 159; 1994: 168, redescrptions.

B i o l o g y. Some data on Palaearctic species are gathered by RAZOWSKI (1970). The biology of New World taxa unknown.

D i s t r i b u t i o n. Known of Holarctic (ca 20 species) and Neotropical (47 species) regions. In the Nearctic subregion five species found till now, and in Canada – two species.

Phalonidia lepidana (CLEMENS)

Argyrolepis ?lepidana CLEMENS, 1860, Proc. Acad. nat. Sci. Philad., **12**: 355. Type-locality: America (after title of work). – *Conchylis straminoides* GROTE, 1873, Bull. Buff. Soc. Nat. Sci., **1**: 16. Type-locality: USA: Buffalo. – *Phalonia plummeriana* BUSCK, 1907, J. N.Y. ent.Soc., **15**(1): 24. Type-locality: USA: Marayland: Plummers I. – *Phalonia schwarziana* BUSCK, 1907, *ibid.*: 25. Type-locality: USA: Maryland: Plummer I. – *Phalonia zaracana* KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 74. Type-localities: USA: central New York, northern Illinois.

Wingspan 13-16 mm; head cream, tinged brownish or ochreous, labial palpus 2, cream-grey, thorax cream to ferruginous, grey medially, tegula also grey. Forewing ground-colour yellowish cream, suffusions grey, distal part of wing and anterior half of costa olive-grey to ochreous. Fringes paler than distal part of wing. Hindwing brownish grey; fringes cream-grey.

Variation distinct. There occur specimens with rust pattern (*zaracana*), dark dorsal part of median fascia (*schwarziana*), dark edges of its dorsal portion, ill-defined median part of fascia and dark dorsal portion of this. The ground-colour beyond median fascia may be as pale as in anterior part of wing; if entire ground-colour of distal half of wing is pale, the terminal area may be dark, brownish.

Male genitalia (Figs 22, 23): Free ends of socii rather short; valva slender, long; sacculus without free termination, convex beyond base ventrally; median part of transtilla long, bifurcate; aedeagus large, with broad coecum penis; cornutus slightly variable, usually about 1/3 length of aedeagus.

Female genitalia (Figs 134, 135): Cup-shaped part of sterigma broad, tapering proximally, rather weakly sclerotized towards ostium bursae, ventrally; ducus bursae fairly long, membranous terminally, with long, rather well sclerotized folds towards corpus bursae; this last provided with numerous small spines and a sclerite in anterior part.

B i o l o g y unknown. Moth collected in June, July and August.

D i s t r i b u t i o n. USA: Illinois, Maryland, Massachusetts, New York, North Carolina, Pennsylvania, West Virginia, Visconsin, Michigan, New Jersey. – Canada. New Brunswick: Mer Blue; Quebec (1 specimen): Knowlton; Ontario (20 specimens in CNC): Ottawa, Bobcaygeon, Pt. Pelee, Merivale, Trenton, Ovilia, Simcoe, Montreal; Toronto (NHML).

Phalonidia ontariana sp.n.

Wingspan 13-15 mm. Head cream, front and end of labial palpus (1.5) whitish, remaining parts of palpus brownish ochreous; thorax ochreous brownish with tegula paler. Forewing expanding terminally, with costa rather straight, termen fairly oblique (in female costa slightly convex). Ground-colour cream, partially tinged yellowish, ochreous in basal area and before tornus; costa to middle strigulated brown; distal area ochreous paler to, wards tornus, with some grey and blackish spots. Median fascia ochreous orange to rust, paler, greyer at costa in holotype, edges black-brown in dorsal half; subapical blotch almost completely atrophied (a weak suffusion). Fringes paler than distal part of wing. Hindwing pale brownish, whiter towards base; fringes white-grey.

Male genitalia (Figs 24, 25). Socii short, broad, separated from one another almost to base; valva slender except for basal third; sacculus strong, convex ventrally, provided with spine-like terminal process; median part of transtilla broad at base, then very slender, bifurcate apically; aedeagus long, rather slender; single, weakly bent cornutus in vesica.

Female genitalia (Fig. 136): Ovipositor fairly long; apophyses posteriores twice longer than apophyses anteriores; sterigma in major part membranous; colliculum uniformly broad throughout, with median sclerite; bursa copulatrix with sclerites and spines; accessory bursa dorsal, extending from before end of ductus bursae; ductus seminalis ventral, from mid-part of corpus bursae.

Holotype, male: "Inverhuron, Ont.[ario] 25.VI.72, A. Mutuura", G.S. No.21496; paratypes, an identically labelled pair.

R e m a r k s. Externally easily distinguished by a vivid coloration, especially by orange-ochreous pattern. In male genitalia distinct by the presence of termination of the sacculus, unique in this genus.

Phalonidia memoranda sp.n.

Wingspan 11-13 mm. Head and distal part of labial palpus (1.5) white, remaining part of palpus brownish, thorax darker except for white area beyond collar. Forewing broadening terminad, broadest at 2/3, with costa curved outwards, apex rounded, termen obliquely convex. Ground-colour white; some brown strigulae and a suffusion in basal area and costa; a dot at end of median cell. Pattern brown, consisting of spots, forming small basal blotch, broad median fascia with indistinct edges and large apical blotch with concave proximal edge. Dark brown spots on median fascia and towards apex, ferruginous triangular spot at costa, posteriorly. Fringes whitish, suffused brownish to before tornus or mid-termen. Hindwing whitish, strigulated brownish grey; fringes whitish.

Variation. Ground-colour of some specimens with ochreous-cream admixture and strong pattern, with some black-brown spots; ochreous costal mark more or less distinct, a concolorous fascia edging apical blotch anteriorly; distal portion of this blotch occasionally with spots of ground-colour. Fringes more or less dark. Hindwing may be whitish grey, with strong, diffuse strigulation or, in distal area, reticulation. Female forewing brownish with greyish white fringes and brownish median line.

Male genitalia (Figs 26, 27): Free parts of socii indistinct; valva very broad, rather not up-curved; sacculus large, convex ventrally, with distinct free termination armed with strong spine. Median part of transtilla slender, broadest postmedially, sharp, resembling that in some *Cochylis*-species. Aedeagus large; one strong cornutus fused with smaller spine at capitulum; juxta very large.

Female genitalia (Fig. 137): Postostial sterigma elongate, with well sclerotized distal edges of lateral arms; colliculum sclerotic; ductus bursae broad, with irregular, longitudinal sclerites and large, distinctly sclerotized lateral process at base; corpus bursae large, with weak lateral sclerites and a few spines; ductus seminalis originating in a rounded area edged by thin spines.

Holotype, male: "Ottawa, Canada, 8.VII.1906, C.H. YOUNG", G.S. 21471. Paratypes: one male with abdomen missing labelled as above but dated 2.VII.; male and female from Norway Bay, Quebec, 21 and 22.VII.1939, collected by G.A. HOBBS (one with abdomen missing); one male labelled "Grand Band, Ont.[ario], 11.VII.1939, T.N. FREEMAN"; two females from Knowlton, Quebec, one collected 11.VII.1929 by J. McDUNNOUGH, the other 8.VII.1928 by J.A. ADAMS. All in CNC collection. One female paratype "Charlton, Ontario, P.7.92" in NHML.

R e m a r k s. This species has a separate position within the genus and thus is placed at the end of the system of the Holarctic *Phalonidia*. Externally it somewhat resembles the East Palaearctic *Ph. zygota* RAZOWSKI, 1964.

Gynnidomorpha TURNER

Gynnidomorpha TURNER, 1916, Trans. Proc. R. Soc. S. Aust., **40**:158. Type-species: *Gynnidomorpha mesoxutha* TURNER, 1916, designated by monotypy, Australian. – *Piercea* FILIPJEV, 1940, Trudy Zool. Inst. Leningr., **6**: 171. Type-species: *Tortrix permixtana* [DENIS & SCHIFFERMÜLLER], 1775, Palaearctic, by original designation. – RAZOWSKI, 1987: 160, as *Piercea*, redescription.

Chaetotaxy described by SVATSCHEK (1958) for one Palaearctic species; food plants of Nearctic species unknown, in Palaearctic subregion the larvae live mainly on *Alismaceae*, *Gentianaceae*, *Plantaginaceae* and *Scrophulariaceae*.

D i s t r i b u t i o n. This genus is known from Palaearctic subregion (10 species), Oriental (5 species) and Australian (1 species) regions. For the first time it is recorded from the Nearctic subregion.

R e m a r k s. The supposed autapomorphies of *Gynnidomorpha* are: the sclerotized fold between bases of socii, large and upcurved base of costa of valva, the arrangement of teeth of apex of median part of transtilla and probably a presence of spines of end part of socius. The differences between the species are slight, both external and genital.

Gynnidomorpha romonana (KEARFOTT), comb.n.

Phalonia romonana KEARFOTT, 1907, Can. Ent., **39**(3): 83. – Type-localities: USA: New Jersey: Essex Co. Park; Illinois: Chicago; Maryland: Plimmers I. and Canada: Manitoba: Aweme. – *Phalonia officiosa* MEYRICK, 1912, Entomologists's Monthly Mag., (2)**23**: 35, unjustified replacement name for *Phalonia romonana* KEARFOTT.

Wingspan 10-12 mm. Head and thorax ochreous cream, labial palpus over 1. Forewing slightly expanding terminally, with costa weakly curved to middle, termen weakly convex and oblique. Ground-colour pale yellow-brown, glossy, darker in basal area, with indistinct, concolorous strigulae and shades mainly in distal half of wing. Pattern yellow-brown: dorso-basal mark weak, elongate; median fascia concave beneath costa anteriorly, with rather irregular edges and with dark brown spot at distal edge near cubital arm of median cell; subapical blotch may extend as an indistinct fascia towards mid-termen; occasionally a weak spot near tornus. Fringes concolorous with ground-colour. Hindwing ochreous brownish to pale brownish grey; fringes paler, creamer.

Male genitalia (Figs 28, 29): Distal half of socius slender; cornutus about 3/4 length of aedeagus.

Female genitalia (Fig. 138): Colliculum indistinct, very slightly sclerotized distally; ductus bursae long, with accessory bursa at its 1/4.

B i o l o g y unknown. In Canada moth collected between 24 of June and 10 of August.

D i s t r i b u t i o n. USA: New Jersey. – Canada (numerous specimens in CNC). New Brunswick: Bathurst, Tabusintac, Mer Blue; Nova Scotia: Parrsboro; Labrador: Chatham; Quebec: Cascapedia; Ontario: Ottawa, Port Colborne, Normandale. Coll. NHML: Toronto.

R e m a r k s. Similar to transpalearctic *G. minimana* (CARADIA, 1916), comb.n. both externally and genitally. The males hardly differ from one the other, the females of *romonana* are easily distinguished by almost completely membranous colliculum.

***Platphalonidia* RAZOWSKI**

Platphalonidia RAZOWSKI, 1965, *Nota lepid.*, 8(1): 58. Type-species: *Phalonia felix* WALSINGHAM, 1895, Nearctic, by original designation. – RAZOWSKI, 1994: 224, redescription.

R e m a r k s. This is exclusively the New World genus, with the majority of species (ca 15) occurring in Mexico and South America. Only a few taxa were found in the southern states of the USA, and one (*felix*) was realised in Canada. Further Canadian species are described below. The supposed autapomorphies of *Platphalonidia* are the presence of a group of scent scales on the outer margin of valva and the incisure of the end part of transtilla. The reduction of the socius and the separation of the distal part of tegumen may be included in the transformation series of the higher *Cochylini*. The systematic position is discussed by RAZOWSKI, 1994, the species are listed by same author (1986a). The specific differences are very slight; often the species are better distinguished externally than genitally.

***Platphalonidia albertae* sp.n.**

Wingspan 15 mm; head dirty cream, labial palpus 1.5, brownish, thorax concolorous. Forewing distinctly expanding posteriorly, with costa almost straight, apex broad, rounded, termen oblique, hardly convex. Ground-colour brownish cream, base and distal portion of wing suffused brownish, costa, dorsum and postmedian area strigulated brown, terminal spots more ochreous, sprinkled blackish, forming an indistinct fascia. Pattern ferruginous brown in form of curved outwards median fascia mixed grey at costa and subapical blotch extending towards middle of median veins to form a fascia darkest before end. Fringes creamy brown, brown scaled. Hindwing pale brownish grey with paler fringes.

Variation: Paratype paler and greyer, with less distinct pattern.

Male genitalia (Figs 30, 31): Valva rather broad to beyond middle; sacculus convex; median part of transtilla short; aedeagus slender, cornutus about half the length of aedeagus.

Female and biology unknown.

Holotype, male: "Nordegg, Al[ber]ta, 9.VI.1921, J. McDUNNOUGH", G.S. 21486. Paratype, also a male, labelled as above but dated 19.VI.1921.

R e m a r k. Genitally similar to *felix* but with smaller and narrower ventral prominence of the sacculus, proportionally smaller cornutus and the median part of transtilla much shorter. Externally the new species differs from *felix* in the shape of the forewing (the apical portion of costa does not extend outwards) and coloration.

***Platphalonidia dangi* sp.n.**

Wingspan 15 mm. Head grey (labial palpus ca 1.5), front white, thorax brownish. Forewing slenderer and more expanding terminally than in *albertae*. Ground-colour creamy, sprinkled grey, suffused grey at wing base, especially along costa and in postmedian area of wing; pattern in form of indistinct, brownish grey median fascia and similarly coloured subapical blotch extending towards middle breadth of wing to form an indistinct subterminal fascia. Fringes white cream. Hindwing pale brownish cream; fringes much whiter.

Male genitalia (Figs 32, 33) as in *albertae* but median part of transtilla very slender, not expanding terminally, with small apical incisure and sacculus more extending ventrally.

Female and biology unknown.

Holotype, male: "Nordegg, Al[ber]ta, 18 June 1923"; G.S. 21491.

Platphalonidia felix (WALSINGHAM)

Phalonia felix WALSINGHAM, 1895, Trans. ent. Soc. London, **1895**: 499, pl.12, fig.2. Type-locality: USA: Colorado: Loweland.

Wingspan 14-17 mm. Head and thorax yellowish brown, labial palpus 2. Forewing expanding in terminal part (costa somewhat extending outwards); ground-colour brownish to yellowish brown; pattern more brown. Median fascia distinct, interrupted near costa; postmedian suffusion forming a blotch. Fringes concolorous with ground-colour. Hindwing brownish with paler fringes. Variable in coloration.

The Canadian specimens have whiter ground-colour with some brownish strigulae along wing edges. Median fascia distinct in dorsal portion where may be marked dark brown; subterminal pattern marked by dark brown blotch or entirely very dark.

Male and female genitalia of Canadian specimens (Figs 34, 35; 139) do not differ from those of the California examples.

D i s t r i b u t i o n. USA: California, Arizona, Colorado, Illinois, Kansas, Nevada, New Mexico; northern to central Mexico. – Canada: Three specimens from Edmonton, Alberta collected on 1 and 14 of July, and 28 of August.

Platphalonidia lavana (BUSCK)

Phalonia lavana BUSCK, 1907, J. N.Y. ent. Soc., **15**(1): 27. Type-locality: USA: Arizona: Tuxon.

Wingspan 14-16 mm. Head brownish grey with pink-violet hue and some black scales; labial palpus 2; thorax concolorous with head. Forewing in male expanding terminally, slightly so in female. Ground-colour creamy white, with olive hue, strigulated grey; blackish dots along costa and dorsum; diffuse grey fasciae in distal half of wing, scaled black towards apex. Median fascia olive brown-grey, divided into large dorsal part broadest at middle of wing and smaller costal part. Fringes whitish suffused grey or blackish. Hindwing white-grey; fringes whitish with grey basal line.

Variation. Pattern often ill-defined, occasionally darker in apical area then in middle, or median fascia reduced to a blackish dorsal blotch.

The only Canadian specimen has whitish ground-colour indistinctly but densely strigulated olive-grey, blackish suffusion of wing base, ferruginous, edged black dorsal blotch followed by grey costal mark.

Male genitalia of Canadian specimens (Figs 36, 37): Valva broad basally, then strongly tapering terminad; sacculus broad, rounded ventrally; median part of transtilla very slender, with small apical thorns; aedeagus distinctly bent; cornutus slender, straight.

Female genitalia (Fig. 140) of the type specimen characterizes with well sclerotized, rather short cup-shaped sclerite of sterigma and short ductus bursae provided with longitudinal sclerites.

D i s t r i b u t i o n. USA: Arkansas and Illinois. – Canada: British Columbia: Shingle Creek, Penticton, single male in CNC.

Platphalonidia imitabilis sp.n.

Wingspan of male 17.5 mm; head brownish grey, thorax more black; labial palpus ca 2. Forewing expanding terminally, broader in female than in male, especially in basal half. Ground-colour whitish strigulated and reticulated pale brownish grey in basal half and terminal third of wing; paler shade posterior to middle; median fascia darker than suffusions, diffuse, consisting of small costal part and large, more proximal dorsal portion; subapical blotch broad at costa, then (remnants) slender. Fringes concolorous with suffusions. Hindwing whitish, strigulated and

suffused brownish distally; fringes whitish. Female (16 mm) with ground-colour creamer and suffusions, pattern and fringes darker. Hindwing brownish; fringes somewhat paler, whitish in anal area.

Male genitalia (Figs 38, 39) similar to those in *lavana* and *P. campicolana* (WALSINGHAM, 1879) from California (described and figured by RAZOWSKI, 1964) but easily distinguished by very large, distinctly curved cornutus.

Female genitalia (Fig. 141) somewhat similar to those in *lavana* but with longer sclerite of colliculum.

Holotype, male: "Waterton Lakes, Al[ber]ta, 30.VI.1923, J. McDUNNOUGH", G.S. 21473; paratype a similarly labelled female, dated "27.VI.1923".

Aethes BILLBERG

Aethes BILLBERG, 1820, Enumeratio Insectorum: 90. Type-species: *Pyrallis smeathmanniana* FABRICIUS, 1781, by subsequent designation (FERNALD, 1908: 51). Holarctic. – *Chlidonia* HÜBNER, [1825], Verz. bek. Schmett.: 393. Type-species: [*Phalaena*] *hartmanniana* CLERCK, 1759, by subsequent designation (FERNALD, 1908: 17). *Phalonia* HÜBNER, [1825], *ibid.*: 393. Type-species: *Tortrix tessera* [DENIS & SCHIFFERMLÜLER], 1775, by subsequent designation (FERNALD, 1908: 17). – *Dapsilia* HÜBNER, [1825], *ibid.*: 394. Type-species: *Tortrix rutilana* HÜBNER, [1817], by subsequent designation (FERNALD, 1908: 17). – *Lozopera* STEPHENS, 1834, Illustr. Br. Ent. *Haustellata*, 4: 287. Type-species: *Pyrallis francillana* FABRICIUS, 1794, by subsequent designation (FERNALD, 1908: 17). – *Argyridia* STEPHENS, 1852, List Specimens Br. Animals Br. Mus.: 83. Type-species: *Tinea dipoltella* HÜBNER, [1813], designed by monotypy. – *Lozopera Coecaethes* OBRAZTSOV, 1943, Mitt. Münch. Ent. Ges., 33: 99. Type-species: *Lozopera mauritanica* OBRAZTSOV, 1943 not Walsingham, 1898 = *Aethes amseli pamiрана* RAZOWSKI, 1967, by orig. design. – *Aethes Cirriaethes* RAZOWSKI, 1962, Acta zool. cracov., 7: 414. Type-species: *Lozopera mauritanica* WALSINGHAM, 1898, by original designation. All Palaearctic. – Redescriptions: RAZOWSKI, 1970: 287; 1987: 167 (based on Palaearctic taxa); 1994: 261.

Early stages, biology and food plants of the majority of the Nearctic species unknown.

D i s t r i b u t i o n. Known of all the regions but Australian, with main bulk of species (about 100) in the Holarctic region of which 40 are Nearctic. There are three Holarctic species.

R e m a r k s. The specific differences are often slight, both the external and genital. Some taxa form compact groups showing slight differences only. These characters are difficult to assess on the available material and without any biological knowledge. However, this problem is important and thus some forms found in Canada are discussed below.

Aethes deutschiana (ZETTERSTEDT)

Tortrix deutschiana ZETTERSTEDT, 1840, Insecta lapponica: 981. Type-locality: Lapponia. – *Cochylis lutulentana* HERRICH-SCHÄFFER, 1856, Neue Schmett.: 5, pl. 8, fig. 35. Type-locality: not recorded. – *Lozopera fuscostriana* CLEMENS, 1864, Proc. ent. Soc. Philad., 2: 417. Type-locality: no data available. – *Conchylis chalcana* PACKARD, 1866, Proc. Boston Soc. nat. Hist., 11: 56. Type-locality: Labrador: Strawberry Harbour near Cape Webuc. – RAZOWSKI, 1970: 316, redescription.

The genitalia as in the Palaearctic population; those of the Canadian examples in figs 40, 41 and 142, 143.

B i o l o g y. The Canadian examples collected in July, only one was taken on June 25 and one in early August.

D i s t r i b u t i o n. A boreo-alpine Holarctic species known in Palaearctic subregion from the mountains of C. Europe (France, Switzerland, Austria), Fennoscandia, Karelia and in the South Europe from Italy and Bulgaria; in Asia recorded from Siberia, Mongolia and in the south from C. Asia and Prov. Kansu in China; in Japan found in Hokkaido. In Nearctic subregion recorded from USA: Colorado, Montana, New Jersey, Oregon, Utah and Washington as well as from Alaska

(64°52'N/148°21'W). – Canada (numerous specimens in CNC). Quebec: Schefferville, Port Chimo; Manitoba: Port Churhill; Alberta: Kananaskis, Nordegg, Waterton Lake, Banff; British Columbia: Mt McLean, Lilloet (6000–7200'), Hope Mts (6000'), Jasmond, Shingle Creek Road, Lichumpton Park near Cuffus Lake, Keremoes; Perce; Quebec: Mt Albert (3000–3200'); Northwest Territory: Mackenzie Delta: Reindeer Depot.

Aethes smeathmanniana (FABRICIUS)

Pyralis smeathmanniana FABRICIUS, 1781, Species insectorum, 3: 278. Type-locality: England. – *Tortrix fabriciana* HÜBNER, [1799], Sammlung eur. Schmett., pl.23, fig.149. Type-locality: Europe (after title of work). – *Cochylis biviana* DUPONCHEL, 1842, Hist. nat. Papillons Lepid. Fr., Suppl., 4: 175, pl. 65, fig.3. Type-locality: France (after title of work). – *Cochylis stachydana* HERRICH-SCHÄFFER, 1851, Syst. Bearb. Schmett. Eur., 4: 185. Cited as probable synonym of *smeathmanniana*. – *Conchylis scissana* WALKER, 1863, List Specimens Lepid. Insects Colln Br. Mus., 28: 360. Type-locality: Nova Scotia. – RAZOWSKI, 1970: 323, redescription.

Genitalia of the Canadian specimens in Figs 42, 43 and 144, 145.

B i o l o g y. Canadian moths collected in June, July and early August (seldom), probably, like in Europe, in two indistinctly separable generations.

D i s t r i b u t i o n. Known from Europe, Asia Minor and Zailiyskij Ala Tau in C. Asia. In Holarctic subregion found in USA: Alaska, and from Maine and Washington to California and Arizona. – Canada (numerous specimens in CNC, some in NHML). Labrador: Cartwright; Alberta: Waterton Lakes; Nova Scotia: White Port Beach (Queens Co), S. Milford, Annapolis, Pamboro, Frankley Beach; Quebec: Knowlton, Mt. Lyall, Frankley Beach; Ontario: Trenton, Ottawa; Manitoba: Aweme; British Columbia: Penticton, Okanagan, Keremoes, Kilbridge, Kanim Lake; New Brunswick: Boiestown, Tracadie; Northwest Territory: Norman Wells; Yukon: Dawson.

Aethes rutilana canadiana ssp.n.

