

Boriomyia persica* MORT., *rava* WITH., and *baltica

n. sp.

By

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(With plates I—IV.)

In his well-known book on the insects of Gotska Sandön (1) Mr. ANTON JANSSON has recorded as new to Europe *Boriomyia persica* MORT., determined by Mr. P. ESBEN-PETERSEN, Silkeborg. As I was very much interested to see this species, I wrote to Mr. JANSSON, who most obligingly forwarded his two specimens, ♂ and ♀ (a third specimen, ♂, is in the collection of Mr. ESBEN-PETERSEN) and also permitted me to make preparations of them, for which permission I am under special obligation to him. Comparing the Sandö-♂ with MORTON's description and figures of *B. persica*, I found that the appendages were of the same shape. *B. persica* was described by MORTON (2) as similar in appearance to other species of the *nervosa*-group but the Sandö-specimens are wholly pale yellow and have no similarity to that group. This pale colour seemed to agree more with the description of *B. rava* WITH., described from specimens from England (Oxchott, Surrey). In his description WITHYCOMBE (4) compared *B. rava* with *B. subnebulosa* STEPH. but emphasized the paler colour of *rava*. His figures of the male genitalia of *rava* show that the species is very closely allied to *persica*. Not being able to decide from the descriptions only to which of the two species the Sandö-specimens might belong, I wrote to Mr. KENNETH J. MORTON, Edinburgh, and asked his opinion on the two species and how they should be separated. Mr. MORTON most kindly answered me that he had seen a preparation of the male genitalia of *B. rava* from a paratype of WITHYCOMBE and that at first sight he was inclined to think *rava* to be a mere form of *persica*, but that he found one particular character separating the two species: in *persica* the part which I call mediuncus, is furnished with a sharp ventral ante-apical tooth,

which is absent or hardly indicated in *rava*. Mr. MORTON was kind enough to lend me a preparation of the abdomen of a *persica* ♂; and when comparing the genitalia of the Sandö-♂ with that preparation, I found at once a difference exactly in this respect. The genitalia of the two species were very similar, but in the Sandö-♂ the ante-apical tooth of mediuncus was missing. Consequently I supposed the Sandö-♂ to belong to *rava* instead of to *persica*. Recently, however, Mr. D. E. KIMMINS, London, kindly presented to me a ♂ of *B. rava*, captured by him at the same locality where WITHYCOMBE took the types of the species, and I immediately made a preparation of the abdomen of the specimen in order to get the matter settled for good. To my great surprise I found that this male proved to belong to a species altogether differing from the Sandö-♂, its genitalia being in some respects very different from those of *persica* and of the Sandö-species. There is no doubt that the species received from Mr. KIMMINS, belongs to *rava* WITH., as its genitalia quite agree with the figures given by WITHYCOMBE, and the preparation of *B. persica* was considered by MORTON himself as being certainly the same as his *persica* type.

Thus, the species from Gotska Sandön proves to be a new one, for I am of the opinion that there are no other species known belonging to this group of the genus. It will be described in this paper as *B. baltica*. I take the opportunity of giving descriptions of the male genitalia also of *B. persica* and *rava*, made up from the specimens mentioned.

The whole genital apparatus of the genus *Boriomyia* has, as far as I am aware, never been described, and as my descriptions will deal with all the chitinised parts, I must try to give an account of them. In order to be quite sure as to the homologies, it would, however, be necessary to study representatives of all the families and genera of the very heterogeneous order Neuroptera from the standpoint of phylogeny. The following account must therefore be regarded only as provisional, most certainly in some respects not correct, made up only in order to facilitate the descriptions.

Account of the external genitalia and terminal abdominal structures of the genus *Boriomyia* BANKS.

Abdomen with 10 segments, the 1st of which is short, 2nd—8th well developed, 9th short, 10th very specialized. 2nd—4th or 2nd—5th sternites with a more or less distinct transverse fold. A similar but less distinct fold is present on the 2nd or 2nd—3rd tergites. Eight pairs of spiracles.

Male (fig. 1).

1st—8th segments and 9th tergite normally developed.

The spiracles-pairs (sp.) situated in the pleural membranes of segments 1 to 8 respectively.

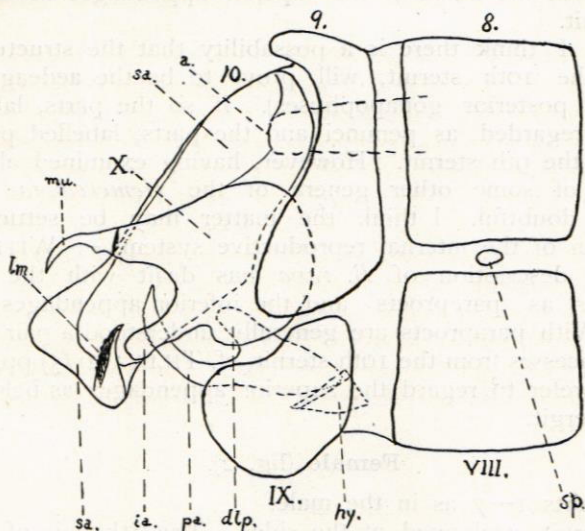


Fig. 1. *Boriomyia baltica* n. sp. ♂.
Sketch of the terminal abdominal structures.
(Right superior appendage withdrawn).

