

The Male Genitalia of the New Zealand Eucosmidae.

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THE Eucosmidae of New Zealand comprise only 20 known species, belonging to 7 genera, a mere fragment of what is elsewhere a very extensive group. In the northern hemisphere the family is particularly well represented, Heinrich's recent revisions of the North American species dealing with over 600 forms, distributed through more than 60 genera. In view of the paucity of the New Zealand representation, it is inadvisable to offer any generalizations of a speculative or critical character and the following article will therefore only aim at being of use as an aid to specific determination.* It may, however, be briefly stated that in the Eucosmidae the harpes are usually well developed and more or less constricted at the middle, the aedeagus short and curved or pistol-shaped, the socii present or absent, the gnathos usually weak or absent, the uncus absent or, if present, small and frequently bifid, the tegumen rather narrow and the vinculum a weak band, without saccus. It should be noted that the ventral surface of the anal tube is frequently more or less chitinized, particularly laterally, and that the gnathos often merges with this chitinization, thus giving the former the appearance of a much more developed organ than it really is. In none of the species examined could I find an instance of the gnathos forming a separate chitinized band beneath or across the anal tube.

Hendicasticha Meyrick.

Monotypic and endemic. No material has been available for the study of this genus, the single species being apparently rare and local.

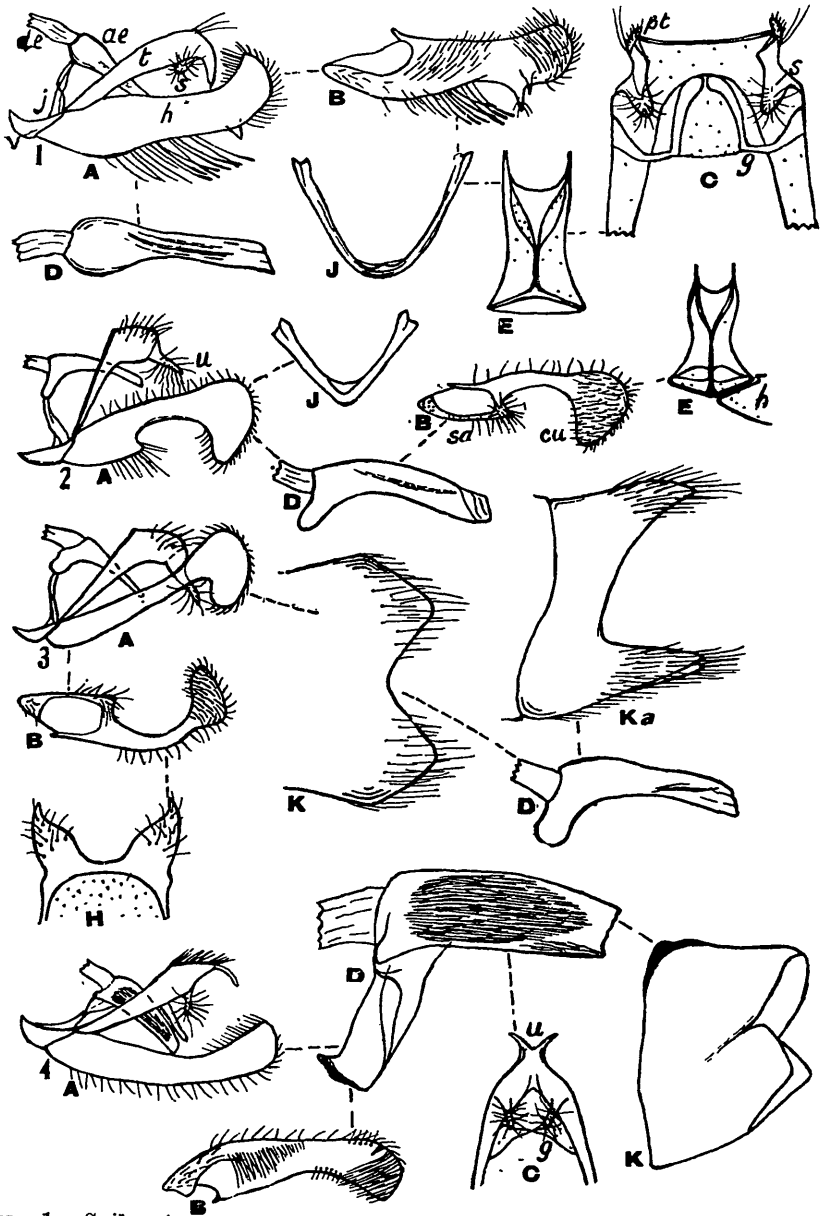
Spilonota Stephens. (Figs. 1 to 5.)