Wingspan 11–13 mm; head ochreous yellow, labial palpus ca 2, often mixed brownish, front yellow; thorax ochreous to brownish, mixed red. Forewing slender, in male somewhat expanding terminally. Ground-colour yellow to golden-yellow; costa and dorsum at wing base and pattern reddish to rust, with refractive edges consisting of postbasal and median fascias parallel to terminal fascia; middle of median fascia connected with terminal fascia at tornus. Fringes concolorous with ground-colour. Hindwing brownish grey; fringes paler.

Variation smaller than in Palearctic populations.

Male genitalia (Figs 44, 45) as in moninative form but with very small terminal process of sacculus. Some other, small differences are in the shape of the transtilla and size of cornutus.

Female genitalia (Fig. 146) as in nominative form, but with a slightly broader sclerite of colliculum.

B i o l o g y. The larva feeds on *Juniperus communis* L. (label data of some specimens from Quebec and Ontario). Moth flies in June and August (only a few examples were taken in May and July).

Holotype, male: "Bobkaygeon, Ont.[ario], 29.VI.[19]31, J. McDUNNOUGH", G.S. 21428. Paratypes, males and females with following data: Ontario: Carlton Co., *Juniperus communis*, 20.VI.; Monotick, 13.V., 14.VI., 15.VI. (5 specimens); Bobkaygeon, 29.V.; Bell's Corners, 13.V., 10.VI., 14.VI., 15.VI., 19.VI., (7 specimens); Trenton, 8.VII.; Carleton Co.; Quebec: Hull, 1.VI., 3.VI. 6.VI., 8.VI., 20.VI., 27.VI., all on *Juniperus communis* (7 specimens); Manitoba: Onch, 18.VI.; Alberta: Moraine Lake, 6 & 7.VIII. (3 specimens).

R e m a r k s. The nominative subspecies ([*Tortrix*] *rutialana* HÜBNER, [1817], Sammlung eur. Schmett., Tortrices, pl.39, fig. 249; type-locality: Europe, after title of work) is west Palaearctic, known from Europe eastwards as far as to Kasan Province, Russia (redescribed by RAZOWSKI, 1970: 325). Ssp. *tatricana* (ADAMCZEWSKI, 1936) occurs in the Polish Tatra Mts. The two characterise with process of the sacculus much longer than in *canadiana*. Externally the new subspecies resembles *tatricana*. Unfortunately, the external variation of this species is little known thus a more accurate comparison of this subspecies is impossible.

Aethes monera septentrionalis ssp.n.

Wingspan 21 mm. Head, thorax and forewing cream with olive-ochreous hue, densely sprinkled olive-grey among veins, with some brown scales; suffused grey along costa; veins paler. Fringes white-creamy with brown basal line. Hindwing brownish grey; fringes whitish or white creamy; basal line brownish. Variation: In some specimens suffusions weaker, basal lines of fringes of forewing atrophying.

Male genitalia (Figs 47, 48) differing from those in nominate form in much longer aedeagus, with short, rather straight terminal projection, almost twice longer cornutus, slenderer median part of transtilla and slenderer end of valva.

Holotype, male: "Nordegg, Al[ber]ta, 15.VI.1921, J. McDUNNOUGH", G.S. 21479; paratypes, two males: "Christopher Lake, Sask.[atchewan], 19.VI.1939 [and 21.VI.1939] A.B. BROOKS".

R e m a r k s. The nominate subspecies was described from Durango, Mexico (RAZOWSKI, 1986: 262). Externally the two subspecies do not differ much, however, the nominate form is paler, with weaker suffusion of the forewing.

Aethes labeculana (ROBINSON)

Conchylis labeculana ROBINSON, 1869, Trans. Am. ent. Soc., 2: 287, pl.8, fig.84. Type-locality: USA: Pennsylvania. – *Conchylis interruptofasciana* ROBINSON, 1869, Trans. Am. ent. Soc., 2: 278, pl.8, fig.85. Type-locality: USA: Pennsylvania. – *Phalonia aureana* BUSCK, 1907, N.Y. ent. Soc., 15(1): 25. Type-localities: Pennsylvania: Oak Station and Texas.

Wingspan 10-13 mm, seldom 8 mm. Head and thorax ochreous cream tinged brownish, labial palpus 2, thorax paler posteriorly. Forewing somewhat variable in shape, with costa convex, apex broad, rounded, termen slightly convex. Ground-colour creamy, suffused and sprinkled pale brownish or ochreous; basal blotch large, distinctly convex, brownish; median fascia divided into brownish costal blotch and dark brown dorsal blotch with rounded costal edge; subapical blotch or fascia brownish, darker at costa. Fringes creamy tinged brownish to yellowish. Hindwing brownish to brown with fringes paler or whitish.

Variation. Ground-colour may occasionally be very strongly suffused grey, brown or blackish, pattern more or less distinct, in dark specimens even blackish. Occasionally ochreous suffusions in terminal area of wing. In some females hindwing dark brown.

Male genitalia (Figs 49, 50): Valva broad to end of sacculus then subtriangular; sacculus stout, rounded terminally; median part of transtilla tapering terminally, armed with apical thorn; arm of vinculum slender; aedeagus slender, curved, with sharp ventral termination; cornutus long, slender.

Female genitalia (Figs 147, 148): Ovipositor short; sterigma, a weakly sclerotized postostial plate with rounded median prominence; sclerite of colliculum well developed; ductus bursae sclerotized to before colliculum where dorsal accessory bursa originates; remaining part of ductus also sclerotized except for proximal spined part, marked with sublateral prominence in middle followed by large, spined, ventro-lateral concavity from the bottom of which extends ductus seminalis.

B i o l o g y. Canadian specimens collected in June and July, one specimen from Nova Scotia in mid-August.

D i s t r i b u t i o n. In USA found in Colorado, Massachusetts, New Jersey, New York, New Hampshire and Pennsylvania. – Canada (8 specimens in CNC): New Brunswick: Chamcook; Nova Scotia: Queens Co.: White Port Beach; Manitoba: Aweme; Ontario: Montreal; Canadian National Park: Brackleys Beach; Quebec: Lac Mercier, Alcove, St. Johns. NHML: Toronto.

Aethes argentilimitana (ROBINSON)

Conchylis argentilimitana ROBINSON, 1869, Trans. Am. ent. Soc., 2: 287, pl.8, fig. 82. Type-locality: USA: Pennsylvania.

Wingspan 12-15 mm; head and thorax white-creamy, labial palpus 2, mixed brown laterally almost to the end. Forewing broader and slightly expanding terminally in male, uniform broad, with termen more oblique in female. Ground-colour glossy whitish with weak ochreous or cream suffusions; pattern brownish to pale ochreous grey, darker or spotted brown along edges, consisting of basal blotch or convex postbasal fascia, median fascia concave proximally, subapical blotch and fascia along termen usually not reaching apex. Fringes whitish. Hindwing pale brownish with white fringes.

Variation. Forewing ground-colour in some examples suffused brownish especially in distal half, costa and dorsum strigulate; pattern often monochrome, without darker edges.

Male genitalia (Figs 51-53): Sacculus convex postbasally; distal half of valva fairly broad, with many spines; median part of transtilla slender; cornutus 1/3 aedeagus length.

Female genitalia (Fig. 149): Sterigma rather weakly sclerotized, with median strongly sclerotized plate, anterior part cup-shaped, tapering proximally, fusing with colliculum; distinct sclerite in distal part of bursa; accessory bursa originating in very short, membranous ductus bursae; weak spines near middle of corpus bursae.

B i o l o g y. In Canada collected in June and July, a few examples taken late May and one in mid-September. Probably two generation a year.

D i s t r i b u t i o n. In USA found in Arkansas, Illinois, Mississippi, New Jersey, New York, Pennsylvania, Virginia, Oklahoma, Ohio and North Carolina. – Canada. CNC, 15 specimens: Quebec: Hemmingsford, Lake Mondor; Ontario: Ottawa, Trenton, Bobcaygeon, Normandale, Norway Point (Lake of Bays), Almonte, St. Thos.; Manitoba.

Aethes angulatana (ROBINSON)

Conchylis angulatana ROBINSON, 1869, Trans. Am. ent. Soc., 2: 286, pl.8, fig. 81. Type-locality: USA: Pennsylvania.

Wingspan 13-15 mm. Head, thorax and ground-colour of forewing yellowish cream, suffusions brownish, pattern brownish to yellow-brown, with darkest spots brown, consisting of dorso-basal blotch reaching middle breadth of median cell, median fascia interrupted medially, with dorsal part slender not reaching dorsum, subapical blotch small and terminal fascia reaching apex. Fringes concolorous with ground-colour, darker at apex. Hindwing brownish with paler fringes.

Male genitalia (Figs 54, 55) as in *argentilimitana* but valva slenderer and sacculus less extending ventrally, slightly rounded; aedeagus and cornutus somewhat longer than in mentioned species.

Female genitalia unknown.

B i o l o g y unknown (one specimen from Canada was collected in July). One specimen collected in USA (Pullman, Washington) was bred from stems of *Solidago* sp.

D i s t r i b u t i o n. In USA collected in Pennsylvania, Illinois, Massachusetts, New Jersey and Ohio. – Canada. Ontario: Toronto (coll.NHML).

R e m a r k s. The type of this species is unknown to me and the determination is based on comparison with the specimens from the Smithsonian Institution.

Aethes promptana (ROBINSON)

Conchylis promptana ROBINSON, 1869, Trans. Am. ent. Soc., 2: 286, pl.8, fig.80. Type-localities: USA: Pennsylvania and Texas.

Wingspan 15-16 mm; head and thorax yellowish cream; labial palpus 2, cream ochreous, cream distally. Forewing of male slightly expanding terminally, termen hardly convex and oblique; ground-colour whitish cream or yellowish cream, suffusions yellow; pattern ochreous-yellow with brownish dots or mixed brownish, subternal blotch being the darkest, similar in shape to that in *angulatana*. Fringes concolorous with ground-colour. Hindwing whitish with yellower periphery; fringes white or grey-cream.

Male genitalia (Figs 56–59): Valva broad except for terminal part, with strong marginal teeth; sacculus indistinctly convex ventrally; aedeagus with slender ventro-terminal part.

Female genitalia (Figs 150 – 152): Sclerite of colliculum strong, broad, slightly tapering proximally, ductus bursae armed with strong sclerites; numerous spines in distal half of corpus bursae, the strongest at base of ductus bursae.

B i o l o g y unknown.

D i s t r i b u t i o n. USA: Pennsylvania, Texas. – Canada. Quebec: Knowlton (CNC, 3 specimens); Ontario: Toronto (NHML, 2 specimens).

R e m a r k s. The type of *promptana* is not examined but I selected the specimens which fit the original description and are widely distributed as one specimen is from Texas. One female labelled "United States" differs from the above described Toronto example in much larger sclerite of colliculum and bursa copulatrix. A specimen from Quebec slightly differing from the last mentioned examples externally characterizes with more slender aedeagus and small tip of valva.

The following "forms" found in Canada which may represent distinct species are illustrated. In one specimen from Montreal which externally resembles *argenteolimitana*, without glossy forewing ground-colour but with aedeagus and cornutus as in *promptana*, the valva is slender, with smaller marginal teeth and the sacculus short, angulate (Fig. 60). In the other Montreal specimen (Fig. 61) there are small differences in the shape of the valva and the aedeagus is longer. The specimens from Nova Scotia are externally similar to *promptana* but the transtilla and valva (Fig. 62) are somewhat different. The female (Fig. 155) has a longer colliculum sclerite. The form from Bathurst, New Brunswick resembling externally *angulatana* have somewhat variable valva (Figs 63, 64) armed with a few, strong spines and slender median part of transtilla. A pair from Ottawa characterises with larger size (wingspan 17 mm), dense chestnut suffusion of the ground-colour and distinct, chestnut-brown pattern. Male genitalia (Fig. 65) with valva rather slender and ventral edge of sacculus almost straight. To this last form belongs small (wingspan 11.5 mm) moth from Montreal with ground-colour whitish and pattern (black-brown, accompanied by pale ochreous shades) similar to that in *angulatana*. Male genitalia (Fig. 66) with subterminal part of valva broad, sacculus extending caudally and median part of transtilla small.

Aethes biscana (KEARFOTT)

Phalonia biscana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., 33: 75. Type-localities: USA: Pennsylvania; New Jersey: Essex County Park, New Brighton, Dalton, Glenburn, Karbondale; Maine: Orono. – *Phalonia biscana* var. *giscana* KEARFOTT, 1907, ibid.: 75. – *Phalonia ixauta* MEYRICK, 1912, Entomologist's Monthly Mag., (2)23: 35, unjustified replacement name for *Phalonia biscana* KEARFOTT.

Wingspan 18-20 mm; head and throat brown to rust brown, labial palpus over 4. Forewing slender, in male hardly expanding terminally, in female rather uniformly broad throughout. Unicolorous, rust-brown or with indistinct, darker, diffuse pattern (remnants of median fascia in the form of a line, subapical shade, diffuse subterminal dots and a subterminal line parallel to termen). Fringes concolorous with ground-colour, brown to base. Hindwing in male cream grey, in female creamy, in apical part mixed brownish; fringes whiter than middle of wing. Variation concerns shape of the pattern and suffusions.

Male genitalia (Figs 67-69): Saccus rounded apically, distal part of valva slender, long; median part of transtilla rather slender.

Female genitalia (Fig 154): Colliculum long, tapering proximally; sac-shaped, distal portion of corpus bursae large, minutely spined.

B i o l o g y. Canadian specimens collected from early June to late August. Food-plant (the label data, specimens from Vineland) is *Solidago graminifolia*.

D i s t r i b u t i o n. USA: Connecticut, Florida, Illinois, Michigan, New Hampshire, New York, Pennsylvania and South Carolina. – In Canada (over 30 specimens in CNC) found in New Brunswick: Fredericton, Tabusintac; Nova Scotia: Smith's Cove, Parrsboro, Baddeck, Bathurst; Quebec: Hemmingsford, Knowlton; Agathe des M.; Ontario: Port Colborne, Ottawa, Mer Blue, Vineland Station; Manitoba: Aweme.

R e m a r k s. In the collection there are some larger and some smaller (darker, unicolorous) specimens which hardly differ externally but the males of the small form have different shape of the valva, especially the angulate distal portion of the saccus.

Aethes heleniana sp.n.

Wingspan 13-14 mm; head whitish, thorax slightly tinged brownish, labial palpus 2.5, brownish grey to beyond middle laterally. Forewing slender, costa convex, termen oblique. Ground-colour whitish to white cream, suffused and sprinkled between pattern with brownish or brownish grey; pattern brownish to brown, dark along edges, consisting of slender fasciae: dorso-basal fascia not reaching wing edge, atrophying in median cell, accompanied by weak costal mark; median fascia divided into slender dorsal fascia parallel to dorso-basal fascia and short, broader costal blotch; subapical blotch short, C-shaped; subterminal fascia long rather reaching tornus, broadening dorsally, almost parallel to termen. Fringes concolorous with ground-colour. Hindwing pale brownish, cream basally; fringes whitish, with pale brownish, incomplete median line. Variation: paler and darker specimens known; pattern occasionally broader than in holotype, with median fascia complete.

Male genitalia (Figs 70-73): Distal part of tegumen with pair of long, well sclerotized processes at base of which socii originate; vinculum arms large, coalesced ventrally; median part of transtilla very long, slender, with two apical thorns. Valva broad to middle, with caudal edge concavely arched, rather well sclerotized, terminal part often armed with a curved process accompanied by one or two ventral thorns; ventral edge of saccus almost straight, distal angle slightly variable. Aedeagus very long, slender, with a series of minute thorns in terminal part, ventrally; single small cornutus in one specimen present.

Female genitalia (Figs 155, 156): Sterigma delicata, in major part well sclerotized; ductus bursae long, slender, well sclerotized, broad at corpus bursae where dorsal accessory bursa originates; some rather weak sclerites in corpus bursae; ductus seminalis ventral, extending from a rounded area surrounded by a sclerite.

Holotype, male: "Port Colborne, Ont.[ario], 10.VI.1934, J.J.de GRAYE"; GS. 21512. Paratypes, numerous males and females labelled as holotype and dated 2.VI., 10.VI. and 27.VI., Pt. Pelee (Ontario), 27.VI., and from Toronto, 4.IX., and 10.IX.1926, bred from *Helenium* by J.J. de GRAYE.

R e m a r k s. The pattern is very similar to that in several species of this group, but the genitalia are very distinct, mainly because of the presence of the peculiar processes of the top of the tegumen in male. Other male characters, as the terminal process of the valva and very slender, long aedeagus and long, sclerotized ductus bursae in the male allow easily to distinguish *heleniana* from all other species of this genus.

***Aethes angustana* (CLEMENS)**

?*Lozopera angustana* CLEMENS, 1860, Proc. Acad. nat. Sci. Philad., **22**: 354. Type-locality: USA: ?Pennsylvania. – *Conchylis dorsimaculana* ROBINSON, 1869, Trans. Am. ent. Soc., **2**: 285, pl. 8, fig. 79, unjustified replacement name for *Lozopera angustana* CLEMENS.

Wingspan 14–15 mm; head and thorax creamy, labial palpus over 2, brownish. Forewing weakly expanding terminally in male; ground-colour yellowish cream, suffusions more yellow-brown, weak, costa in basal third brownish; dorso-basal blotch yellow-brown; costal remnant of median fascia brown followed by paler shade; subternal blotch brownish edged dark brown. Fringes concolorous with ground-colour. Hindwing cream, darker on periphery; fringes whitish.

Male genitalia (Figs 74–76): Valva very broad, with short terminal portion; sacculus large, rounded apically, convex beyond base ventrally; dense spines both on sacculus and distal portion of valva; median part of transtilla slender; aedeagus rather slender, with two posterior lobes; one slender cornutus in vesica.

Female genitalia (Figs 157, 158): Poststernal part of sterigma broad, cup-shaped portion well sclerotized proximally; ductus bursae short; sclerite of corpus bursae posterior; small, membranous sac at base of accessory bursa; ductus seminalis originating at base of membranous dorsal sac of the corpus. Subgenital sternite large, convex medially, fusing with sterigma.

B i o l o g y unknown. Canadian specimens collected in June, July and August.

D i s t r i b u t i o n. USA: New York, Virginia, Pennsylvania, Maryland, Kansas, Illinois. – Canada. About 10 specimens in CNC. Ontario: Port Colborne, Montreal, Ottawa, Simere.

R e m a r k s. The above description is based on the material in the Smithsonian Institution. The Canadian examples differ from the specimens from the USA in the coloration and a little in the male genitalia. Their forewing ground-colour is white, in dorsal area suffused with brown; pattern dark brown consisting of slender dorso-basal blotch accompanied by costal suffusion, subsquare dorsal part of median fascia and slender costal fascia directed towards tornus; hindwing whitish. The sacculus beyond the postbasal prominence more or less convex, less expanding terminally.

***Aethes mymara* sp.n.**

Wingspan 16–18 mm. Head creamy, labial palpus ca 4, browner distally; thorax pale ochreous creamy. Forewing as in *dorsimaculana*; ground-colour white-cream, indistinctly sprinkled brownish along dorsum. Pattern brownish, dark brown along edges; basal blotch in form of oblique dorso-basal fascia atrophying in basal and costal parts; ternal blotch triangular, very distinct, followed by two weak, much paler marks near middle of wing and subcostally; some small brown spots along mid-part of termen; fringes rather concolorous with wing.

Male genitalia (Figs 77, 78) as in *angustana* but valva and sacculus much slenderer, this last weakly expanding beyond base ventrally, median part of transtilla larger, aedeagus slenderer, with pair of rather equally long lateral parts; cornutus slender, delicate, with small capitulum; latero-dorsal processes of juxta long, slender, sharp terminally.

Female genitalia (Fig. 159) as in the above mentioned species, but with sterigma smaller, convex distally and distal part of bursa copulatrix (ductus bursae?) slenderer.

Holotype, male: "Toronto, Canada, PARISH, VI.[19]13", G.S. 12878; allotype, an identically labelled female; both in coll. of NHML.

Aethes floccosana (WALKER)

Conchylis floccosana WALKER, 1863, List Specimens lepid. Insects Colln Br. Mus., **28**: 358. Type-locality: North America, Nova Scotia. – *Tortrix confusana* ROBINSON, 1863, Trans. Am. ent. Soc., **2**: 274, pl.5, fig.43. Type-locality: USA: Pennsylvania.

Wingspan 14-16 mm; head cream, tinged ochreous, thorax slightly darker. Forewing weakly expanding terminally, costa weakly convex. Ground-colour yellowish to yellow-cream, with base of wing and dorsum suffused orange or brownish rust; basal half of costa and subdorsal remnant of median fascia brownish, weak brownish suffusion more proximally and subapically; fringes creamy. Hindwing creamy in anal area mixed brownish; fringes cream white.

Male genitalia (Figs 79-81): Valva very broad to beyond middle, rounded apically; sacculus broad postbasally, tapering towards small free termination, bristled; some bristles in terminal third of valva; median part of transtilla large, terminating in a single prominence; aedeagus slender, bent, with curved apical part and asymmetric processes at zone (right process about 3 times longer than the left). No cornutus found in vesica.

Female genitalia (Figs 160-162): Sterigma membranous, with hairs, and elongate-ovate median plate; membranous pocket between distal part of subgenital sternite and sterigma; ductus bursae and posterior half of corpus bursae with sclerites; accessory bursa and ductus seminalis dorsal, from postmedian part of corpus and base of ductus bursae, respectively.

B i o l o g y unknown. In Canada moths collected in second half of June.

D i s t r i b u t i o n. In USA collected in Massachusetts, Pennsylvania and Illinois. – Canada (2 specimens in CNC). Nova Scotia; Ontario: Ottawa.

Aethes atomosana (BUSCK)

Phalonia atomosana BUSCK, 1907, J.N.Y. ent. Soc., **15**(1): 22. Type-locality: USA: Pennsylvania: Pittsburgh.

Wingspan 18-19 mm. Head and thorax cream tinged ochreous, labial palpus over 2, pale ochreous medially. Forewing weakly expanding terminally; ground-colour cream to yellow-cream, darker medially; black dots scattered all over surface of wing agglomerated along dorsum and in posterior part of wing; brownish suffusion near base; fringes concolorous with ground-colour. Hindwing yellowish cream, darker on periphery with fringes concolorous. Variation. Straw-yellowish forewing with some brown-black spots beneath apex and dot at end of median cell. Occasionally periphery of hindwing yellowish-brownish.

Male genitalia (Figs 82-84): Base of valva very broad, distal half tapering terminally, terminating in strong hook; sacculus very broad at base, slightly concave caudally, bristled. Median part of transtilla large, with a series of terminal thorns; distal arms of aedeagus asymmetric.

Female genitalia (Figs 163-165): Poststrial part of sterigma broad, concave in middle distally; cup-shaped part large, connected with sclerite of ductus bursae; accessory bursa and ductus seminalis dorsal extending from base of ductus bursae and middle of posterior part of corpus bursae, respectively.

B i o l o g y. Canadian specimens collected between mid-July and early September.

D i s t r i b u t i o n. USA: Pennsylvania and Canada (ca 10 specimens in CNC): Ontario: Mer Blue, Trenton, Port Colborne and Charlton.

Aethes spartinana (McDUNNOUGH)

Phalonia spartinana McDUNNOUGH, 1916, Can.Ent., **48**(4): 144. Type-locality: USA: S. Dakota: Elk Point.

Wingspan 24 mm; head white cream, thorax creamy tinged brownish. Forewing broad, straw-yellow cream; base suffused brownish yellow, postmedian suffusion paler, indistinct; some brown dots in basal half and one in middle of wing; fringes creamy. Hindwing cream, hardly mixed brownish in anal area; fringes white cream. Variation: a tendency to atrophy of dark dots.

Male genitalia unknown.

Female genitalia (Figs 166, 167): Ovipositor rather short but papilla analis and anapophyses anteriores long; sterigma very weakly sclerotized, with elongate median sclerite beyond ostium; anteostial part of sterigma very broad, better sclerotized, with numerous longitudinal folds; ductus bursae very short, with two spined prominences dorsally; accessory bursa ventral, extending from anterior prominence; ductus seminalis ventral, from middle of corpus bursae.