9th sternite short. Posterior gonapophyses developed into two parameres (pa), attached closely to one another in their basal parts, but in their apical parts free and often divergent. Near the base of the apical parts each paramere is furnished with a more or less distinct dorsal lobe (dlp). — Lateral gonapophyses (coxites) fused into an internal hypandrium (hy), very weakly chitinised and often nearly unpigmented, situated below or behind the basal part of the parameres. This internal hypandrium forms a more or less deeply excavated keeled thin plate, veined laterally more or less resembling the stem of a boat.

Penis membranous and not visible in preparations of macerated abdomens.

10th tergite divided into two large lobes, the superior appendages (sa), which are furnished with a group of trichobothria on their outer surface and with one or two rows of strong black laminae-similar teeth (lm) at apex.

10th sternite very specialized, consisting of a rather strong plate, the side-borders of which are ventrally bent. From the

sternit arise a median unpaired process, which I call the mediuncus (mu), and two inferior appendages (ia), the latter being possibly developed from the cerci.

Anus (a) opens in the membrane that forms the hind body-wall, between the bases of the superior appendages and above the tenth sternit.

Note: I think there is a possibility that the structure, dealt with as the 10th sternit, will prove to be the aedeagus (fused penis and posterior gonapophyses). If so the parts, labelled ia, are to be regarded as penunci and the parts, labelled pa, as the coxites of the 9th sternit. However, having examined also representatives of some other genera of the *Hemerobiidae* I find it somewhat doubtful. I think the matter may be settled by an examination of the internal reproductive system. — WITHEYCOMBE (4) in his description of *B. rava* has dealt with the superior appendages as »paraprocts» and the inferior appendages as »penunci». With paraprocts are generally understood a pair of latero-ventral processes from the 10th sternit, cf. TILLYARD (3) pp. 27—28. I should prefer to regard the superior appendages as belonging to the 10th tergite.

Female (fig. 2).

Segments 1—7 as in the male.

8th tergite prolonged at the sides. The 8th pair of spiracles are placed in these prolonged tergite-sides, not in the pleural membrane. The other pairs of spiracles placed as in the male.

8th sternit much reduced, forming a subgenital plate (sgp), above which the anterior gonapophyses (ga) are situated. These are basally rather firmly attached to the plate.

9th tergite very narrow on its upper surface, prolonged on the sides in a similar manner as the 8th tergite and gradually broadening. Its lower margins almost meet on the under surface of the abdomen.

Of the 9th sternit only two broad or elongate large pieces (gl) are to be found. These are most probably to be understood as the coxites (lateral gonapophyses). They carry no styles.

10th tergite, as in the male, divided into two large lobes, each carrying a group of trichobothria.

I have found no traces of the 10th sternit.

Anus (a) opens in the membrane between the lobes of the 10th tergite.

Material from which this account is worked out: Swedish specimens, males and females, of *Borimyia concinna* STEPH., *quadri-fasciata* REUT., *betulina* STRØM (= *nervosa* FABR.), *mortoni* MAC LACHL., and *subnebulosa* STEPH. together with the following three species.

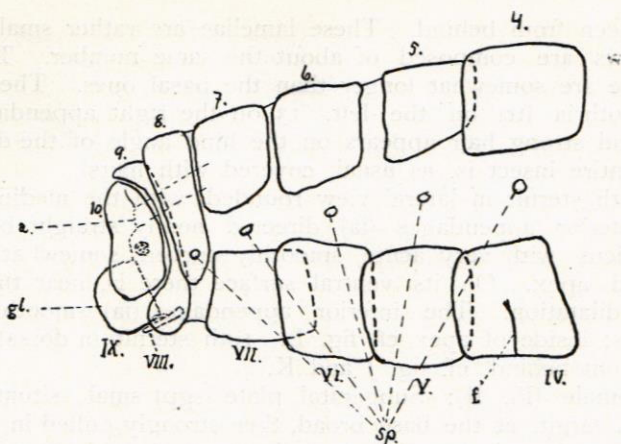


Fig. 2. *Boriomyia baltica* n. sp. ♀.
Sketch of the terminal abdominal structures.

Boriomyia baltica n. sp. (Pl. I and II).

Head pale yellow without darker spots or shadings. Palpi pale yellow with the two apical segments somewhat darker. Mandibles in the apical part brownish. Antennae wholly pale yellow. Eyes globose, black.