One of the smaller genera. Fairly well represented in Australia, where three of the New Zealand species occur also. Of the eight New Zealand species three have not been available for dissection.

†The eighth segment is considerably modified, the caudal margin being deeply excavated laterally and ventrally. Tegumen narrow

*For a general consideration of the family (sens. lat.) the reader is referred to Heinrich's recent works: "Revision of the North American Moths of the subfamily Eucosminae." *U.S. National Museum Bulletin*, 123 (1923), and "Revision of the North American Moths of the subfamilies Laspeyresinae and Olethreutinae." *U.S. National Museum Bulletin*, 132 (1926).

†It must be understood that the generic diagnoses are applicable only to such species as are dealt with in the present paper.



- FIG. 1.—*Spilonota ejectana* Walk. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. E, juxta and anellus. J, vinculum.
- FIG. 2.—*S. zopherana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta and anellus with base of harpe. J, vinculum.
- FIG. 3.—*S. partheniata* Meyr. A, male genitalia. B, harpe. D, aedeagus. H, socii, ventral view. K, eighth segment, ventral view. Ka, eighth segment, lateral view.
- FIG. 4.—*S. macropetana* Meyr. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. K, eighth segment, lateral view.

laterally, broader dorsally, not fused with vinculum; uncus absent or but slightly developed. Socii present, porrect or drooping, usually covered outwardly with long backwardly directed hair. Gnathos weak or absent. Aedeagus short, curved, more or less swollen basally; cornuti usually present. Anellus opening out ventrally and fusing with diamond-shaped juxta; this ventral development of the anellus supports the aedeagus as on a hinge and has the effect of pushing the organ much higher between the arms of the tegumen than is usual. Vinculum narrow and weak, without saccus. Harpes long, more or less constricted at middle, inner surface of cucullus usually densely haired and frequently spine-bearing.

KEY TO THE SPECIES OF *SPILONOTA*.

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|--|-----|---------------------------------|
| 1. Uncus absent | .. | 2. |
| Uncus present | | 4. |
| 2. Gnathos present; apex of tegumen broadly truncate with a pair of lateral processes directed triangularly downwards; harpes moderately broad, little constricted, with a pair of prong-like processes from within near ventral margin at $\frac{1}{2}$ | | <i>ejectana</i> Walk. |
| Gnathos absent | | 3. |
| 3. Sacculus prominent on lateral view; caudal margin of cucullus armed with series of very short but stout spines | | <i>zopherana</i> Meyr. |
| Sacculus hardly noticeable on lateral view; series of spines round caudal margin of cucullus smaller than in <i>zopherana</i> | ... | <i>partheniata</i> Meyr. |
| 4. Uncus bifid; socii weak, finger-like; harpes narrow; aedeagus short, almost filled with bundle of cornuti | | <i>macrozetana</i> |
| Uncus entire; socii well chitinized rounded vertical plates bent over horizontally above; harpes broad; aedeagus rather long, a moderate bundle of cornuti in apical $\frac{1}{2}$; anellus widely expanded ventrally | | Meyr.
<i>chaophila</i> Meyr. |

Eucosma Hubner. (Fig. 6.)