B i o l o g y. Type reared from *Spartina*. AINSLIE (1917) described life history of this species. Canadian specimens collected in July.

D i s t r i b u t i o n. Known from USA: Iowa, Massachusetts, South Dakota and Wyoming. – New to Canada. In CNC 3 specimens from Nova Scotia: Parrsboro and Manitoba: Aweme.

Cochylidia OBRAZTSOV

Cochylidia OBRAZTSOV, 1956, Mitt. Münchn. Ent. Ges., **46**: 14. Type-species: *Tortrix subroseana* HAWORTH, [1811], by original designation. – RAZOWSKI, 1970: 374; 1987: 169, redescriptions.

D i s t r i b u t i o n. Known from Holarctic region and northern part of Oriental region (Nepal). Of nine species 8 are Palaearctic, one Oriental. One species is Transpalaearctic and one (*subroseana*) occurs also in northern part of this subregion.

R e m a r k s. *Cochylidia* is related to *Cochylis* as the presence of the cone-shaped cluster of cornuti shows. The shape of the valva is the synapomorphy with another Palaearctic genus, *Diceratura* DIAKONOV, 1923 but this latter has no terminal spines on the costal arm of the valva. There are two groups of species within this genus, one formed by 3 species from the Palaearctic part of the distribution of *Cochylidia* (close to *C. rupicola* /CURTIS, 1834/ characterized with broad costal part of valva and little specialized aedeagus) and the other close to *subroseana*.

Cochylidia subroseana (HAWORTH)

Tortrix subroseana HAWORTH, [1811], Lepid. Br.,: 402. Type-locality: England. – *Cochylis phaleratana* HERRICH-SCHÄFFER, 1851, Syst. Bearb. Schmett. Eur., **4**: 189 (1874, *ibid.*, Tortr., pl.13, fig.85, non binom.). Type-locality: Germany: Frankfurt am Main. – *Cochylis flammeolana* TENGSTRØM, 1848, Notis. Sällsk. Faun. Fenn., **1**: 161. Type-locality: Almän vid Uleaborg. – RAZOWSKI, 1970: 379, redescription.

The genitalia of Canadian specimens as in figs 85,86 and 168.

D i s t r i b u t i o n. Palaearctic subregion from British Is to Japan, in northern Europe to 60° in Norway, in the south across Central Europe to Prov. Kirin (Manchuria) in China. – Canada (8 specimens in CNC). Ontario: Ottawa; Alberta: Nordegg.

Cochylis TREITSCHKE

Cochylis TREITSCHKE, 1829, Schmett. Eur., **7**: 233. Type-species: [*Tortrix*] *rubellana* HÜBNER, [1823] = *Tortrix roseana* HAWORTH, 1811, by subsequent designation (CURTIS, 1834, Br. Ent., explanat., pl. 491). *Conchylis* SODOFFSKY, Bull. Soc. imp. Naturalistes Mosc., **6**: 93, unjustified emendation. – *Pontoturania* OBRAZTSOV, 1953, Mitt. Münchn. ent. Ges., **33**: 97. Type-species: *Cochylis defessana* MANN, 1861, by original designation. – *Cochylischroa* OBRAZTSOV & SWATSCHEK, 1958 [in:] SWATSCHEK, Abh. Larvalsystem. Insekten, **3**:

233. Type-species. *Eupoecilia atricapitana* STEPHENS, 1851, by original designation. – *Longicornutia* RAZOWSKI, 1960, Polskie Pismo ent., **30**(17): 314. Type-species: *Cochylis phaleratana* HERRICH-SCHÄFFER, 1851 = *Cochylis epilina* DUPONCHEL, 1842, by original designation. – *Neocochylis* RAZOWSKI, 1960, *ibid.*: 316. Type-species: *Conchylis calavrytana* REBEL, 1906 = *Cochylis molliculana* ZELLER, 1847, by original designation. Established as subgenus of *Cochylis* TREITSCHKE. – *Paracochylis* RAZOWSKI, 1960, *ibid.*: 316. Type-species: *Cochylis amoenana* KENNEL, 1899, by original designation. Established as subgenus of *Cochylis* TREITSCHKE. – *Brevicornutia* RAZOWSKI, 1960, *ibid.*: 317. Type-species: *Cochylis pallidana* ZELLER, 1847, by original designation. Established as subgenus of *Cochylis* TREITSCHKE. – *Thyralia* WALSINGHAM, 1897, Proc. zool. Soc. London, **1897**: 138. Type-species: *Conchylis bunteana* ROBINSON, 1869, by original designation. – *Thyralia* [sic!] WALSINGHAM, 1914, Biologia cent.-am., Zool. Lepid.-Heterocera, **4**: 296, unjustified emendation of *Thyralia* WALSINGHAM, 1897. – RAZOWSKI, 1970: 397; 1987: 171; 1994: 284, redescrptions.

Early stages and biology. Chaetotaxy of only one New World species is known (*C. caulocatax* RAZOWSKI, 1984).

D i s t r i b u t i o n. Known from Holarctic, Oriental and Neotropical regions. In Nearctic subregion occurs ca 15 species. 14 species are recorded from Canada.

R e m a r k s. The system of this genus requires re-consideration. Several subgenera or genera were described from the Palaearctics, but almost all were sunk as synonyms (RAZOWSKI, 1970). These groups of species are characterised and discussed by RAZOWSKI (1987).

Cochylis nana (HAWORTH)

Tortrix nana HAWORTH, [1811], Lepid. Br.: 439. Type-locality: England. – *Eupoecilia cruentana* GUENÉE, 1845, Eur. Micr.Index: 60. Type-locality: France: Dept. Eure-et-Loir: Châteaudun. – *pallidana* HERRICH-SCHÄFFER, 1847 Syst. bearb. Schmett. Eur., pl.10, fig. 65 – non binom. *pumilana* HERRICH-SCHÄFFER, 1847, *ibid.*, pl.10, fig.66 – non binom. – *Simaethis albidana* WALKER, 1863, List Specimens lepid. Insects Colln Br. Mus., **35**: 1807. Type-locality: Canada: Nova Scotia. – *Penthina ochreoalbana* WALKER, 1863, List Specimens lepid. Insects Coll. Br. Mus., **28**: 375. Type-locality: Canada: Nova Scotia. – *Conchylis altocorsicana* PETRY, 1904, Stettin. ent. Ztg., **65**:245. Type-locality: Corsica: Monte d'Oro. – *Phalonia winniana* KEARFOTT, 1905, Can. Ent., **37**(1): 10. Type-localities: USA: New Jersey: Essex County Park, Montclair and Canada: Quebec: Oxford. – RAZOWSKI, 1970: 428, redescription.

The genitalia of the Canadian specimens are illustrated and described as follows.

Male genitalia (Figs 87, 88): Uncus broad, tapering apically; socius small, scarcely hairy; valva elongate, slender; sacculus convex postbasally, with well developed, sharp free termination; aedeagus in distal part slender, sharp; caulis broad, large; cornuti absent.

Female genitalia (Fig. 169): Ovipositor fairly long; posterior apophyses about twice longer than apophyses anteriores; sterigma broad, membranous except for distal third where minutely spined; ductus bursae built of strong membrane, without stronger sclerotization at ostium bursae; ductus seminalis originating at base of this latter, ventrally; corpus bursae minutely spined throughout. No accessory bursa present.

Early stages. In Canada collected between 25. V. and 20.VII. (mostly in June). One specimen reared from *A. tenuifolia* (the label data).

D i s t r i b u t i o n. Known from Europe and the Nearctic subregion. USA: Alaska, Connecticut, Maine, New York, Washington, N. Carolina, Oregon, South Dakota and Utah. – Canada (numerous specimens in CNC and some in NHML): New Brunswick: Bathurst, Caraquet; Nova Scotia (type localities of *albidana* and *ochreoalbana*): Petite Riviere, Baddeck, Smiths Corners, Parrsboro, S.Milford; Quebec: Oxford (type locality of *winniana*): St.Hilaire; British Colombia: Osojocks; Quebec: Little Mecatins Is., Cascapedia, Harrington Harbour; Ontario: Bobcaygeon, Ottawa; Alberta: Edmonton.

R e m a r k s. The systematic position of this species is still unclear. OBRAZTSOV (cf. synon. of *Cochylis*) erected for it a separate genus *Acornutia* and characterized it by presence of the uncus

what, however, is a plesiomorphic character. *Thyralia* WALSINGHAM was described for *Conchylis bunteana* ROBINSON which is very close to *nana* and differs (as some other closely related Nearctic taxa) from it by a completely reduced uncus. The shape of the valva-complex in the male and that of the bursa copulatrix in female are common of all those species. On basis of the present knowledge I am unable to decide whether *Acornutia* and *Thyralia* are really synonymous with *Cochylis* or deserve a status of a distinct genus. Thus I am following previous interpretations retaining both in the genus in question.

Cochylis discana (KEARFOTT)

Phalonia discana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 78. Type-localities: USA: Pennsylvania: Allegheny Co.: Oak Station, Connecticut: New Haven. *Phalonia cricota* MEYRICK, 1912, Entomologist's Monthly Mag., (2)**23**: 35, unjustified replacement name for *Ph. discana* KEARFOTT.

Wingspan 12-14 mm; head brownish, labial palpus ca 2, front greyer or creamer; thorax brownish with darker spots or grey hue. Forewing ground-colour brownish with ochreous-olive hue in basal half; strigulation brown; median fascia brown with black-brown marks; subapical pattern in form of a fascia, a blotch or some three strigulae accompanied by smaller marks. Fringes concolorous with ground-colour. Hindwing brownish grey; fringes paler with distinct basal line. A variable species: The type almost unicolorous, without trace of median fascia, with basal half of wing darker than the posterior half where costal area creamy, subapical spot brownish, strigulation rather concolorous. Canadian specimens brownish, with distinct strigulation; median fascia and subapical blotch marked black-brown; refractive elements in ground-colour present.

Male genitalia (Figs 89, 90): Saccus almost as long as costa of valva, aedeagus much shorter than in *nana*, uncus atrophied, socius much larger.

Female genitalia unknown.

B i o l o g y unknown. The Canadian example collected in August.

D i s t r i b u t i o n. USA: Pennsylvania, Illinois, Michigan, Cincinnati, Connecticut. – Canada. Ontario: Vineland Station, Port Colborne (3 specimens in CNC), Muskoka and Toronto (2 specimens NHML).

Cochylis voxcana (KEARFOTT)

Phalonia voxcana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 83. Type-localities: Canada: Ottawa; USA: New Hampshire: Hampton, Maine: Kennebunkport. – *Phalonia omphacitis* MEYRICK, 1912, Entomologist's Monthly Mag., (2)**23**: 35, unjustified replacement name for *Phalonia voxcana* KEARFOTT.

Wingspan 12-14 mm; head brownish, labial palpus ca 2, thorax concolorous. Forewing ground-colour cream brown, mixed with pink except for basal third, strigulation darker. Median fascia brown to rust, at costa mixed grey, with gently concave proximal edge, occasionally atrophying subcostally and dorsally; subapical blotch slender, reaching mid-termen, concolorous with median pattern; paler suffusion between the two elements marked dark brown medially. Fringes concolorous with suffusions or strigulation. Hindwing brownish, cream brown or grey-brown with fringes much paler, mixed whitish.

Variation distinct. Some specimens with dark distal half of forewing and tornal area ferruginous pink or similar. Head and thorax often concolorous with ground-colour of basal half of forewing, in females head occasionally darker.

Male genitalia (Figs 91-93) as in *discana* but saccus much shorter and aedeagus longer.

Female genitalia (Figs 170, 171) as in *nana* but sterigma shorter.

B i o l o g y unknown. Canadian specimens taken in July and August. Food-plant (from the label of the Vineland Station specimen) is *Lactuca spicata*.

D i s t r i b u t i o n: USA: Maine, New Hampshire. – Canada (ca 40 specimens in CNC). Nova Scotia: Annapolis Royal, Parrsboro; Ontario: Toronto, Ottawa, St. Davids, Port Colborne, Vineland Station; Quebec: Montreal, Knowlton, Hemmingsford; British Columbia: Vernon, Kaslo.

R e m a r k s. Externally distinct, but in male genitalia close to *discana*, if the examined female is conspecific with the discussed male it is more similar to *nana* than to *discana*.

***Cochylis hofmanana* (KEARFOTT)**

Phalonia hoffmanana KEARFOTT, 1907, Bull.N.Y.Am.Mus.,**23**: 162, pl.8,fig.4. Type-locality: USA: North Carolina: Mount Graybeard Valley. – *Phalonia marloffiana* BUSCK, 1907, J.N.Y. ent. Soc.,**15**(1): 10. Type-locality: USA: Pennsylvania: Oak Station. – *Phalonia nonlavana* KEARFOTT, 1907, Trans. Am. ent. Soc. Philad.,**33**: 85. Type-localities USA: New Brighton, Pennsylvania: Pittsburgh. – *Phalonia toxcana* KEARFOTT, 1907, Trans.Am.ent.Soc.Philad.,**33**:85. Type-locality: USA: New Jersey: Essex County Park. – *Phalonia baryzela* MEYRICK, 1912, Entomologist's Monthly Mag.,(2)**23**: 35, unjustified replacement name for *Phalonia toxcana* KEARFOTT. – *Phalonia zoxcana* KEARFOTT, 1907, Trans.Am.ent.Soc.Philad.,**33**:86. Type-locality: USA: Cincinnati. – *Phalonia telifera* MEYRICK, 1912, Entomologist's Monthly Mag.,(2)**23**: 35, unjustified replacement name for *Phalonia zoxcana* KEARFOTT.

Wingspan 10-14 mm. Head brownish cream, labial palpus 1.5, often more or less suffused brownish; thorax browner. Forewing in male slightly expanding terminally, termen fairly oblique, hardly convex; female forewing less expanding. Ground-colour creamy, suffused cream-ochreous, darkest in distal third of wing; suffusions along edges of wing and diffuse shades of distal wing area incl. apex browner or greyer. Pattern: median fascia brownish to grey ochreous with brown spots mainly at costa and in middle, subapical blotch brownish olive, brown distally, subterminal marking brownish olive. Fringes creamy or brownish creamy with browner basal line. Hindwing pale brownish, fringes paler.

Very variable species: in nominate form forewing ground-colour varying from whitish to brownish white, occasionally with pink hue; females darker than males. In type of *nonlavana* ground-colour white, suffused grey, marbled grey in distal half of wing; pattern brown-grey, paler, sprinkled black, suffusions grey; in *toxcana* pattern rather pale, tinged olive ochreous. In dark examples ground-colour may be brownish with more ochreous-yellow shades, pattern dark brown, occasionally rust. In very pale specimens pattern indistinct. Ochreous cream ground-colour and more orangeous pattern rare.

Male genitalia (Figs 94-97): Tegumen short, with small apical prominence probably representing the uncus; socius large, elongate; arm of vinculum slender; transtilla with median part expanding distally, terminating in two hooks. Valva fairly broad to beyond middle, very slender in terminal portion, with minute spines in ventral portion of broad area above sacculus; this last slender posteriorly, tapering, with extremely small free termination. Aedeagus long, slender, curved at base of coecum penis and at caulis, with sharp ventral termination; cornuti: anterior group of ca 10 slender spines and a posterior row of ca 20 somewhat thicker spines.

Female genitalia (Figs 172, 173): Ovipositor fairly short, apophyses very slender; sterigma with shallow cup-shaped portion and large lateral plates; subsquare prominence anterior to ostium; ductus bursae long, rather well sclerotized, except for weakly sclerotized anterior third which is curved terminally; accessory bursa beyond middle of ductus bursae, ventro-lateral; ductus seminalis originating in membranous base of this last.

B i o l o g y. In Canada collected between 11.VII. and 22.VIII. (only one specimen taken on 11.XI.). Food-plant: *Aster novaeangliae* (from label of the specimens from the Vineland Station).

D i s t r i b u t i o n: Known from USA: Arkansas, District Colombia, Connecticut, Illinois, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, Pennsylvania, North Carolina, New York, Virginia and Canada. – Canada (numerous specimens in CNC, several

ones in NHML): Nova Scotia: Smith's Cove, Baddeck, White Port Beach (Queens Co.); Ontario: Vineland Station, Port Colborne, Ottawa, Toronto, Thunder Bay Area, Parrsboro.

Cochylis viscana (KEARFOTT)

Phalonia viscana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 84. Type-locality: USA: New Jersey: Essex County Park. – *Phalonia peganitis* MEYRICK, 1912, Entomologist's Monthly Mag., (2) **23**: 35, unjustified replacement name for *Phalonia viscana* KEARFOTT.

Wingspan 10-14 mm; head brown-grey to cream grey; labial palpus ca 2, darker, browner, brownish above; thorax darker than head. Forewing ground-colour whitish, glossy at edges of median fascia, suffused grey or brown-grey, pinkish in distal third. Pattern: median fascia bronzy cinnamon with black marks; subapical fascia rather concolorous, occasionally edged silver, suffusions paler, without darker places. Fringes paler than wing suffusions. Hindwing dark greyish brown; fringes cream grey, basal line pale brown-grey. Holotype is rather damaged, certainly paler than described above, more ochreous in general hue, with ochreous brown pattern and median fascia atrophying at dorsum.

Male genitalia (Figs 98, 99): Top of tegumen elongate, cup-shaped, with small dorso-apical prominence; socius slender; median part of transtilla slender, broadest medially, sharp apically. Valva broad except for distal third which is slender, rounded ventro-caudally; minute spines in median part of disc, much larger spines along distal edge; sacculus convex postbasally, without free termination. Aedeagus rather as long as valva, with slender distal part about as long as coecum penis; cornuti a bunch of fairly long spines and much smaller group of short spines.

Female genitalia (Fig. 174): Ovipositor fairly long, with long, thick apophyses; sterigma broad, partially weakly sclerotized, concave proximally, with two lateral, small lobes of distal edge; ductus bursae as long as sterigma, rather weakly sclerotized, with longitudinal folds; accessory bursa dorsal, originating near base of ductus bursae.

B i o l o g y unknown.

D i s t r i b u t i o n. USA: Illinois, Maine, Massachusetts, Maryland, Michigan, North Carolina, Pennsylvania, West Virginia. – Canada (2 specimens in NHML): Ontario: Toronto.

Cochylis wiscana (KEARFOTT)

Phalonia wiscana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 77. Type-locality: USA: Wisconsin: Milwaukee Co. – *Phalonia acropeda* MEYRICK, 1912, Entomologist's Monthly Mag., (2) **23**: 35, unjustified replacement name for *Phalonia wiscana* KEARFOTT.

Wingspan 14-16 mm; head and thorax brownish grey, scape of antenna whitish, labial palpus brownish grey, whitish above; thorax brownish. Ground-colour of forewing white with weak pinkish hue in distal third, strigulated grey; spots along costa black-grey to middle, then olive brown; median fascia brownish with rust and black spots, divided at least into two parts of which the costal is very small; subapical fascia long, similarly coloured, marks along termen blackish; suffusions brownish-olive or ochreous; fringes white cream with median line ochreous, scaled brown-black. Hindwing grey, distinctly strigulated brownish grey; fringes whitish, basal line brownish grey.

Canadian specimens much darker, with larger black parts of pattern and basal blotch developed at least in costal area; suffusions ochreous-pink; fringes with blackish lines and divisions.

Male genitalia (Figs 100, 101) as in *viscana* but socius broader and shorter, median part of transtilla broader, distal part of valva less differentiated; large, ventro basal area of distinct spines on disc and broad belt of large submarginal spines ventro-caudally.

Female genitalia (Fig. 175) as in *viscana* but ductus bursae much shorter, weakly sclerotized.

B i o l o g y: The Canadian specimens reared from *Senecio jacobaea*.

D i s t r i b u t i o n. USA: Wisconsin and Kentucky. – Canada (2 specimens in CNC): Saskatchewan: Regina.

R e m a r k s. Examined specimens were compared with the type only externally.

Cochylis avita sp.n.

Wingspan 11-12 mm; head whitish tinged grey at vertex; labial palpus 1.5, cream ochreous; thorax dark grey scaled whitish grey. Forewing slender, termen hardly oblique, almost straight. Ground-colour white cream, costa and dorsum partially suffused ash-grey, weaker suffusion beyond median fascia becoming blackish grey towards termen. Median fascia interrupted subcostally and subdorsally where grey, ochreous in median part, marked with black spot at cubital vein; subapical fascia blackish, ochreous towards costa, accompanied by tornal marking extending towards middle of wing, blackish and ochreous in colour. Fringes dark grey. Hindwing greyish, paler basally; fringes pale greyish. Female forewing broader, ground-colour white, glossy, silvery at pattern edges; dorsal part of median fascia oblique, terminating in blackish spot, more ochreous-orange submedially; subtornal blotch extending towards middle of wing broad, rounded, brown; costal part of subapical fascia ochreous.

Male genitalia (Figs 102, 103): Tegumen terminating in large, broad, rounded apically lobe connected with rather short socii, probably representing the uncus; median part of transtilla broad, rather short, rounded apically; valva slenderer than in two preceding species, with marginal (ventro-caudal edge) belt of spines; base of sacculus limited by a dentate convexity; aedeagus curved, with long ventral termination; caulis large; cornuti not found.

Female genitalia (Fig. 178): Sterigma in large membranous sac, with two rounded posteriorly lobes beyond ostium and base of ductus seminalis, and less sclerotized, hairy distal portion; ductus bursae broad, membranous; accessory bursa ventral, extending from its base.

Holotype, male: "P[or]t Colborne, Ont.[ario], Aug.[ust] 8, 1933, J.J. de GRYSSE", G.S. 21488. Paratype, female: "Ottawa, Ont.[ario], 5.VIII.1925, C.H. CURRAN". Both in CNC.

R e m a r k s. Externally distinct by slender forewing and the oblique dorsal part of median fascia. In male genitalia somewhat resembling the two preceding species (mainly in the shape and spinulation of the valva) but completely distinct by uncus-like apical process of the tegumen.

Cochylis temerana (BUSCK)

Phalonia temerana BUSCK, 1907, J.N.Y. ent.Soc., **15**(1): 28. Type-locality: USA: Pennsylvania: Oak Station. – *Phalonia cincinnatana* KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 78. Type-locality: USA: Ohio: Cincinnati.

Wingspan 13-15 mm. Head brownish, labial palpus ca 2, front whiter. Forewing weakly expanding terminally, costa almost straight. Ground-colour grey, rather glossy, strigulation grey to brownish grey, distinct in basal third of costa; suffusions rather concolorous, that in median portion of posterior part of wing darker, broad, usually ovate, apical suffusion weak; pattern brown, often with darker strigulae, consisting of median fascia usually interrupted subcostally and subapical blotch or slender fascia showing a tendency to atrophy. Fringes darker than ground-colour, with darker divisions, often with blackish striae at bases, or brownish. Hindwing brownish grey, paler basally; fringes paler than wing. Variation: Some specimens with ferruginous suffusions in distal part of forewing. There is a tendency to atrophy of pattern.

Male genitalia (Figs 104-106): Tegumen short with small apical prominences; socius elongate; arm of vinculum slender; median part of transtilla slender, sharp. Valva broad except for terminal third which is very slender; sacculus simple, with ventral edge rather straight and almost right

caudal angle. Aedeagus slender, curved subterminally; caulis postmedian; some short, broad basally cornuti (and one plate-shaped) in vesica, if present; juxta very large.

Female genitalia (Fig. 176): Ovipositor rather short, apophyses anteriores fairly long, very slender; sterigma subsquare with protruding anterior and posterior corners; ostium bursae submedian; ductus bursae broad, except for distal portion; accessory bursa extending from distal corner of lateral sclerite; ductus seminalis dorsal, from before end of ductus bursae; corpus bursae with minute spines.

B i o l o g y: No data. Canadian specimens collected between May 10 and June 10, three specimens taken in first decade of July.