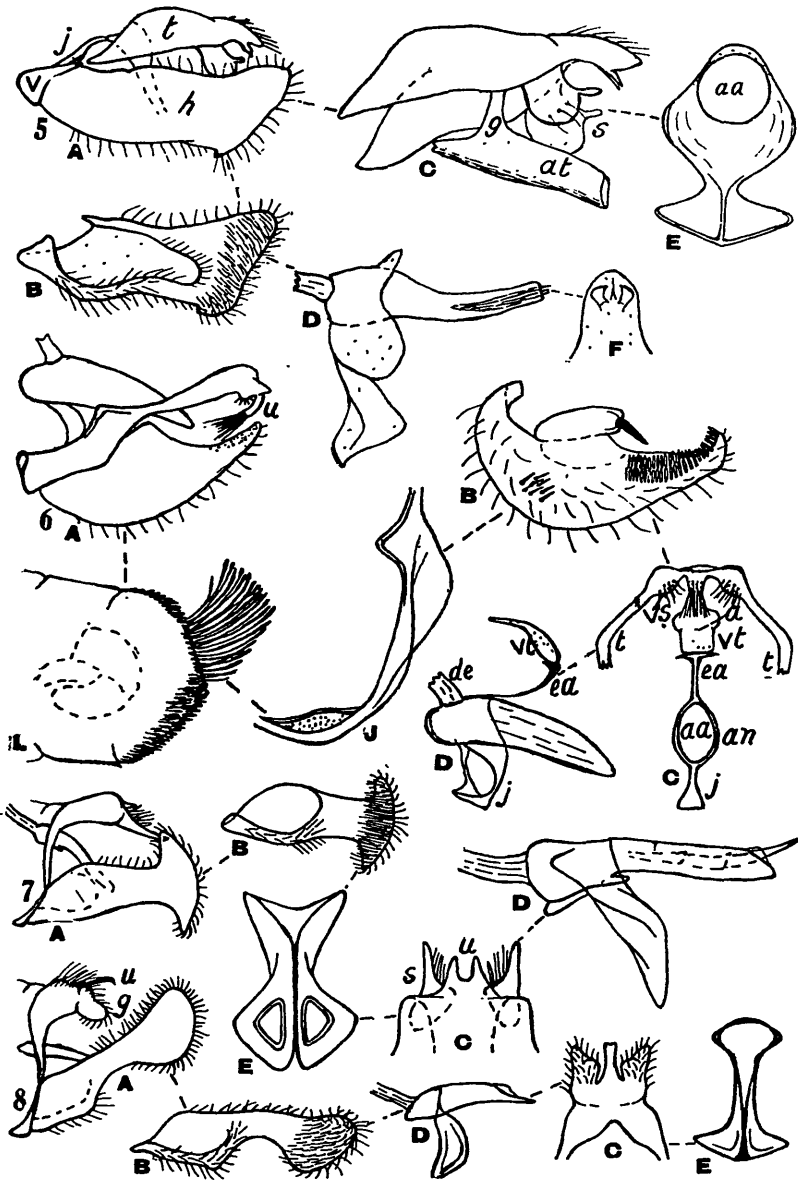
Meyrick has described 4 New Zealand species of this very extensive genus, but only one of these seems to be known to New Zealand collectors.

Eucosma querula Meyr.

The male genitalia of this species are not only entirely different from the ordinary type of the genus, but do not approach those of any species of the family of which figures have been available for comparison. It is a question whether a form with such widely different sex-organs should not be separated generically.

LETTERING.

Lettering: a, anus; aa, aperture for aedeagus; ae, aedeagus; an, anellus; at, anal tube; cu, cucullus; de, ductus ejaculatorius; ea, upper extension of anellus; g, gnathos; h, harpe; j, juxta; pt, apical processes of tegumen; s, socii; sa, saccus; t, tegumen; u, uncus; v, vinculum; vs, vestigial socii; vt, ventral plate of anal tube. Unless otherwise stated the views of the genitalia (A) and aedeagus (D) are from a lateral aspect; those of the harpe (B) are from within.



- FIG. 5.—*S. chaophila* Meyr. A, male genitalia. B, harpe. C, tegumen, obliquely lateral view. D, aedeagus. E, juxta and anellus.
- FIG. 6.—*Eucosma querula* Meyr. A, male genitalia. B, harpe. C, tegumen with connections from juxta to uncus, semi-diagrammatic, caudal view. D, aedeagus. J, vinculum. L, end of abdomen with genitalia not exerted.
- FIG. 7.—*Raumatia trimaculata* Philp. A, male genitalia. B, harpe. C, apical portion of tegumen, dorsal view. D, aedeagus. E, juxta and anellus.
- FIG. 8.—*E. potamias* Meyr. A, male genitalia. B, harpe. C, tegumen, dorsal view. D, aedeagus. E, juxta and anellus.