D i s t r i b u t i o n: USA: Illinois, Louisiana, Maryland, New York, Ohio, Pennsylvania and Virginia. – Canada (30 specimens in CNC): Quebec: Mt. Lyall, Wright, Cascapedia; Ontario: Ottawa, Leamington, Smoky Falls (Mattagani River), St. Thos, Merivale; Manitoba: Riding Mt., Aweme.

Cochylis dormitoria sp.n.

Wingspan 14 mm; head grey, vertex darker, labial palpus ca 2; thorax blackish grey, scaled whitish. Forewing distinctly expanding terminally, slender in basal portion; apex rounded; termen somewhat oblique, slightly convex. Ground-colour whitish, in distal half of wing creamy, strigulation scarce, grey; base and basal third of costa suffused grey; median fascia ill-defined, consisting of grey spots and some groups of black scales in distal half, some concolorous groups of scales along dorsum towards tornus; terminal third of wing grey; subapical fascia fusing with terminal pattern, apex mark darker, black scaled. Fringes white-cream, grey basally and terminally, with some similar divisions. Hindwing whitish, in distal part spotted and strigulated pale brownish grey; fringes concolorous with weak pale brownish lines.

Male genitalia (Figs 107, 108): Dorso-apical part of tegumen with elongate projection; socius slender; arm of vinculum slender; median part of transtilla long, tapering terminally, rather variable. Valva long, broadest near middle, tapering in distal third; sacculus simple, broadest at base. Aedeagus broadest beyond caudis, with slender ventro-terminal process; cornuti, a row of small spines and posterior plate.

Female unknown.

Holotype, male: "Merivale, Ont.[ario], 13.VI. 1935 J.McD[UNNOUGH]"; G.S. 21490; coll. CNC. Paratype, also a male labelled "Toronto, Canada, Parish,V.[19]23; GS. 7280 [RAZOWSKI], in NHML.

Cochylis aurorana (KEARFOTT)

Phalonia aurorana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 83. Type-localities: USA: New Jersey: Essex County Park and Maine: Kennebunkport.

Wingspan 11-13 mm. Head and thorax brownish cream, labial palpus ca 2, brownish. Forewing as in other *Cochylis*-species; ground-colour brownish cream with pinkish hue mainly in distal half where large suffusion may occur; suffusions and strigulation brownish; pattern brown, more or less dark; median fascia usually interrupted near costa or subdorsally, with some darker spots; subapical fascia concolorous, occasionally atrophying; a row of brownish spots along termen; fringes concolorous with suffusions, usually with darker divisions. Hindwing brownish cream, darker on periphery; fringes creamy with median line cream-grey or brownish cream.

Male genitalia (Figs 109, 110): Uncus large, rather well sclerotized, with rather smooth lateral edges; distal part of socius bearing some papillae, the ventral elongate, sharp; arm of vinculum slender; median part of transtilla broadening terminally. Valva broad, slightly expanding to end of

sacculus with small, slender apical portion; disc densely spined; sacculus slender, in distal third spinose, with small free termination. Aedeagus small, ventro-terminal part long, marked with spines or thorns; cornuti not found.

Female genitalia (Fig. 178): Sterigma very large, half-moon-shaped, convex proximally, with numerous folds; ductus bursae rather slender; accessory bursa ventral, originating in posterior part of this last.

B i o l o g y unknown.

D i s t r i b u t i o n: USA: New Jersey, New Hampshire, Massachusetts, Connecticut. – Canada: One specimen from Ontario: Toronto (coll. NHML).

R e m a r k s. The male genitalia of a "cotype" are illustrated, the female from Toronto is compared with a specimen from Massachusetts.

Cochylis arthuri DANG

Cochylis arthuri DANG, 1984, Can. Ent., **116**: 253, figs 1-7. Type-locality: Canada: Saskatchewan: SE Saskatoon.

Wingspan 10-14 mm; head whitish, vertex creamy, labial palpus 1.3, ochreous; thorax white-grey. Forewing expanding terminally, costa slightly curved outwards, with apex rounded, termen obliquely convex. Ground-colour white cream, in distal part of wing tinged pink; strigulation grey, in distal area darker, tinged brownish; median fascia diffuse, consisting of grey spots and shades, with some black scales subdorsally; subapical fascia and a spot near apex much darker. Fringes ochreous with blackish brown basal line and weaker subterminal line. Hindwing whitish, creamy on periphery, with grey strigulation. Fringes whitish, with brownish grey basal line.

Male genitalia (Figs 11, 112) as in *aurorana* but uncus slenderer, tapering apically, with several wart-like processes; socius with a few "warts" only, median part of transtilla broad postmedially, and valva without spinulation of disc and with larger slender distal part. Aedeagus about twice longer, with ca 10 fairly long cornuti.

Female (Fig. 179): Distal edge of sterigma concave medially, proximal corners long; colliculum broad, rounded proximally, with weak anterior process extending into ductus bursae; accessory bursae dorsal, originating in anterior part of colliculum, sublaterally; ductus seminalis ventral, from base of ductus bursae; corpus bursae minutely spined, without other sclerites.

B i o l o g y described by ARTHUR & POWELL, 1990. Host is wild sunflower.

D i s t r i b u t i o n (ca 10 specimens in CNC): Canada: Saskatoon, and Manitoba.

R e m a r k. Externally similar to *aurorana* and *dormitoria*. The male genitalia of the type close to the former species. The shape of uncus may be variable as in one specimen from Manitoba (not included in this description) is slender, elongate-triangular, without any "wart".

Cochylis dubitana (HÜBNER)

[*Tortrix*] *dubitana* HÜBNER, [1799], Sammlung eur. Schmett., Tortrices, pl.12, fig.71. Type-locality: Europe (after title of work). – *Tortrix ambiguana* FRÖLICH, 1828, Enumeratio Tortr. Wu"rtemb.: 53. Type-locality: Germany: Württemberg: Stadthau. – *Lobesia baseirufana* BRUAND, 1850, Mém. Soc. ent. Doubs, **3**: 19. Type-locality: not mentioned, probably France. – RAZOWSKI, 1970: 413, redescription

Male genitalia of Canadian specimen as in Figs 113, 114.

B i o l o g y. In Europe the larva lives in two generations from mid-August to end of September and in June and July on *Crepis* L., *Senecio* L., *Picris* L., *Hieracium* L., *Carduus* L., *Solidago* L., *Cirsium* L. and several other plants. Moth is on wing in May and June, in second generation from mid-July to end of August. The Canadian specimens collected in June and July.

D i s t r i b u t i o n. Palaearctic subregion: Europe, Caucasus, China: Shansi and Nearctic subregion (Canada). – Canada (ca 20 specimens in CNC, 1 in NHML): Quebec: Cascapedia, Percé; Alberta: Waterton Lake, Banff, Nordegg; British Columbia: Shingle Creek Rd., Kemerer.

Cochylis buccera sp.n.

Wingspan 9-13 mm. Head brownish cream, front paler, labial palpus 1.5, darker distally; thorax creamy brown. Forewing slightly expanding posteriorly in male, uniformly broad in female. Ground-colour cream to pale brownish cream; strigulation along costa and dorsum brown, suffusions paler; median fascia slender, diffuse dorsally yellowish brown to brown with some darker scales; subapical blotch rather paler than median fascia, small, reaching mid-termen. Fringes concolorous with ground-colour or darker at tornus. Hindwing brownish grey or creamy grey; fringes greyish cream to whitish grey.

Male genitalia (Figs 115-118): Ends of socii very short; median part of transtilla slender; valva broad to middle, with slender, up-curved distal part; sacculus convex ventrally, spined in distal third and partially along dorsal edge; strong process above base of sacculus; aedeagus slender, rather as long as costa of valva, with slender, slightly bent ventral termination; a few (2 or 4) short cornuti with broad bases in vesica.

Female genitalia (Figs 180, 181): Sterigma rounded proximally, with straight posterior portion and curved sclerites surrounding ostium bursae laterally extending in lateral, minutely spined lobes; ductus bursae fairly short; accessory bursa small, lateral, extending from before middle of this last; ductus seminalis ventral, from posterior part of corpus bursae.

B i o l o g y. In Canada moth flies from early June to mid-August, the examples from Texas were taken in April, June and August. Host of Canadian specimen is *Monarda mollis*.

Holotype, male: "Vineland Station, Ont.[ario], 11.VII.1938, W.L. PUTMAN; Host *Monarda mollis*"; Paratypes: males and females from same locality dated 7. and 9.VII., 11.VIII.; Port Colborne, Ontario 2.VIII., Chatham Labty, 15.VIII.; Aweme, Manitoba, 5.VI. in Canada (coll. CNC), and Dallas and Forestburg, Texas (coll. NHML).

Unplaced species

Cochylis hospes WALSINGHAM

Cochylis hospes WALSINGHAM, 1884, Trans. ent. Soc. London, **1884**: 131. Type-locality: USA: North Carolina. – RAZOWSKI, 1964, Annls zool. Warsz., **22**(16): 2, fig. 84; 1994, Acta zool. cracov., **37**(2): 293. – RAZOWSKI, 1994: 293, redescription.

Genitalia of the Canadian specimens redescribed as follows.

Male genitalia (Figs 119, 120): Remnants of uncus small; median part of transtilla stout; valva short, broad, with slender dorso-terminal portion armed with two thorns; sacculus long, curved in middle part ventrally, densely spined; small spines on disc of valva above base of sacculus; aedeagus somewhat expanding distally; cornuti short, forming two groups.

Female genitalia (Figs 182, 183): Sterigma large, rounded proximally, densely spined; its proximal part forming a shallow pocket, lateral parts in form of lobes; ductus bursae slender, somewhat sclerotized medially; ductus seminalis ventral, originating at end of corpus bursae; accessory bursa from sclerite of the ostium region.

Early stages. Some larval characters are provided by ARTHUR & POWELL, 1990.

B i o l o g y. Life history is described by WESTDAL, 1949 who treats it as a pest of sunflower. In Canada the moth is on wing in July and August.

D i s t r i b u t i o n. USA: Arizona, Colorado, Illinois, Iowa, Massachusetts, Michigan, New Jersey, New York, North Carolina, New Mexico, Utah. – Canada (over 10 specimens in CNC): Ontario: Ottawa, Trenton; Saskatchewan: Trossachs.

R e m a r k s. The external variation is rather slight; in the male genitalia it occurs mainly in the shape of the transtilla.

Unplaced *Cochylini*

Phalonia maiana KEARFOTT

Phalonia maiana KEARFOTT, 1907, Trans. Am. ent. Soc. Philad., **33**: 82. Type-localities: USA: New Jersey: Essex County Park and Great Nootch.

Wingspan 7-8 mm; head grey, front ash-grey, in male white-grey, labial palpus over 1. Forewing weakly expanding terminally, with costa slightly convex. Ground-colour cream suffused and strigulated brownish; suffusions darker than ground-colour, distinct in distal half of wing. Pattern brown in form of median fascia subdivided into 2-3 blotches, the costal and median parts being darker than the dorsal, and subapical fasciae reaching beyond mid-termen. Fringes concolorous with ground-colour, darker at wing apex. Hindwing brownish grey; fringes brownish creamy with brownish median line. Variation: ground-colour may be whitish with grey strigulation and suffusions or dark grey sprinkled blackish. The Canadian specimen is dark grey, with blackish grey pattern.

Male genitalia (Figs 121, 122): Terminal part of tegumen weakly sclerotized, with subtriangular apical portion; socius small, at base of this triangle, laterally; median part of transtilla slender, long; juxta broad, rather short; base of valva broad, with sclerite reaching its middle portion armed with strong, densely spined dorsal process; terminal third of valva tapering terminally, rather slender; sacculus convex postbasally; aedeagus slender, curved; coecum penis with two very large basal lobes; cornuti not found.

Female genitalia unknown.

B i o l o g y unknown. The Canadian specimen taken in August.

D i s t r i b u t i o n. USA: Pennsylvania, New Jersey, New Hampshire. – Canada (1 specimen in CNC): Nova Scotia: Parrsboro. New to Canada.

Conchylis oenotherana RILEY

Conchylis oenotherana RILEY, 1882, Trans. Acad. St. Louis, **4**: 316. Type-locality: USA: Missouri.

Wingspan 11-2 mm. Head grey, vertex and labial palpus (over 2) olive-grey; thorax olive-ochreous, creamer distally. Forewing in male expanding terminally with costa weakly convex and termen fairly oblique, in female broad, indistinctly expanding, with shorter termen. Ground-colour yellow to ochreous yellow developed as large blotch in basal half of wing except for costa and occasionally wing base and small blotch in postmedian area; remaining surface dark pink. Fringes paler than ground-colour, pink at apex and occasionally at tornus where mixed brownish, with traces of median line. Hindwing greyish brown; fringes in male white with grey basal line, in female brownish with brown basal line.

Male genitalia (Figs 123, 124): Tegumen broad, with short terminal part; socius fairly large; median part of transtilla broad, tapering apically, with small terminal process; valva broad in basal portion, with slender, distinctly sclerotized, sharp dorsal part and strong sacculus terminating in a similar, but smaller, sharp process; juxta large; aedeagys very broad beyond zone, with very large lateral lobes extending ventro-terminally; coecum penis slender; caulis broad; vesica armed with

a pair of terminal curved terminally, sharp sclerites accompanied by broader, dull lateral process, all minutely spined; no other cornuti realised.

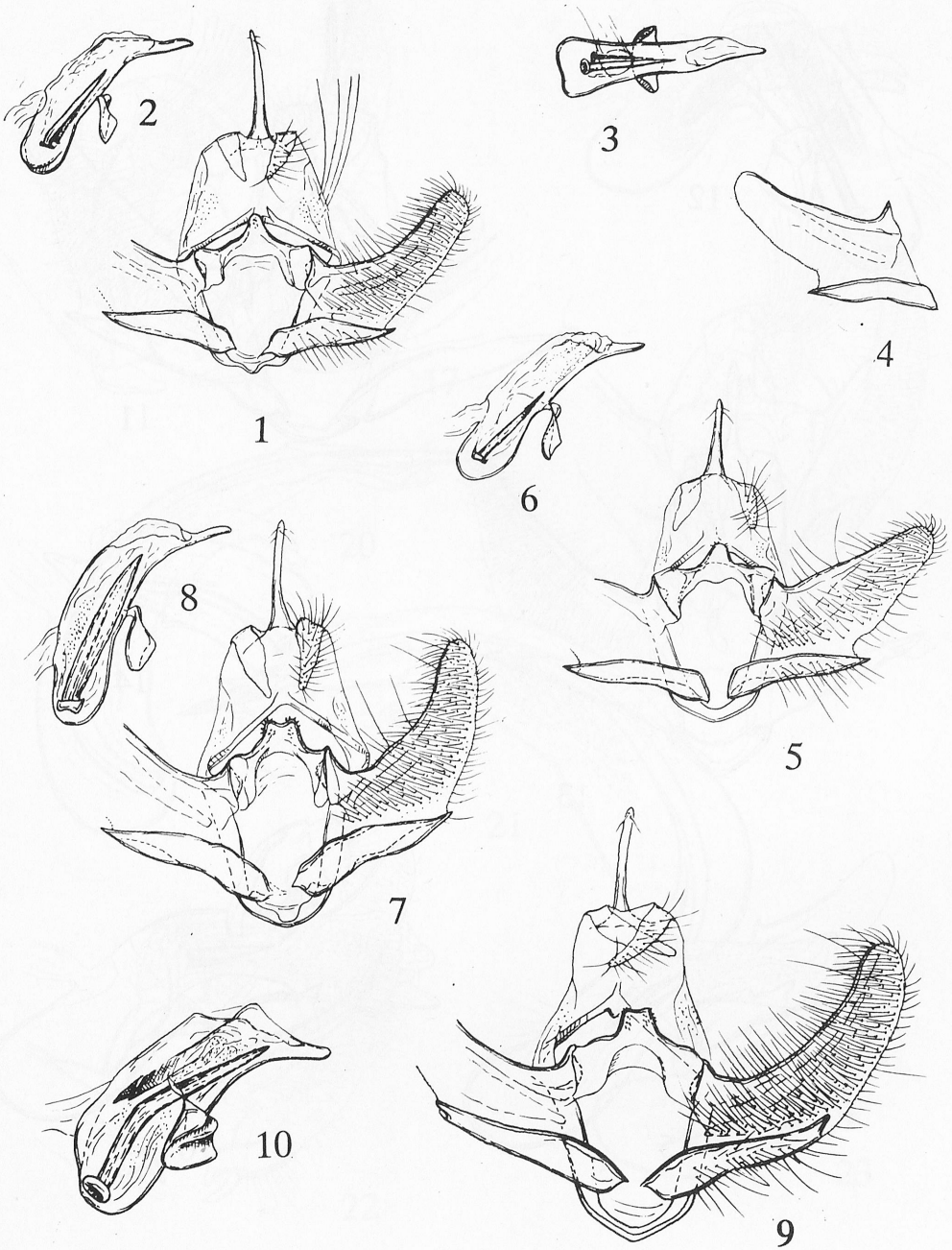
Female genitalia (Fig. 184): Ovipositor short; sterigma large forming a membranous pocket protecting, complicate sclerite with distal and lateral parts rounded; ventral plate with two distal lobes; proximal edge weakly sclerotized, folded radially; corpus bursae very small; ductus bursae very short; accessory bursa dorsal, originating at end of ductus bursae.

B i o l o g y. The Canadian specimens collected chiefly in July and August; a few specimens taken in second half of May, mid-June and first decade of September. Probably two generations a year. Host plant in *Oenothera*.

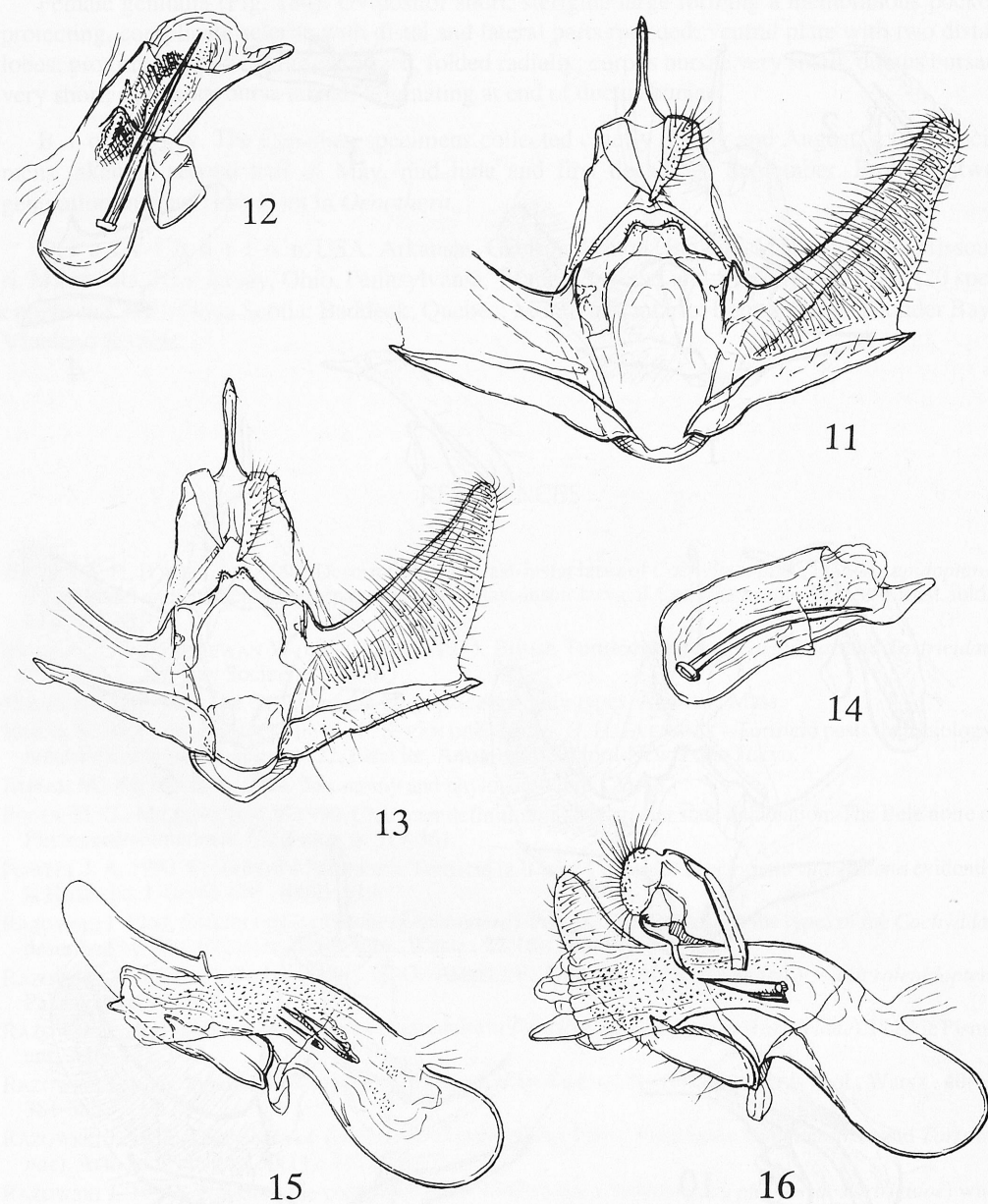
D i s t r i b u t i o n. USA: Arkansas, Georgia, Illinois, Indiana, Massachusetts, Missouri, Minnesota, New Jersey, Ohio, Pennsylvania, Tennessee, Texas and Virginia. – Canada (20 specimens in CNC): Nova Scotia: Baddeck; Quebec: Montreal; Ontario: Lemmington, Thunder Bay, Vineland Station.