The genitalia are normally concealed within the eighth segment, which is in turn partly withdrawn within the seventh. A dense tuft of long curved hair-scales rises from the conjunctiva beyond the eighth segment and protrudes through the opening, taking the place of the usual anal tuft. The genitalia proper form a compact, more or less rounded mass. The tegumen is narrow and fused with the much broader vinculum, the organ being sharply angled at the point of junction. The uncus is small, bent sharply downwards and bears a terminal brush of moderately long hair. On each side of the uncus the tegumen is slightly dilated, the area carrying a few weak hairs; probably this represents the vestigial socii. The gnathos is absent. The aedeagus is stout and tusk-like. The anellus is of the Eucosmid type ventrally, merging with the rather short angular juxta, but dorsally it throws out a thin well chitinized spring-like strip which connects with the ventral chitinized plate of the anal tube. The harpes are broad and strongly rounded on the basal $\frac{2}{3}$, the apical third being much narrowed and densely clothed with short blunt spines along the upper margin; attached to the upper margin is a rounded flap, armed apically with a stout blunt socketed spur. This flap is normally folded back on the harpe, but is hinged and freely moveable.

Raumatia n. g. (Figs. 7 to 9.)

A genus, characterized elsewhere in this volume, erected for the reception of three species formerly placed in *Eurythecta* (Tortricidae). I am indebted to Dr. A. Busck, of the U.S. National Museum, for drawing my attention to the misplacement of these forms; an examination of the genitalia at once confirmed his views.

Tegumen small; uncus a pair of very weak well separated processes or a minute median one. Socii broad irregular plates or more rod-like organs. Gnathos absent as a chitinized organ and apparently absorbed in the socii. Aedeagus rather small, slightly swollen basally, very little curved. Anellus and juxta normal. Harpes large, constricted above sacculus; a few hairs on sacculus and apical part of cucullus, but median area naked. Vinculum very small and weak.

KEY TO THE SPECIES OF *RAUMATIA*.

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|--|---------------------------|
| 1. Socii narrow apically; uncus a pair of weak prongs;
harpes with upper and lower angles produced | <i>trimaculata</i> Philp. |
| Socii broad apically; uncus a single weak prong;
harpes deeply emarginate on lower margin, apical
angle not produced | 2. |
| 2. Harpes with upper margins sinuate, "neck" narrow;
juxta broader than long.... | <i>potamias</i> Meyr. |
| Harpes with upper margin not sinuate; "neck"
broader; juxta diamond-shaped | <i>varia</i> Philp. |

Crocidosema Zeller. (Fig. 10.)

Within the last few years a representative of this genus has established itself in New Zealand. This is *C. plebeiana* Z. an insect widely spread throughout the drier parts of the world.

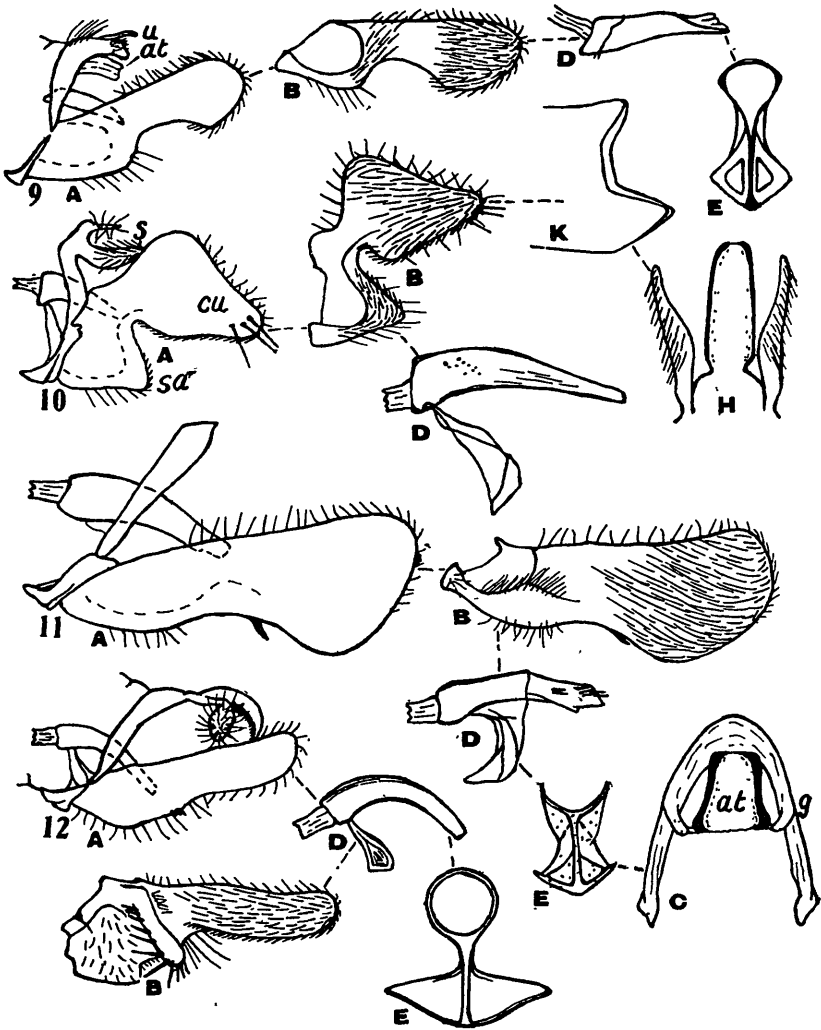


FIG. 9.—*R. varia* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta and anellus.

FIG. 10.—*Crocidosema plebeiana* Z. A, male genitalia. B, harpe. D, aedeagus. H, socii, gnathos and anal tube, ventral view. K, eighth segment, lateral view.

FIG. 11.—*Laspeyresia pomonella* L. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. E, juxta and anellus.

FIG. 12.—*Bactra* sp. A, male genitalia. B, harpe. D, aedeagus. E, juxta and anellus.

C. plebeiana Z.

The eighth segment is modified in much the same way as in *Spilonota*, being deeply emarginate laterally and dorsally. Tegumen narrow, fused with vinculum. Uncus a very weak finger-like process. Socii rather broad, pointed, porrect. Gnathos a pair of weak thin strips which merge in the lateral chitinization of the anal tube. Aedeagus short, swollen basally and tapering to apex, without cornuti. Juxta similar to *Spilonota*; anellus less developed. Harpes deeply and widely cleft on ventral margin, resulting in a broad triangular cucullus and a similar but smaller sacculus; three long stout spines on outer surface of cucullus near apex. Vinculum as broad as tegumen, saccus not developed.

Laspeyresia Hubner. (Fig. 11.)

The world-wide orchard pest, *L. pomonella* L., is the only New Zealand member of this widely spread genus.

L. pomonella L.

Tegumen narrow, not fused with vinculum; uncus absent. Socii absent. Gnathos weak, connecting with lateral chitinized strips of anal tube, but with a noticeable weakening at point of junction. Aedeagus moderately long, slightly swollen basally, 7 or 8 short stout cornuti, a slight obliquely longitudinal ridge towards apex beneath. Anellus and juxta normal. Vinculum moderately broad with slight saccus. Harpes large, broad, constriction at neck moderate, a short stout prong projecting from ventral margin below cucullus, cucullus dilated, rounded.

Bactra Stephens. (Fig. 12.)

Of this large and widely distributed genus four species have been recorded from New Zealand. These species are extremely alike and in the absence of certainty as to determination I can do nothing further than describe the genitalia of one form (probably *B. xystrota* Meyr.), leaving the specific identification open for the present. A much larger form, of which I possess some examples, does not show any difference in genitalia characters, except perhaps a very small extra rounding of the socii.

Bactra sp.

Tegumen narrow, not fused with vinculum; uncus moderately long, thin, strongly curved, with rows of short strong spines beneath. Socii leaf-like, moderately large, flat. Gnathos absent. Aedeagus moderately long, rather thin, curved, without cornuti. Juxta broad, closer to anellus than in above genera, thus bringing the aedeagus nearer to the bases of the harpes. Harpes with cucullus moderately broad, strongly short-spined along ventral margin, sacculus broad, with a transverse fold bearing 11 strong socketed spines, the inner ones being the larger.