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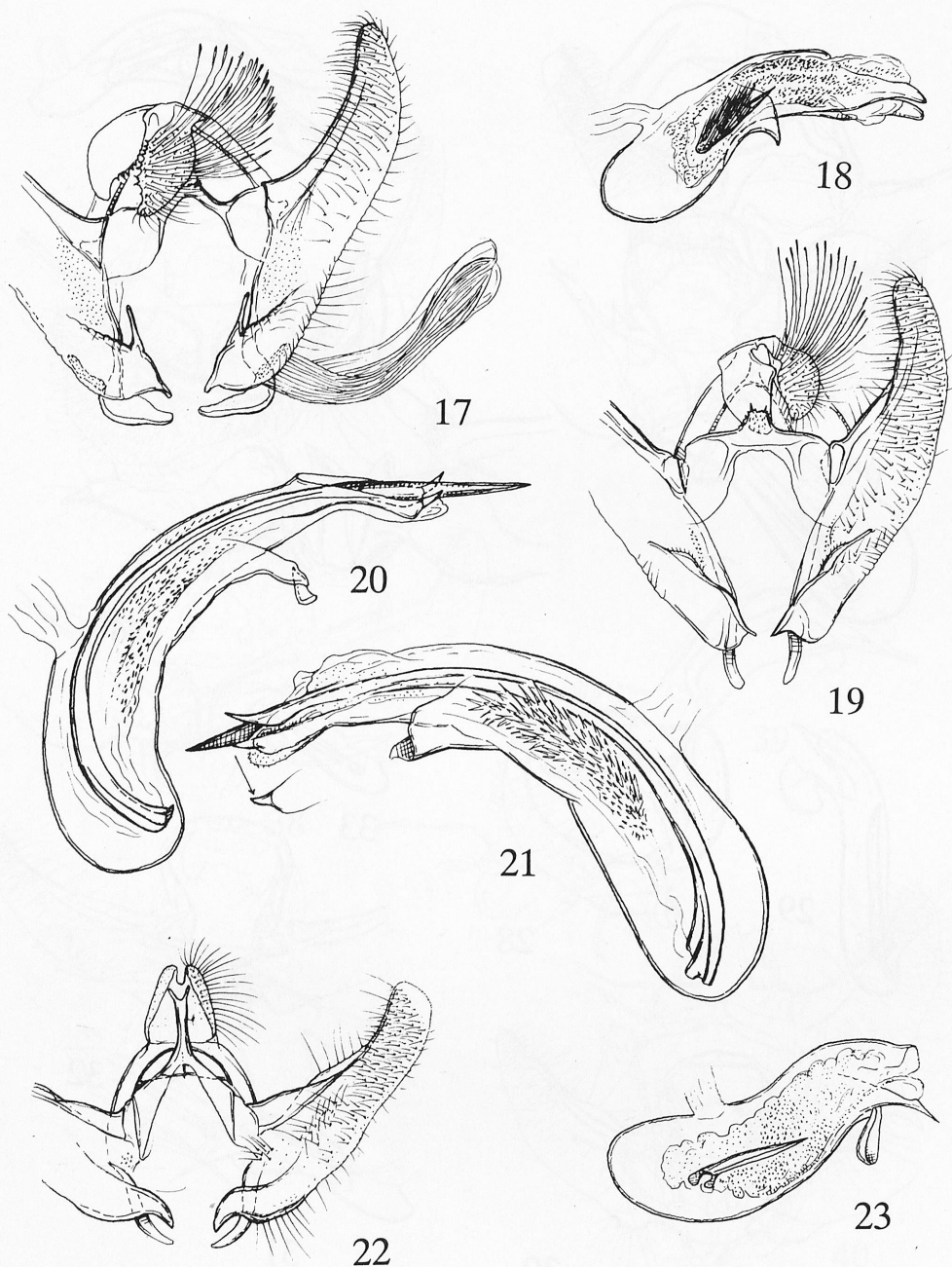
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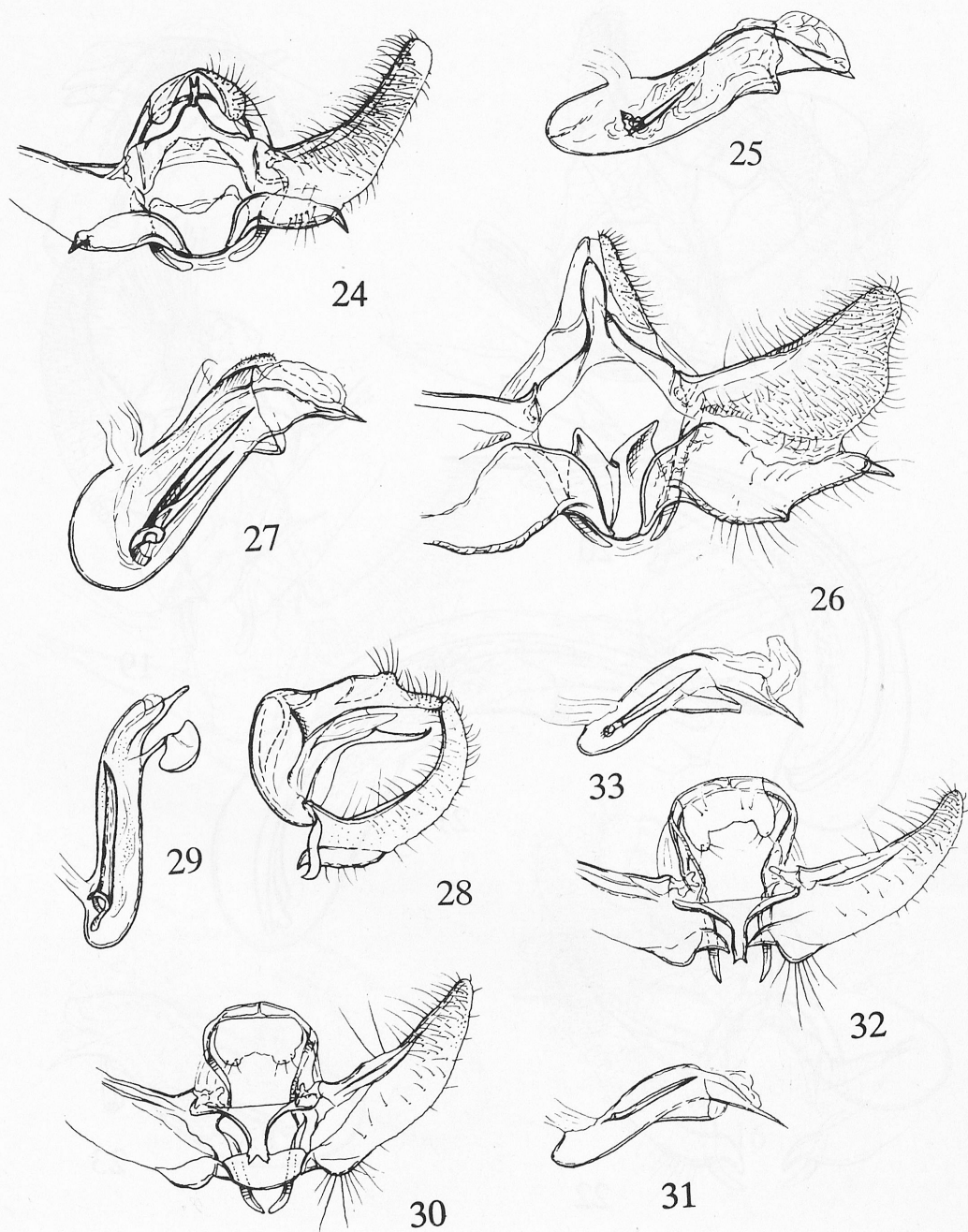
Figs 1-10. Male genitalia of *Phtheochroa* STEPHENS: 1-4 – *Ph. aureoalbida* (WALSINGHAM), British Columbia: Pouce Coupe; 5, 6 – *Ph. vitellinana* (ZELLER), New Britain: Waweig; 7, 8 – *Ph. fulviplicana* (WALSINGHAM), Saskatchewan: Saskatoon; 9, 10 – *Ph. riscana* (KEARFOTT), Nova Scotia: Petite Riviere.



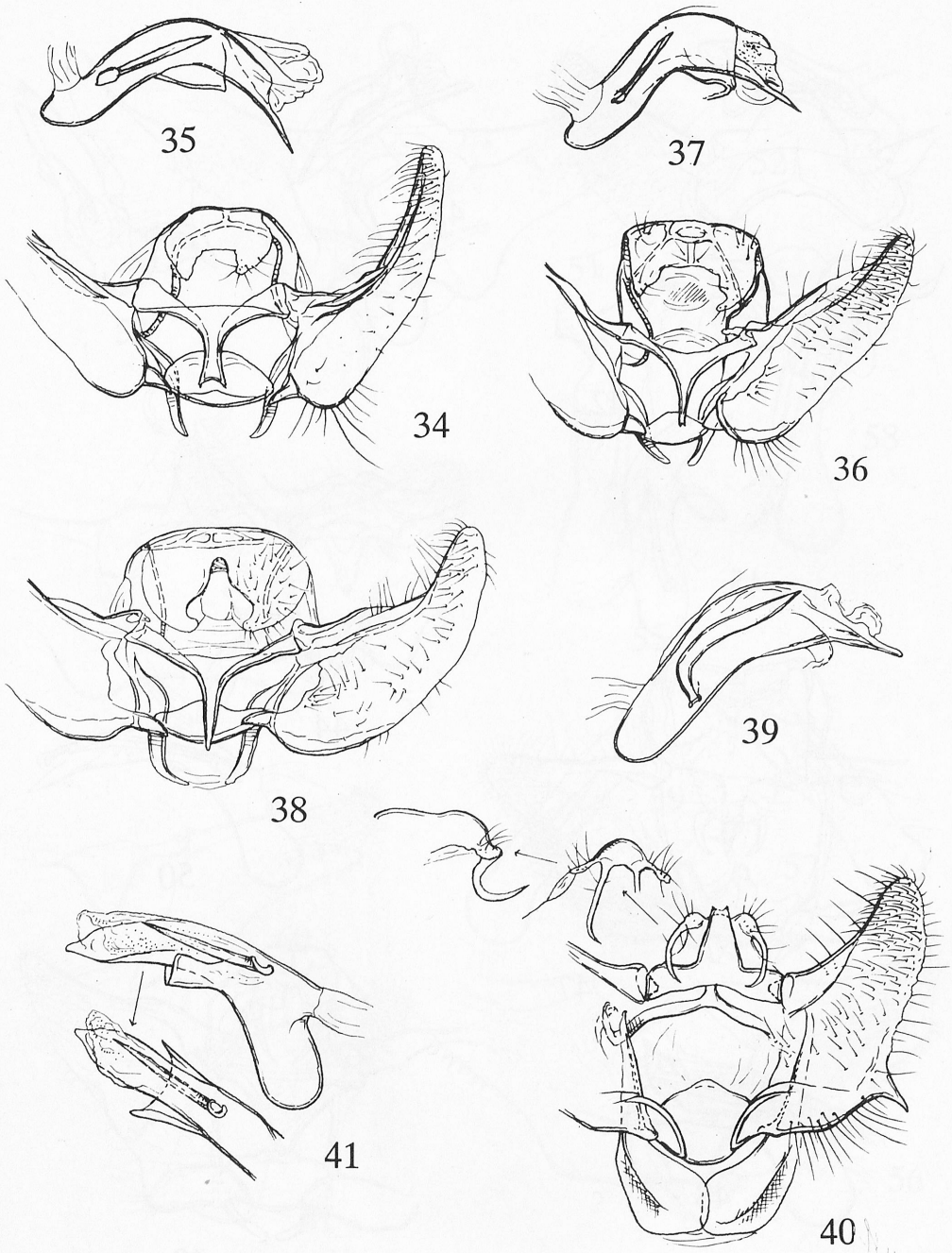
Figs 11-16. Male genitalia of *Phtheochroa* STEPHENS and *Henricus* BUSCK: 11, 12 – *Ph. waracana* (KEARFOTT), Manitoba; 13, 14 – *Ph. cartwrightana* (KEARFOTT), Manitoba; 15 – *H. infernalis* (HEINRICH), British Columbia: Clinton; 16 – same species, holotype of *H. brevipalpanus* (MCDUNNOUGH).



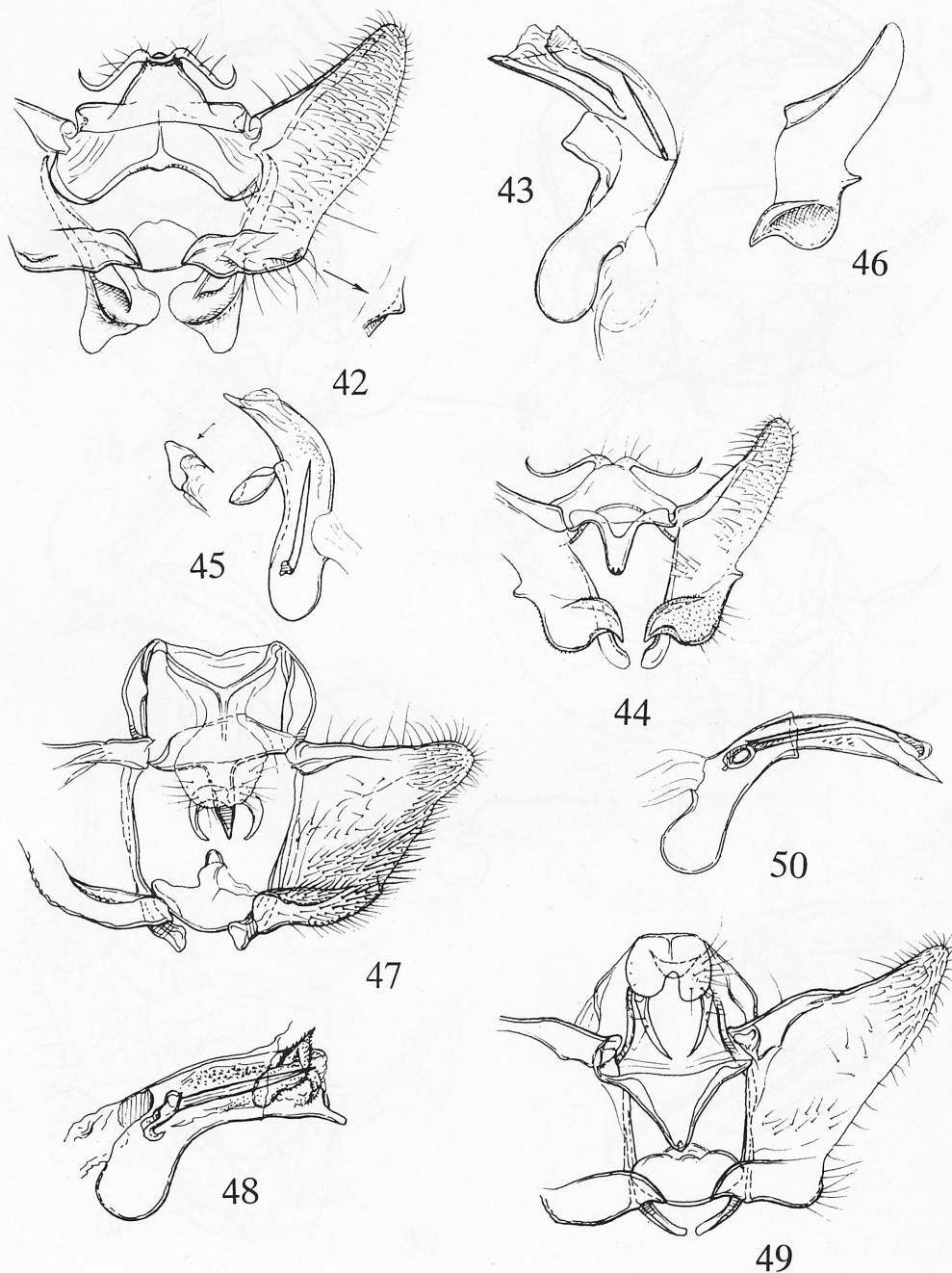
Figs 17-23. Male genitalia of *Henricus* BUSCK and *Phalonidia* LE MARCHAND: 17, 18 – *H. fuscodorsanus* (KEARFOTT), British Columbia: Corichan; valva partially reconstructed; 19, 20 – *H. contrastanus* (KEARFOTT), British Columbia; 21 – same species, aedeagus of holotype; 22, 23 – *Ph. lepidana* (CLEMENS), Montreal.



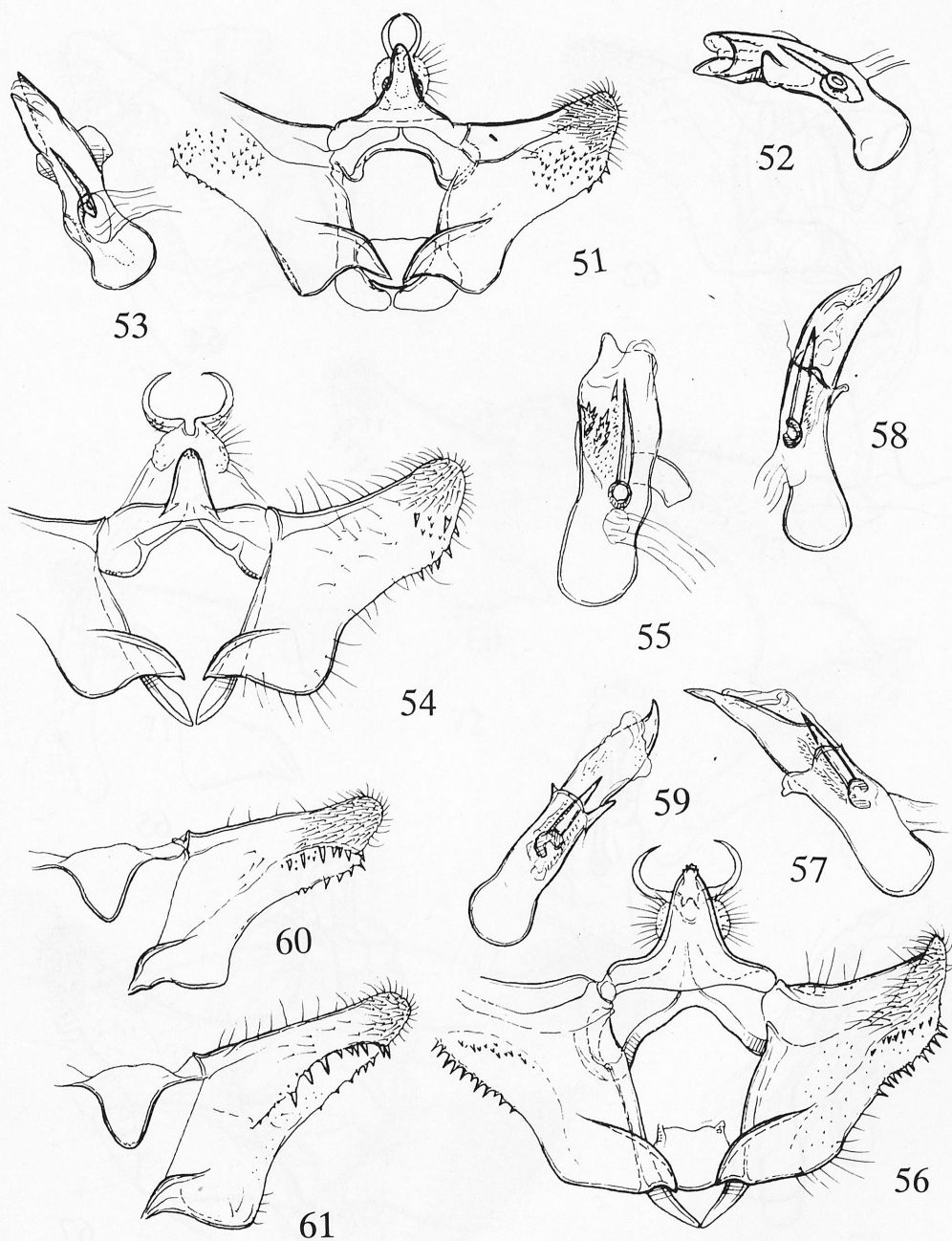
Figs 24-33. Male genitalia of *Phalonidia* LE MARCHAND, *Gynnidomorpha* TURNER and *Platphalonidia* RAZOWSKI:
 24, 25 – *Ph. ontariana* sp.n., holotype; 29, 30 – *Ph. memoranda* sp.n., holotype; 28, 29 – *G. romonana* (KEARFOTT),
 Labrador: Chatham; 30, 31 – *Platphalonidia albertae* sp.n., holotype; 32, 33 – *P. dangi* sp.n., holotype.



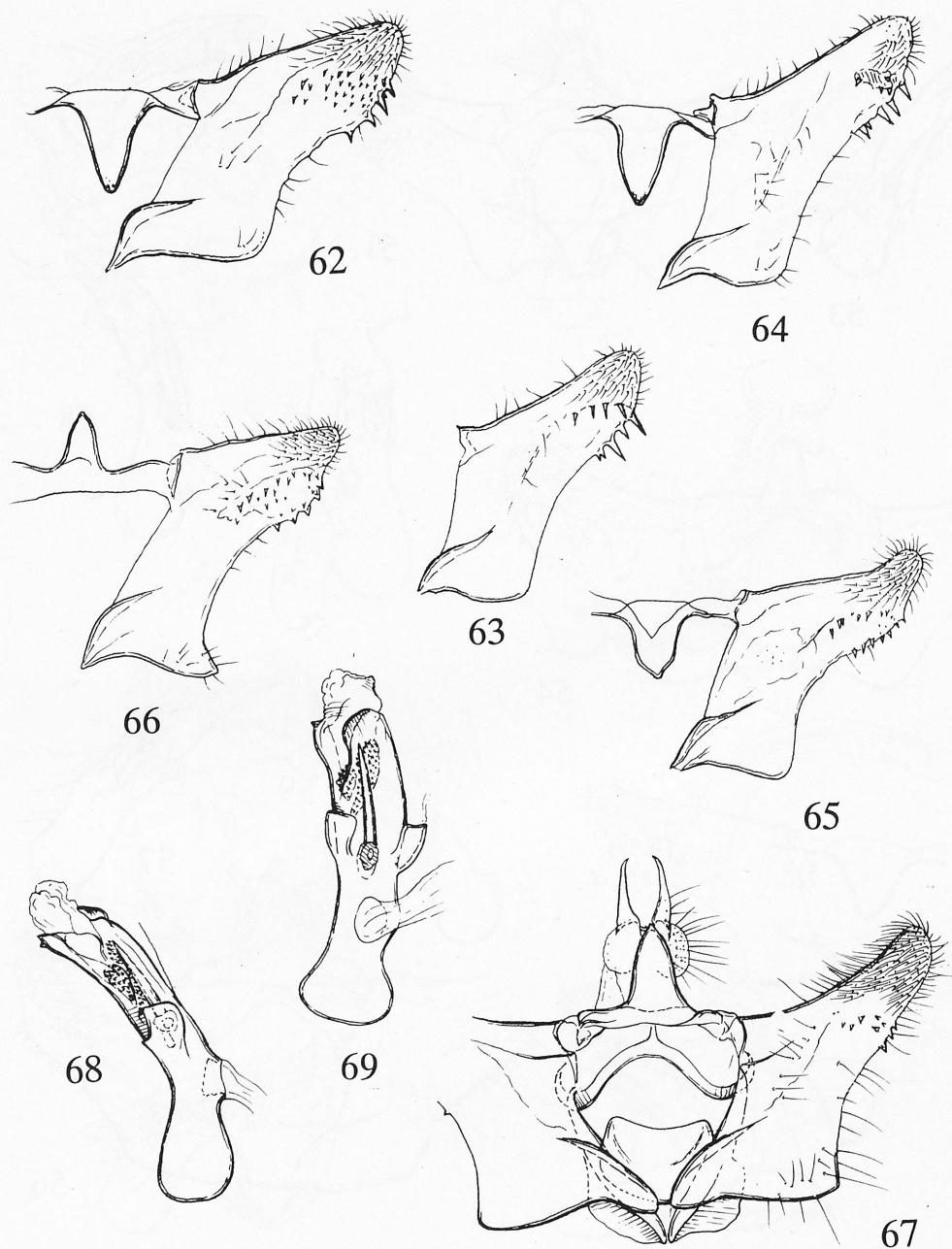
Figs 34-41. Male genitalia of *Platphalonidia* RAZOWSKI and *Aethes* BILLBERG: 34, 35 – *P. felix* (WALSINGHAM), Alberata: Edmonton; 36, 37 – *P. lavana* (BUSCK), British Columbia: Shingle Creek; 38, 39 – *P. imitabilis*, holotype; 40, 41 – *Aethes deuschiana* (ZETTERSTEDT), British Columbia: Mt. Mc Lean.



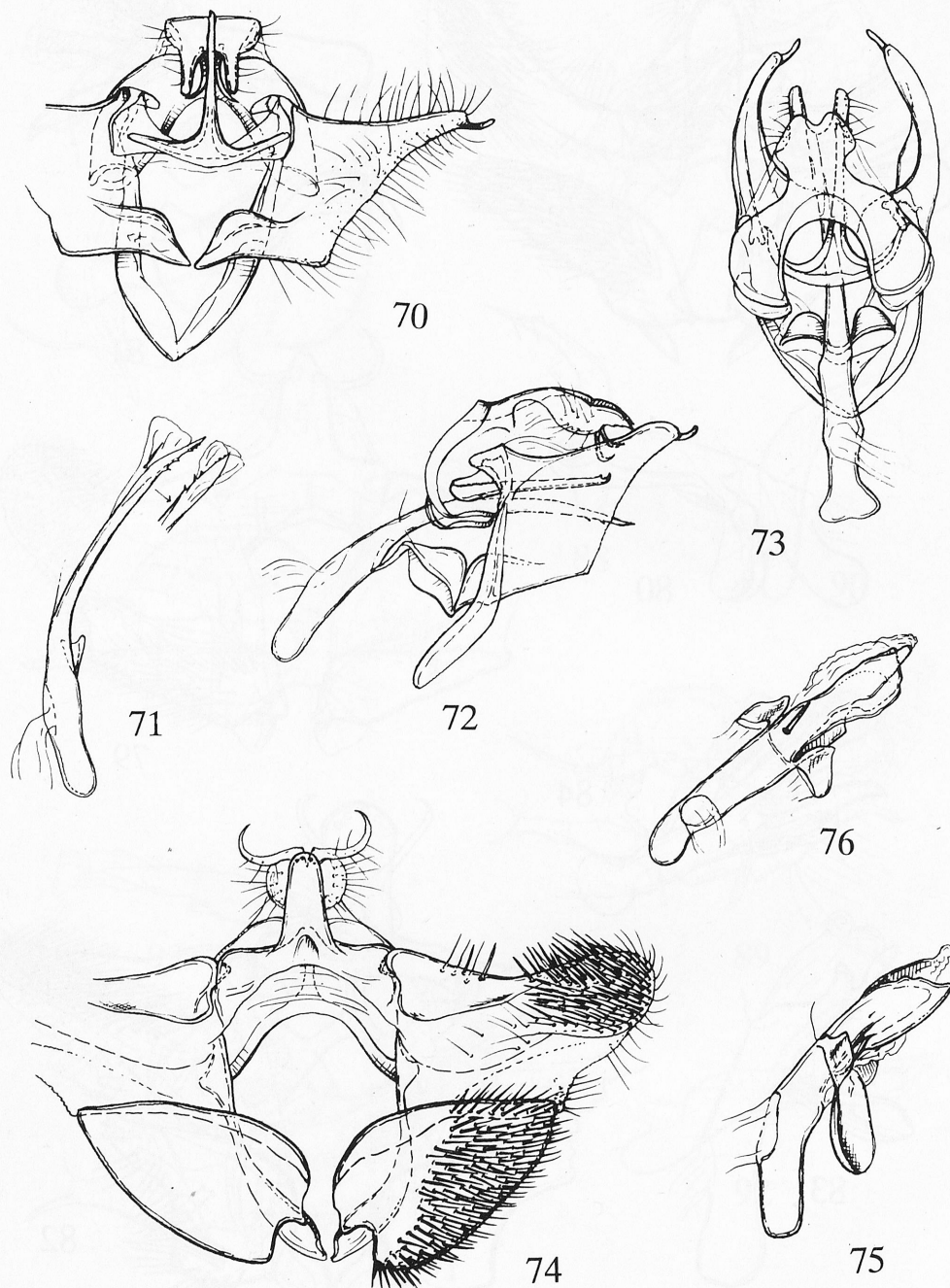
Figs 42-50. Male genitalia of *Aethes* BILLBERG: 42, 43 – *Ae. smeathmanniana* (FABRICIUS), British Columbia: Mt. Mc Lean; 44-46 – *Ae. rutilana canadiana* ssp.n., holotype; 47, 48 – *Ae. monera septentrionalis* ssp.n., holotype; 49, 50 – *Ae. labeculana* (ROBINSON), Nova Scotia: White Port Beach



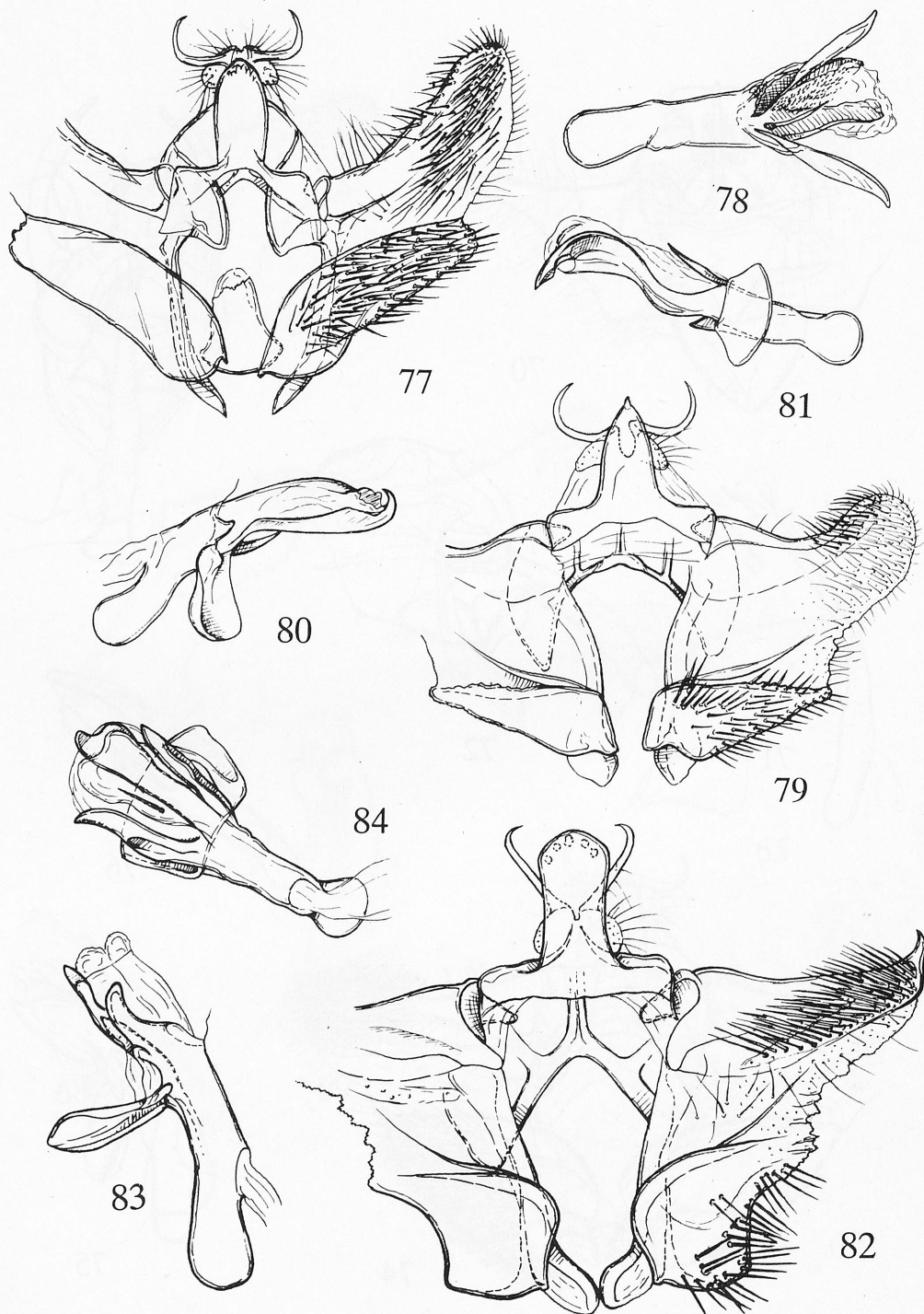
Figs 51-61. Male genitalia of *Aethes* BILLBERG: 51-53 – *Ae. argentiimitana* (ROBINSON), Ontario: Bobcaygeon; 51-55 – *Ae. angulatana* (ROBINSON), Ontario: Toronto; 56-59 – *Ae. promptana* (ROBINSON), Quebec: Knowlton; 60 – Ontario: Montreal; 61 – same locality.



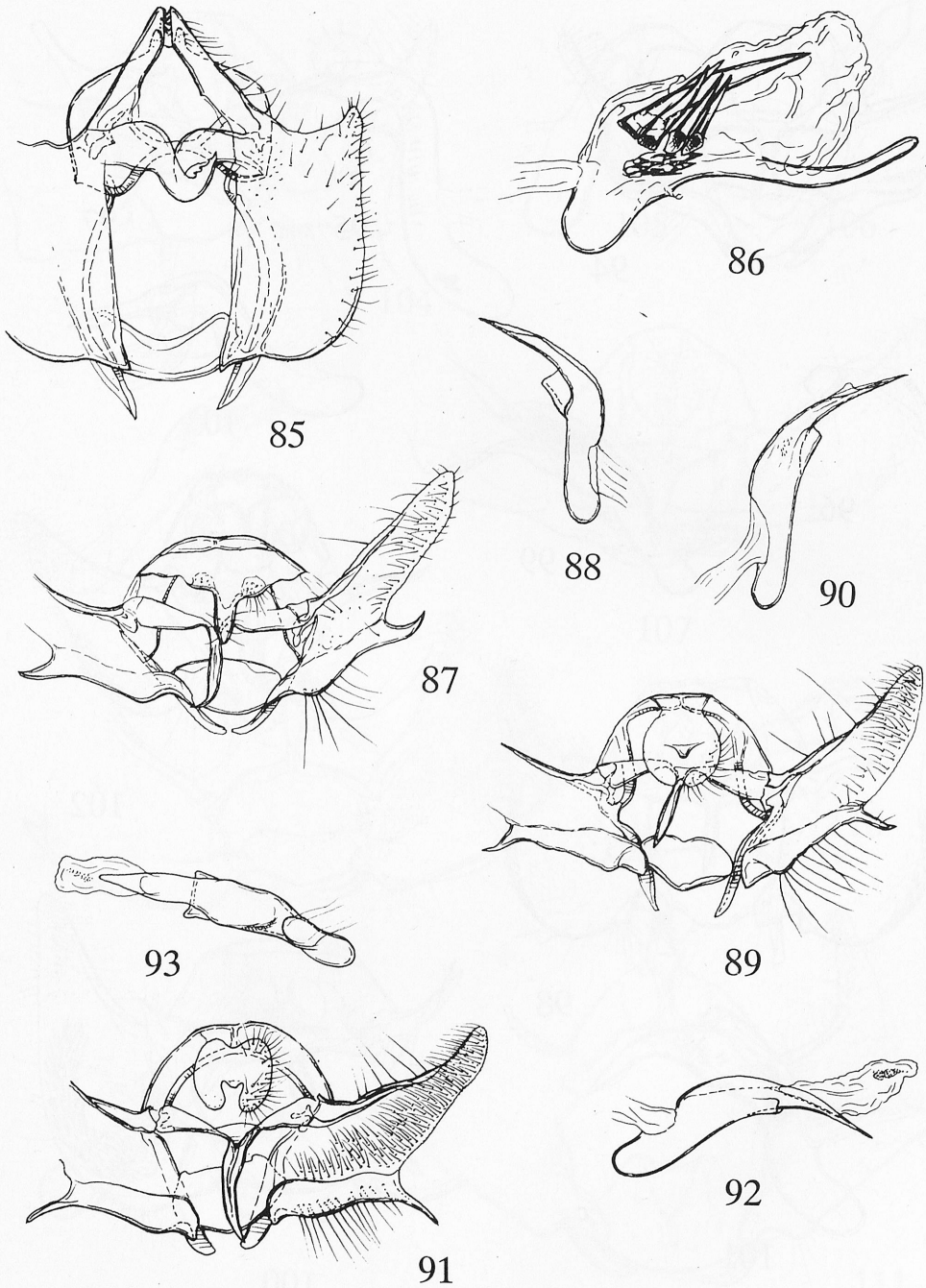
Figs 62-69. Male genitalia of *Aethes* BILLBERG: 62-66 – "forms" of *A. promptana* (ROBINSON); 67-69 – *Ae. biscana* (KEARFOTT), Nova Scotia: Parrsboro.



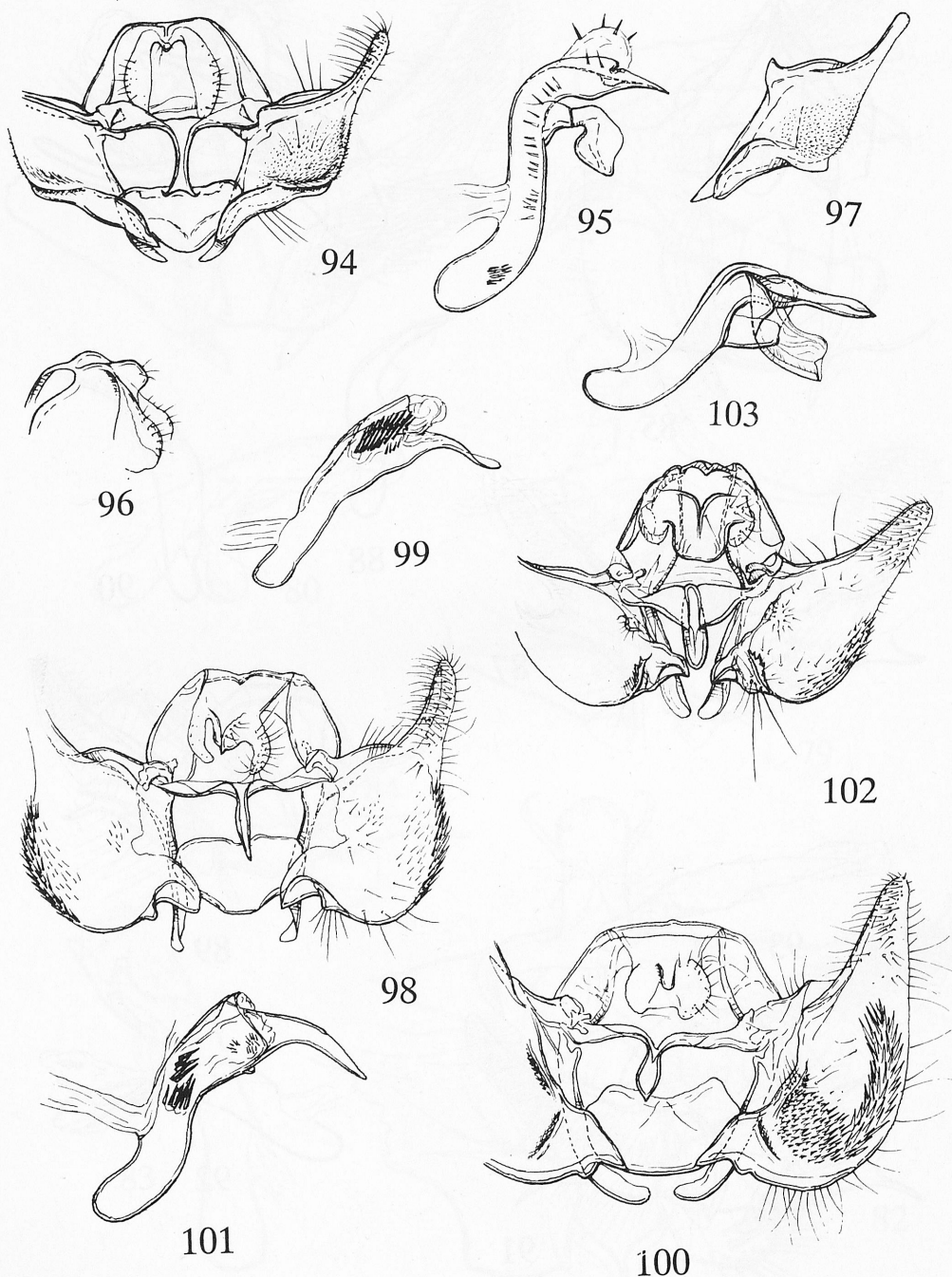
Figs 70-76. Male genitalia of *Aethes* BLLBERG: 70-73 – *Ae. heleniana* sp.n., paratype; 74-76 – *Ae. angustana* (CLEMENS), Ontario: Ottawa.



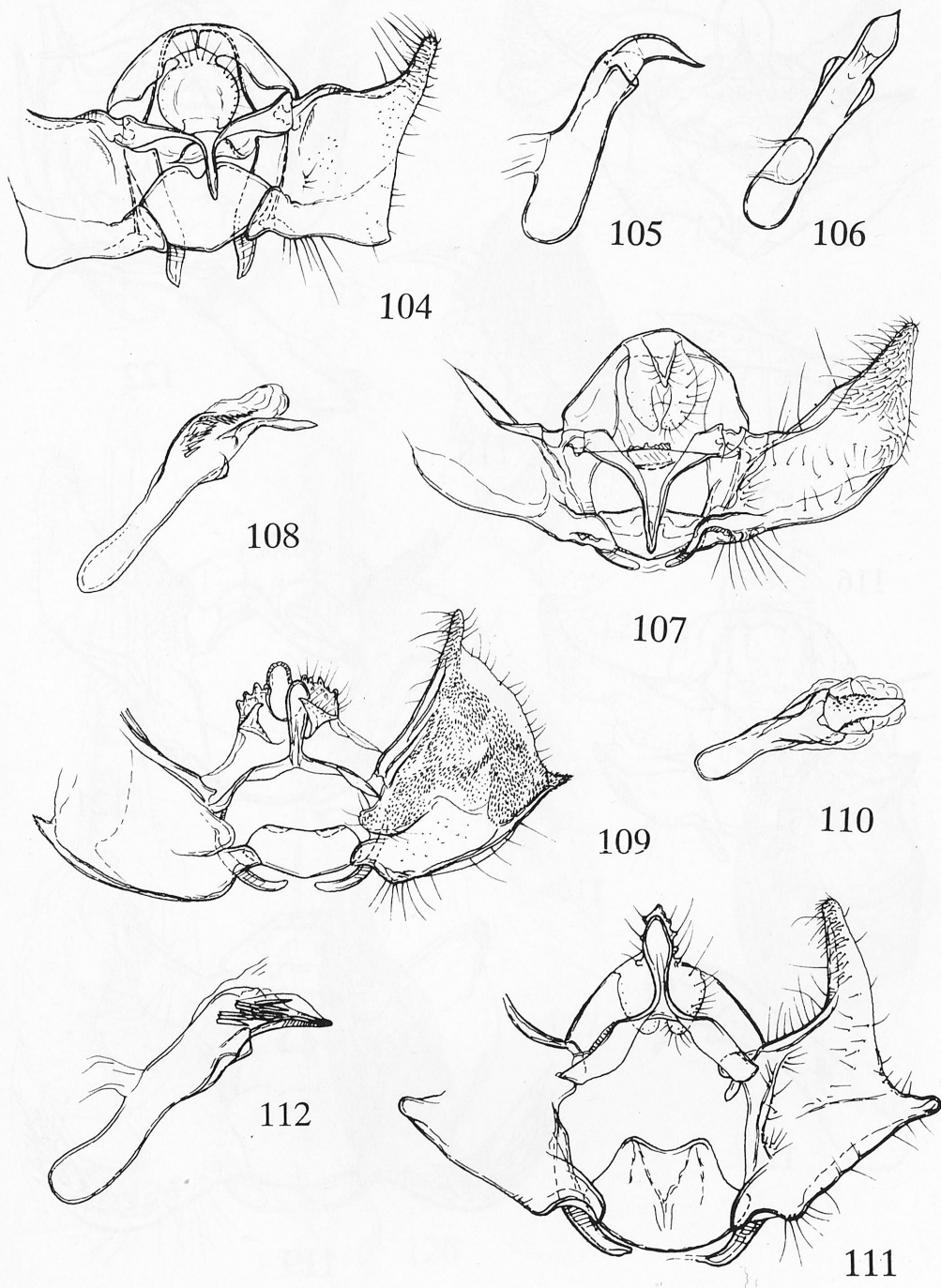
Figs 77-84. Male genitalia of *Aethes* BILLBERG: 77, 78 – *Ae. mymara* sp.n., holotype; 79-81 – *Ae. floccosana* (WALKER), Ontario: Ottawa; 82-84 – *Ae. atomosana* (BUSCK), Labrador: Chatcham.



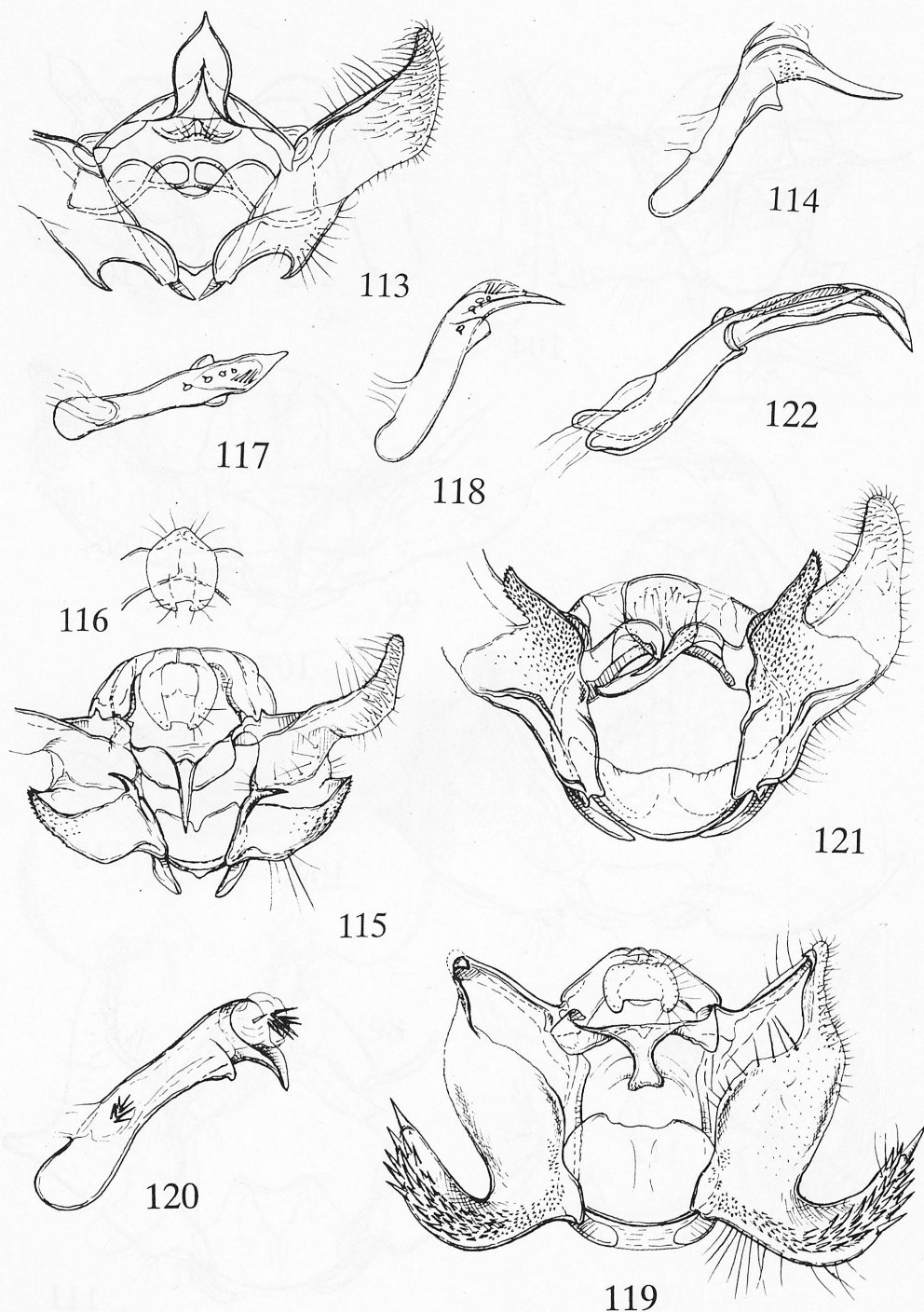
Figs 85-93. Male genitalia of *Cochylidia* OBRAZTSOV and *Cochylis* TREITSCHKE: 85, 86 – *Cochylidia subroseana* (HAWORTH), Ontario: Ottawa; 87, 88 – *Cochylis nana* (HAWORTH), Nova Scotia: Parrsboro; 89, 90 – *C. discana* (KEARFOTT), Ontario: Port Colborne; 91-93 – *C. voxcana* (KEARFOTT), Ontario: Ottawa.



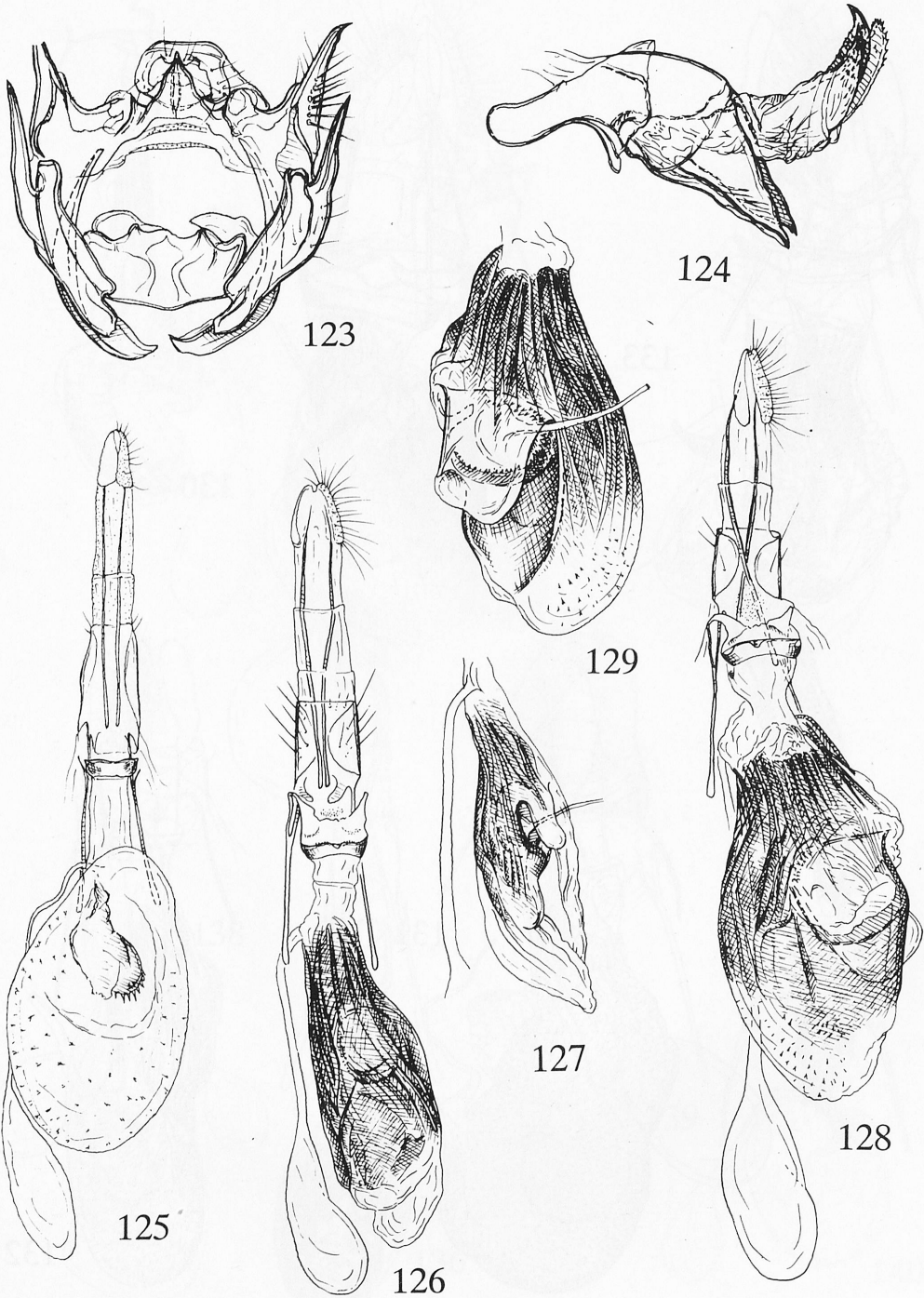
Figs 94-103. Male genitalia of *Cochylis* TREITSCHKE: 94-97 – *C. hofmanana* (KEARFOTT), Ontario: Vineland Station; 98, 99 – *C. viscana* (KEARFOTT), USA: Maine; 100, 101 – *C. wisnana* (KEARFOTT), Saskatchewan: Regina; 102, 103 – *C. avita* sp.n., holotype.



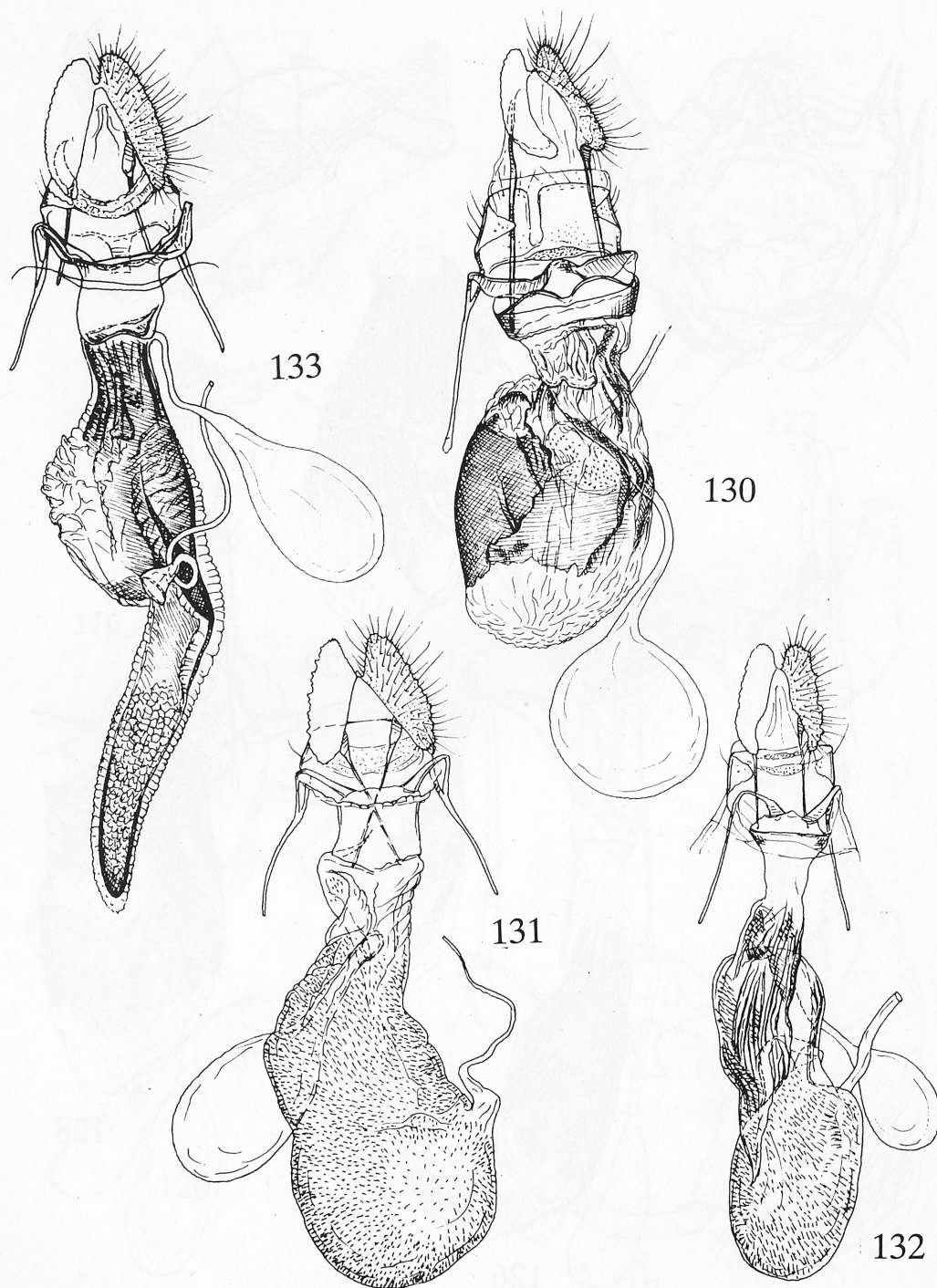
Figs 104-112. Male genitalia of *Cochylis* TREITSCHKE: 104-106 – *C. temerana* (BUSCK), Manitoba: Riding Mt.; 107, 108 – *C. dormitoria* sp.n., holotype; 109, 110 – *C. aurorana* (KEARFOTT), "cotype", USA: New Jersey: Montclair; 111, 112 – *C. arthuri* DANG, Manitoba: Morden.



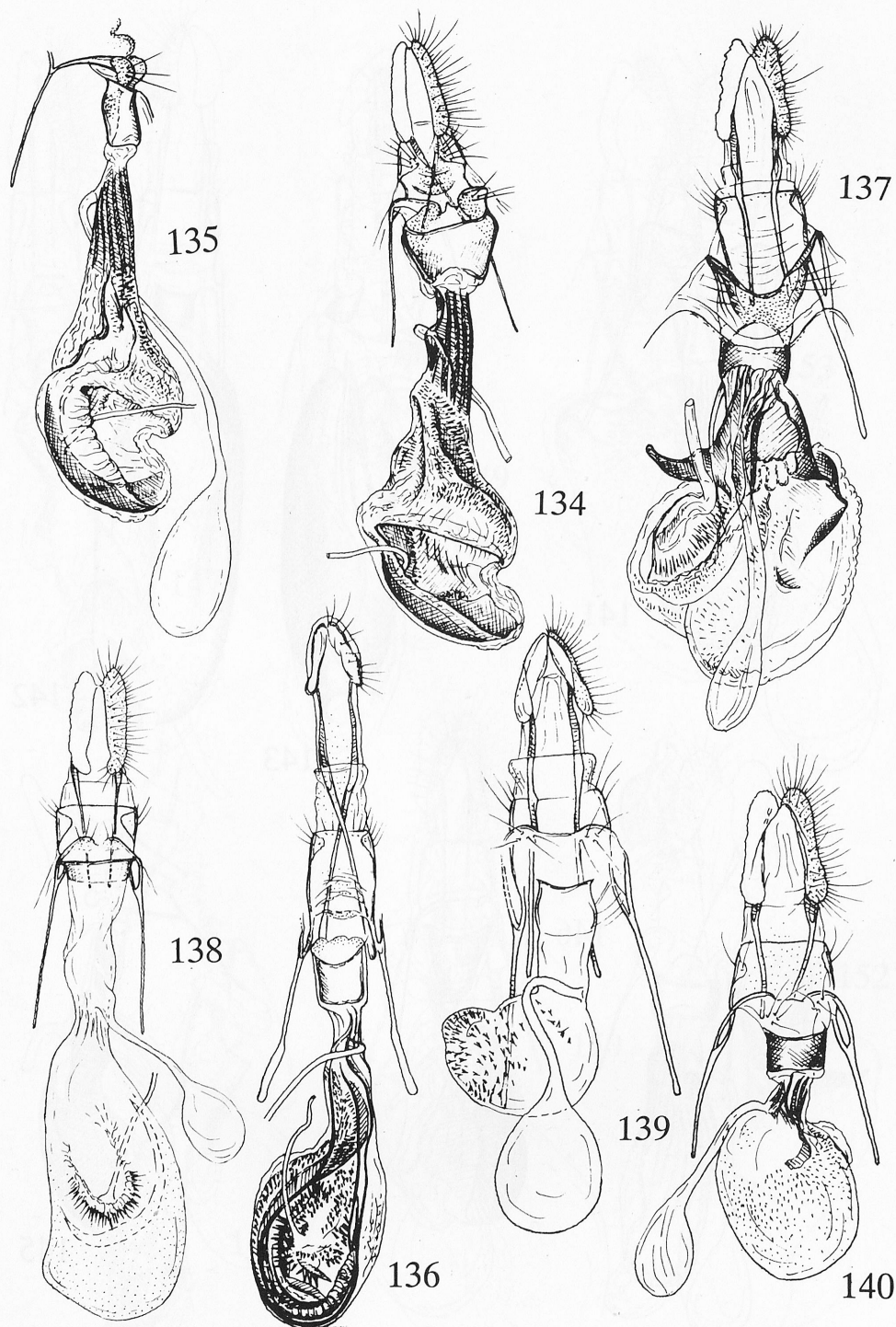
Figs 113-122. Male genitalia of *Cochylis* TREITSCHKE and unplaced species: 113, 114 – *C. dubitana* (HÜBNER), British Columbia: New Westminster; 115-118 – *Cochylis bucera* sp.n., paratype, Ontario: Vineland Station; 119-120 – *Cochylis hospes* (WALSINGHAM), Ontario: Ottawa; 121, 122 – *Phalonia maiana* KEARFOTT, Nova Scotia: Parrsboro.



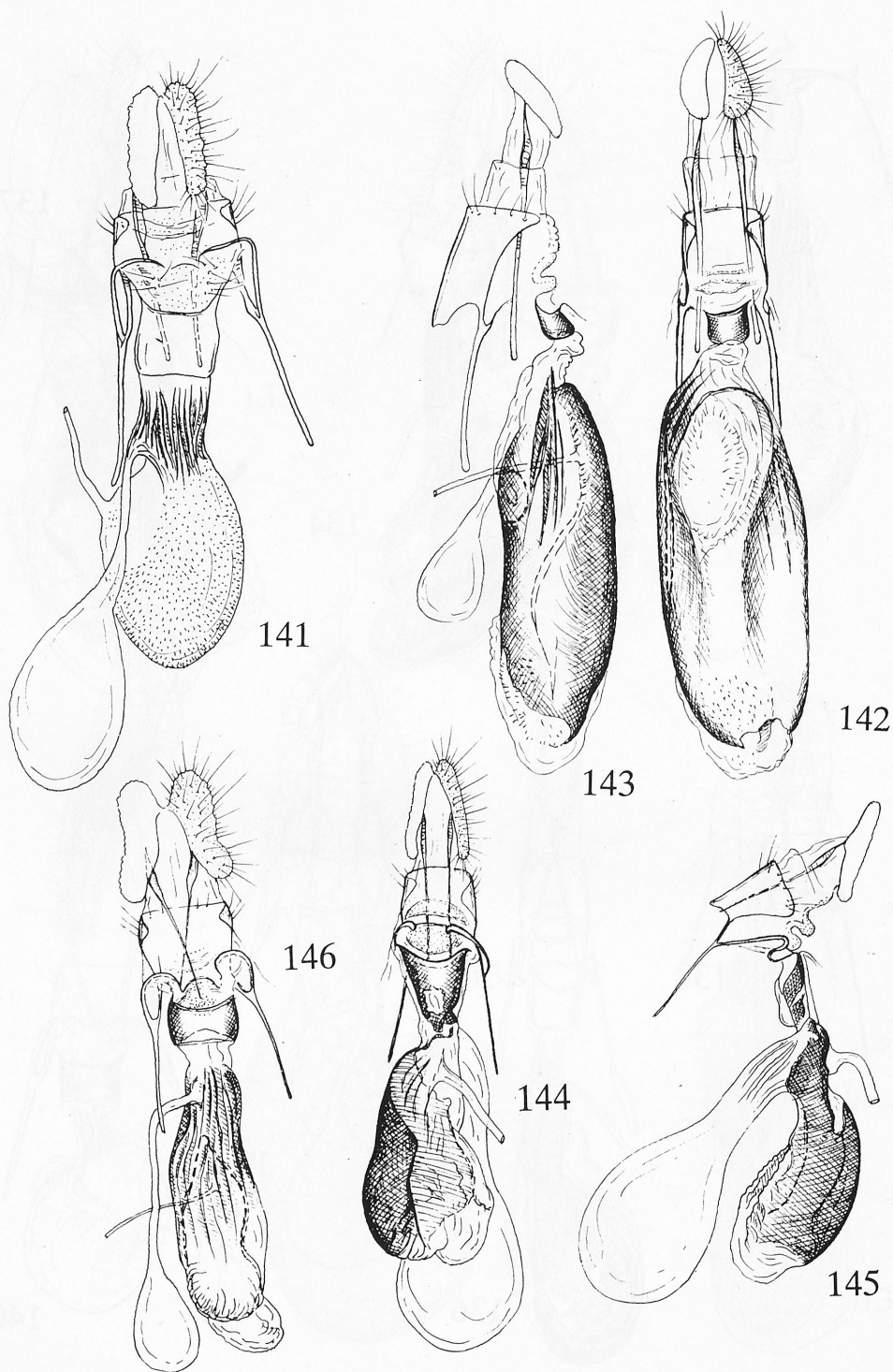
Figs 123-129. Male and female genitalia of *Cochylis* TREITSCHKE and *Phtheochroa* STEPHENS: 123, 124 – *C. oenotherana* RILEY, Ontario: Vineland Station; 125 – *Ph. aureoalbida* (WALSINGHAM), Ontario: Toronto; 126, 127 – *Ph. vitellinana* (ZELLER), Waterton Lakes; 128, 129 – *Ph. riscana* (KEARFOTT), Nova Scotia: Baddeck.



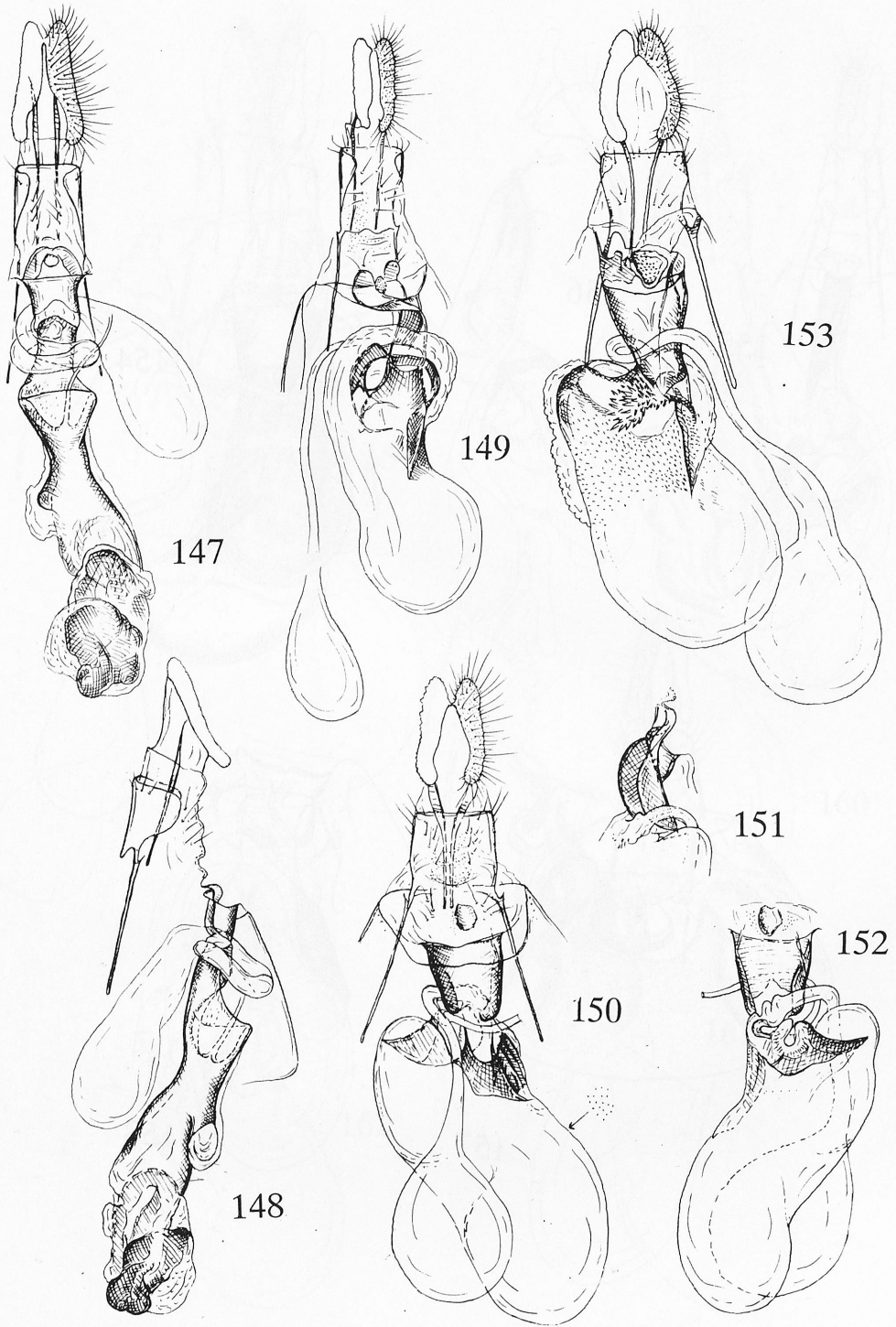
Figs 130-133. Female genitalia of *Phtheochroa* STEPHENS and *Henricus* HEINRICH: 130 – *Ph. vulneratana* (ZETTERSTEDT), Alberta: Moraine Lake; 131 – *H. infernalis* (HEINRICH), British Columbia; 132 – *H. fuscodorsanus* (KEARFOTT), British Columbia; 133 – *H. contrastanus* (KEARFOTT), British Columbia: Victoria.



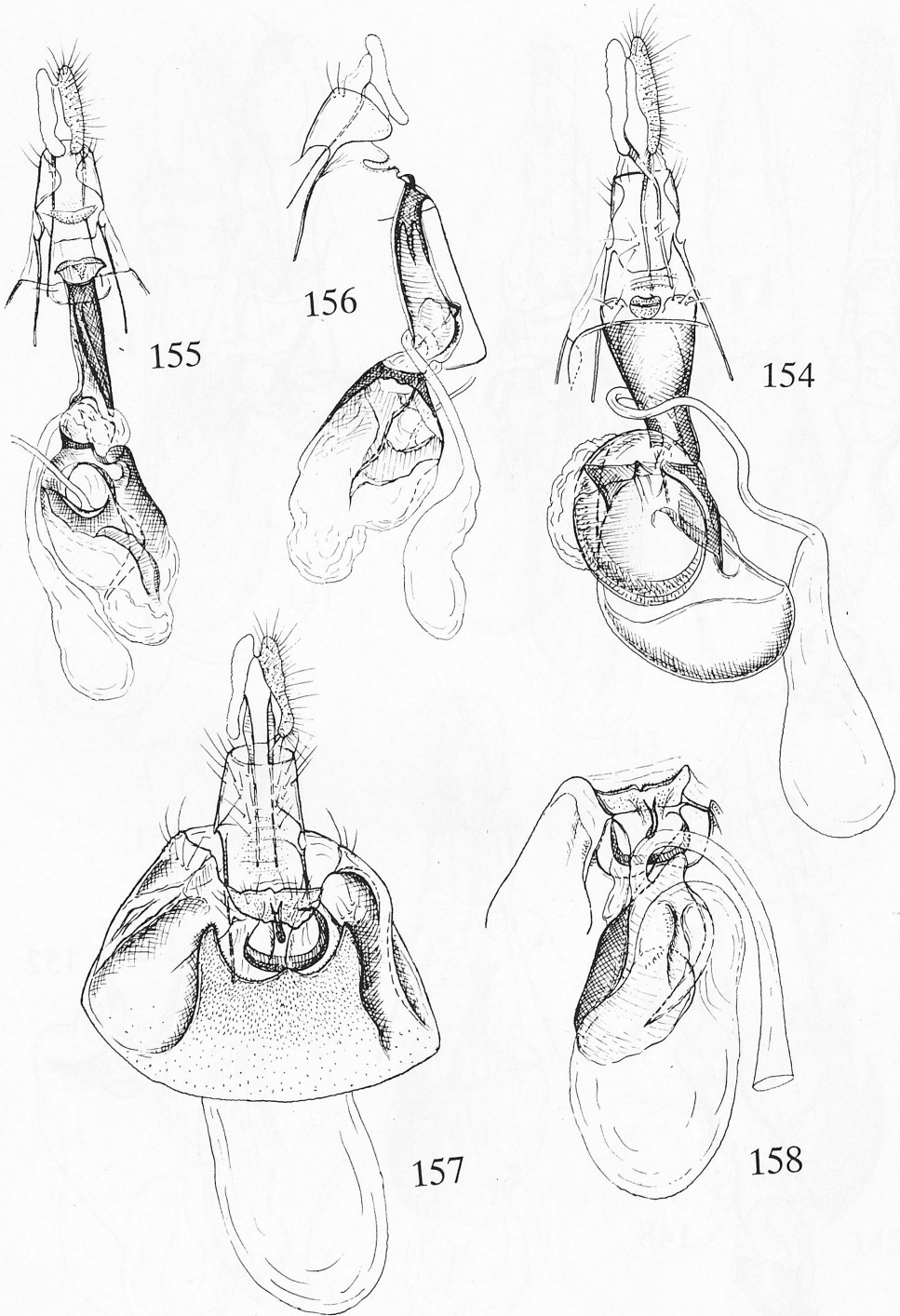
Figs 134-140. Female genitalia of *Phalonidia* LE MARCHAND, *Gynnidomorpha* TURNER and *Platphalonidia* RAZOWSKI: 134, 135 – *Ph. lepidana* (CLEMENS), Ontario: Ottawa; 136 – *Ph. ontariana* sp.n., paratype; 137 – *Ph. memoranda* sp.n., paratype; 138 – *G. romonana* (KEARFOTT), Ontario: Normandale; 139 – *P. felix* (WALSINGHAM), Alberta: Edmonton; 140 – *P. lavana* (BUSCK), holotype.



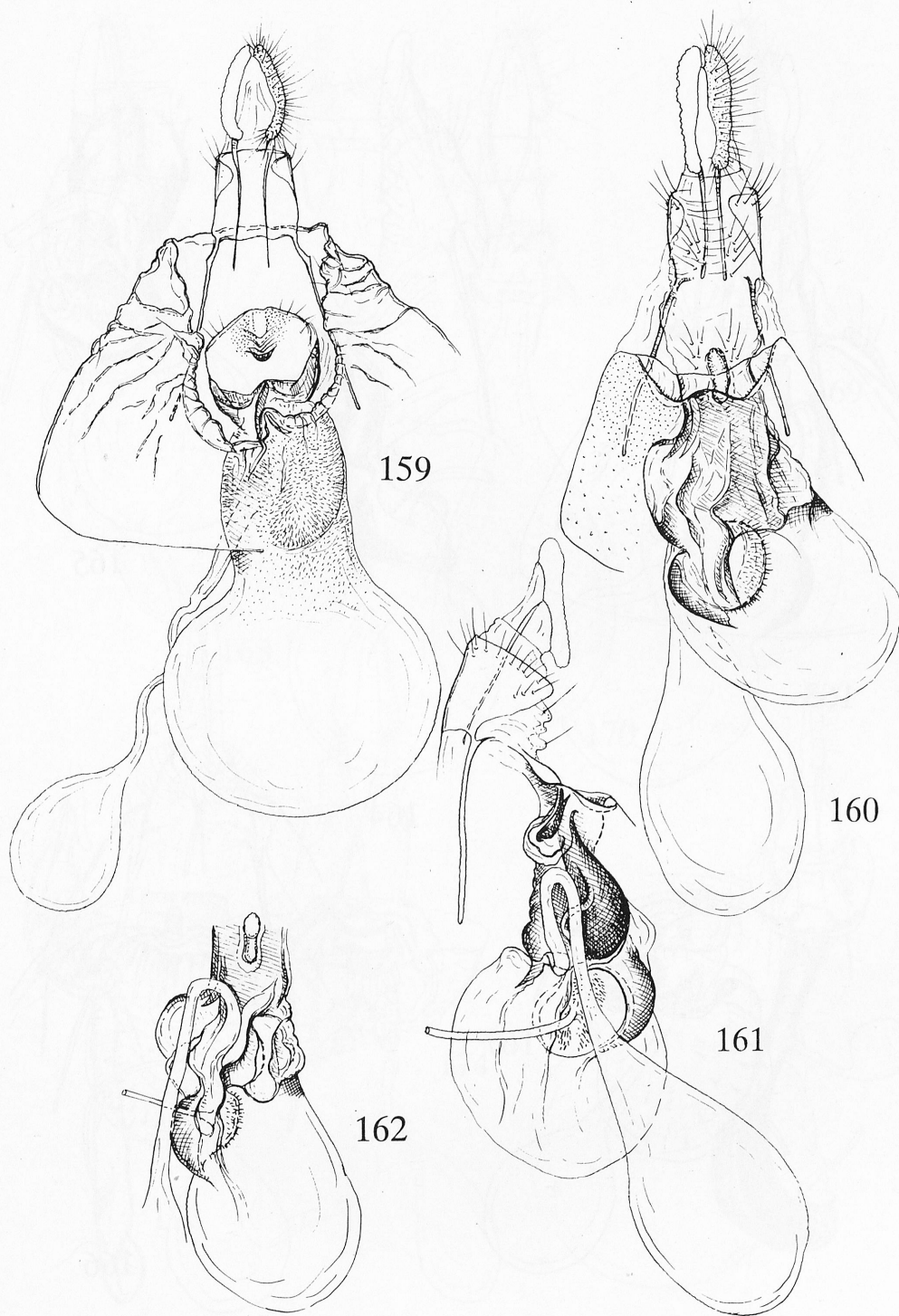
Figs 141-146. Female genitalia of *Platphalonidia* RAZOWSKI and *Aethes* BILLBERG: 141 – *P. imitabilis* sp.n., paratype; 142, 143 – *Ae. deutschiana* (ZETTERSTEDT), Quebec: Mt. Albert; 144, 145 – *Ae. smeathmanniana* (FABRICIUS), North West Territory: Norman Wells; 146 – *Ae. rutilana canadiana* ssp.n., paratype, Ontario: Manotick.



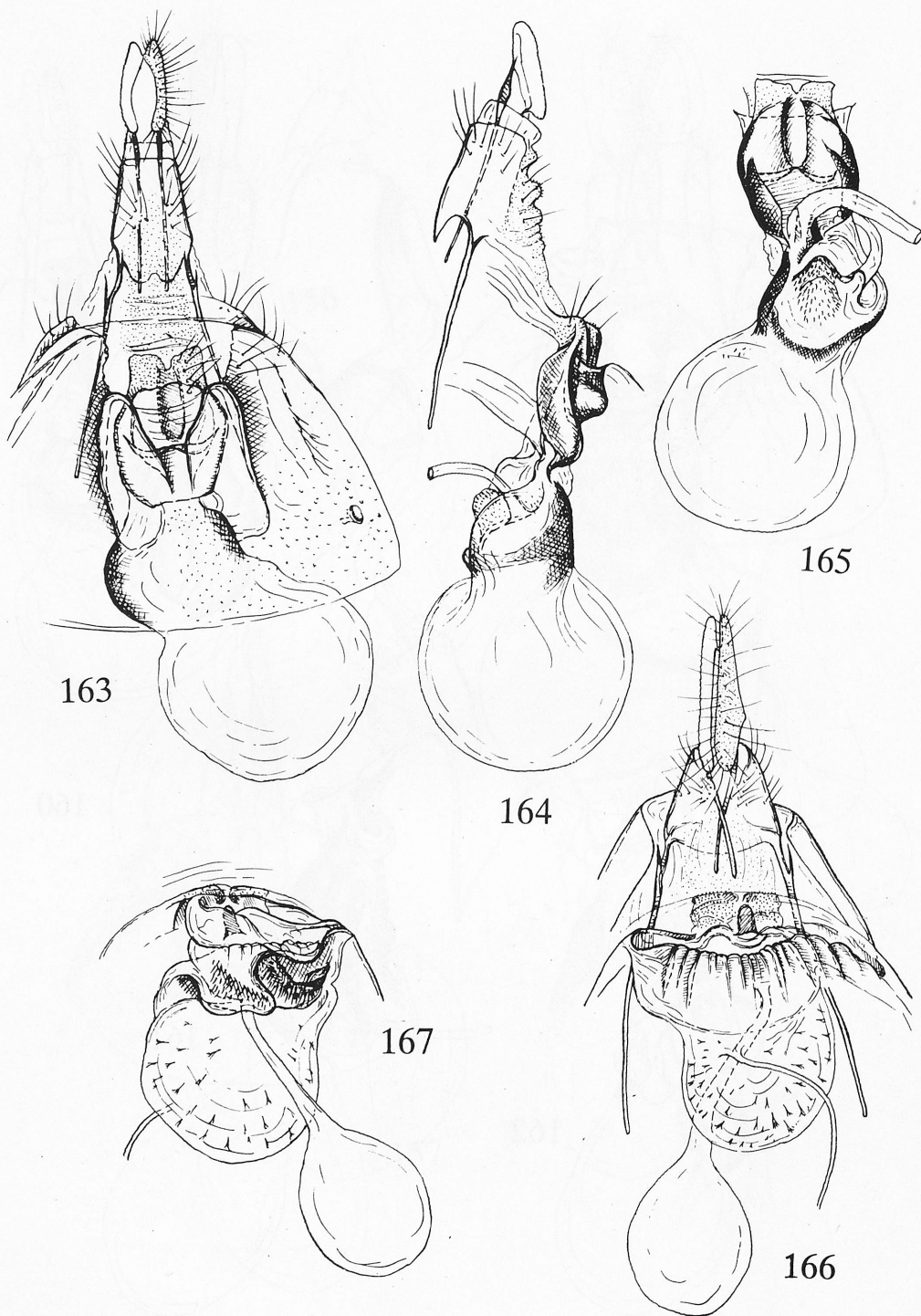
Figs 147-153. Female genitalia of *Aethes* BILLBERG: 147, 148 – *Ae. labeculana* (ROBINSON), Quebec: St. Johns; 149 – *Ae. argenteimitana* (ROBINSON), Ontario: Ottawa; 150-152 – *Ae. promptana* (ROBINSON), New Brunswick: Waiweig; 153 – "form" of same species, Nova Scotia.



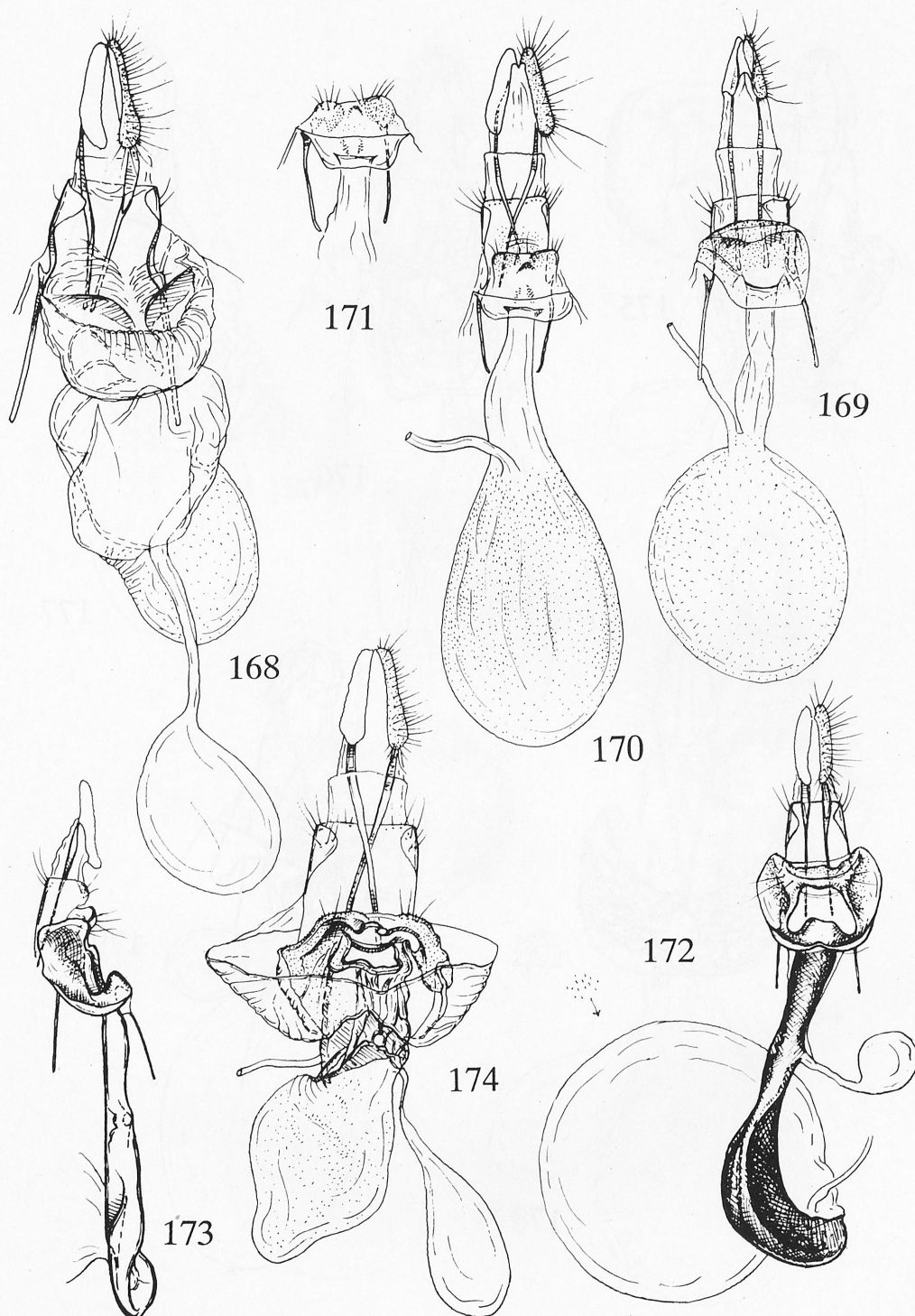
Figs 154-158. Female genitalia of *Aethes* BILLBERG: 154 – *Ae. biscana* (KEARFOTT), New Brunswick: Bathurst; 155, 156 – *Ae. heleniana* sp.n., paratype, Ontario: Toronto; 157, 158 – *Ae. angustana* (CLEMENS), Ontario: Ottawa.



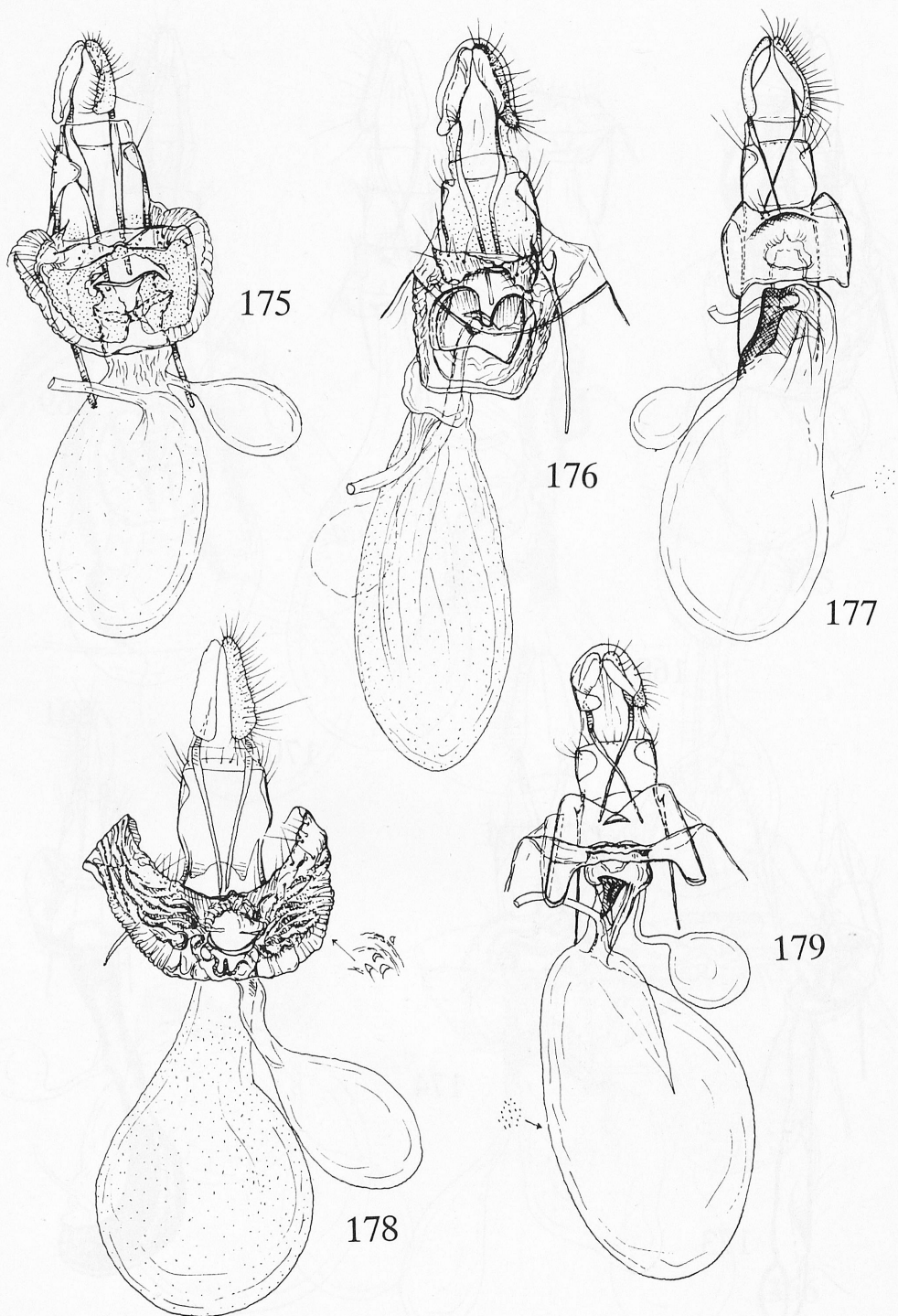
Figs 159-162. Female genitalia of *Aethes* BILLBERG: 159 – *Ae. mymara* sp.n., paratype; 160-162 – *Ae. floccosana* (WALKER), Ontario, Canada.



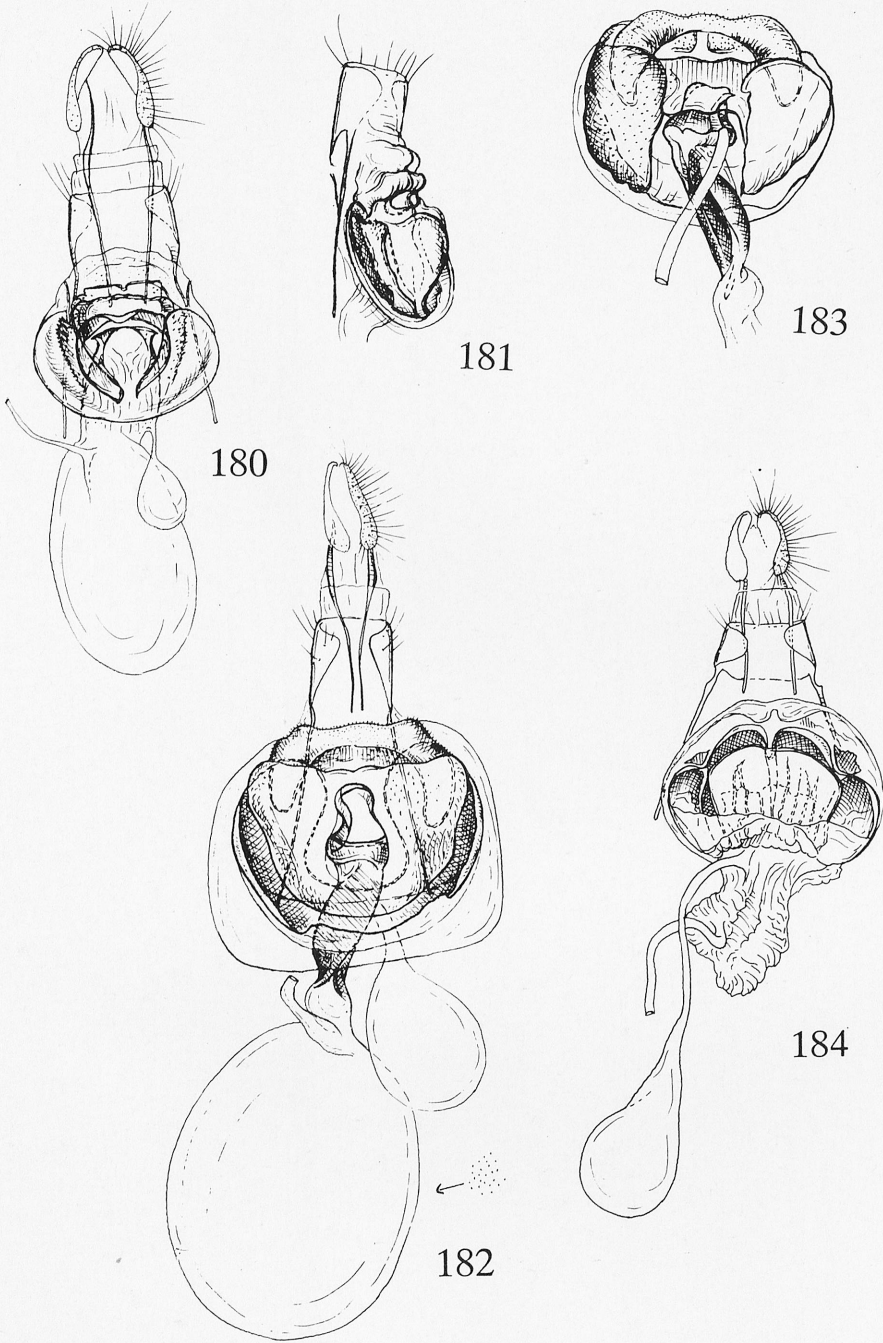
Figs 163-167. Female genitalia of *Aethes* BILLBERG: 163-165 – *Ae. atomosana* (BUSCK), Ontario: Trenton; 166, 167 – *Ae. spartinana* (MCDUNNOUGH), Manitoba: Aweme.



Figs 168-174. Female genitalia of *Cochylidia* OBRAZTSOV and *Cochylis* TREITSCHKE: 168 – *Cochylidia subroseana* (HAWORTH), Alberta: Nordegg; 169 – *Cochylis nana* (HAWORTH), Ontario: Bobcaygeon; 170, 171 – *C. voxcana* (KEARFOTT), Ontario: Ottawa; 172, 173 – *C. hofmanana* (KEARFOTT), Ontario: Vineland Station; 174 – *C. viscana* USA: Illinois: Puttnam County.



Figs 175-179. Female genitalia of *Cochylis* TREITSCHKE and unplaced species: 175 – *C. wiscana* (KEARFOTT), Saskatchewan: Regina; 176 – *C. avita* sp.n., paratype; 177 – *C. temerana* (BUSCK), Ontario: Leamington; 178 – *C. aurorana* (KEARFOTT), Ontario: Toronto; 179 – *C. arthuri* DANG, NE Saskatchewan.



Figs 180-184. Female genitalia of *Cochylis* TREITSCHKE: 180, 181 – *C. bucera* sp.n., Ontario: Vineland Station; 182, 183 – *C. hospes* (WALSINGHAM), Ontario: Ottawa; 184 – *Conchylis oenotherana* RILEY, Ontario: Vineland Station.

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CONTENTS

Mikhail B. POTAPOV. <i>Anurophorus</i> species of East Asia and North America (<i>Collembola</i> , <i>Isotomidae</i>)	1-35
Igor J. KAPRUS'. New species of the genus <i>Willemia</i> BÖRNER, 1901 (<i>Collembola</i>) from a cave in Ukraine	37-39
Waldemar CELARY. Additions to the Polish <i>Nomadini</i> (<i>Hymenoptera</i> , <i>Apoidea</i> , <i>Anthophoridae</i>). I. <i>Nomada tridentirostris</i> DOURS, 1873	41-45
Alexander G. BUGROV, Michael G. SERGEEV. A new grasshopper species of the genus <i>Podisma</i> Berthold (<i>Orthoptera</i> : <i>Acrididae</i>) from the Southern Kuril Islands and its karyotypic features	47-52
Michael G. SERGEEV, Alexei A. POKIVAJLOV. New grasshopper species of the genus <i>Conophyma</i> (<i>Orthoptera</i> : <i>Acrididae</i>) from the Pamirs	53-55
Andrzej SZEPTYCKI. New <i>Acerentulus</i> species from France (<i>Protura</i> , <i>Acerentomidae</i>)	57-69
Zdzisława STEBNICKA. A new genus and species of <i>Eupariini</i> from Argentina (<i>Coleoptera</i> : <i>Scarabaeoidea</i> : <i>Aphodiinae</i>)	71-73
Zdzisława STEBNICKA. New and little known species of <i>Aphodiinae</i> from China (<i>Coleoptera</i> : <i>Scarabaeoidea</i>)	75-77
Józef RAZOWSKI. <i>Euliini</i> (<i>Lepidoptera</i> : <i>Tortricidae</i>) of Peru with description of new taxa and list of the New World genera	79-105
Józef RAZOWSKI. <i>Cochylini</i> (<i>Lepidoptera</i> : <i>Tortricidae</i>) of Canada	107-163