Thorax pale yellow; legs pale yellow, only the last tarsal segment somewhat darker. Wings yellowish with pale longitudinal veins. Cross-veins somewhat darker especially the outmost cross-vein between M_{3+4} and Cu_1 . Wing-venation similar to that of other *Boriomyia*-species with 3-parted Rs.

Abdomen brownish in the dried specimens. 2nd—3rd tergites and 2nd—4th sternites with transverse folds.

Male (Pl. I): Parameres (pa) rather long and broad with divergent apices, which, seen sideways, are rather acute with serrate under-border. Dorsal lobes (dlp) rather elongated with rounded apex. The two lobes diverge to the same extent as the apices of the parameres. Seen from below both the apices and the dorsal lobes appear oval and rounded. Internal hypandrium (hy) situated below the parameres, broad at the base with backwards strongly convergent sides and somewhat emarginated apex.

Superior appendages (sa) in lateral view bandlike, somewhat narrowing before the dilated and truncate distal part. The apex bends very abruptly inwards and upwards, and is in the dried insect not visible from the side. Fig. B. shows the inside of the left superior appendage. The apex is furnished with two convergent rows of black lamellae (lm), which appear most distinctly

when seen from behind. These lamellae are rather small and the two rows are composed of about the same number. The apical lamellae are somewhat longer than the basal ones. There are 14 trichobothria (tr) on the left, 13 on the right appendage. One long and strong hair appears on the hind angle of the distal part. (The entire insect is, as usual, covered with hairs).

10th sternit in lateral view rounded, with the mediuncus (mu) and inferior appendages (ia) directed nearly straight backwards. Mediuncus with very acute, smoothly curved, somewhat ventrally directed apex. On its ventral surface there is, near the base, a small dilatation. The inferior appendages (ia) smoothly curved inwards; inside of apex cf. fig. L. 10th sternit in dorsal view and seen from behind, cf. fig. J and K.

Female (Pl. II): Subgenital plate (sgp) small, situated below the 9th tergite, at the base broad, then strongly pulled in, gradually dilating and again tapering towards the truncated apex (cf. fig. B). The gonapophyses anteriores (ga) are rather large, each forming an almost triangular plate. They are situated closely together above the subgenital plate, reaching with their acute apices somewhat more backwards than the plate, to which they are attached in their basal parts. Subgenital plate with anterior gonapophyses in lateral view, cf. fig. C.

Lateral gonapophyses (gl) short and broad with rounded hindmargin.

Lobes of 10th tergite long and rather narrow, somewhat dilated before apex. There are 13 trichobothria on the right, 14 on the left lobe.

Membrane around the anus somewhat dark-pigmented.

Measurements: ♂ and ♀.

Length of body about 5 mm.	Width of forewing 2,5 mm.
» » forewing 6,5 mm.	» » hindwing 2 mm.
» » hindwing 5,5 mm.	

Habitat: Sweden, Gotska Sandön in the Baltic, holotype ♂ and allotype ♀ captured by Mr. ANTON JANSSON, the ♂ in the northern part of the island, the ♀ on the sand-hills near Bredsand, July-August 1922. The specimens appear to be fully mature.

Boriomyia persica MORT. (Pl. III).

MORTON, Ent. Mo. Mag. 57, 221—222, fig. 5, 6 (1921). Persia.

I have only seen the above-mentioned preparation of a ♂ from Palestine, Jerusalem (BODENHEIMER, 7. XI. 1926) in Mr. MORTON's collection, from which preparation the figures are drawn. The

preparation is in side-view, and I am therefore precluded from giving figures from other aspects. Especially in two respects the species differs from *B. baltica*, viz. in the shape of the mediuncus and the parameres.

The parameres (pa) are in their apical part very slender, tapering to a very acute apex. The under border not serrate. The dorsal lobes (dlp) appear to be somewhat broader than in *baltica*. (I was not able to detect the internal hypandrium; probably it has become too translucent in the Canada Balsam).

The superior appendages seem to be quite similar to those of *B. baltica*, but I was not able to trace the true shape of the lamellae. There are 14 trichobothria on each of the superior appendages. A long and strong hair is to be found on the hind angle of each appendage as in *baltica*.

The mediuncus has a long and acute apex, bent smoothly ventrally and is furnished with a ventral sharp and long anteapical tooth, which is not placed so nearly to the base as the small dilatation in *B. baltica*, but more towards the middle of the mediuncus (cf. fig. D). The inferior appendages similar to those of *B. baltica* but with straighter borders and a somewhat more squarely truncated apical part; apex similar to that of *B. baltica* (cf. fig. E).

I do not know the female.

Boriomyia rava WITH. (Pl. IV).

WITHYCOMBE, The Entomologist, 56, 202—204, Pl. 3, fig. 2—5 (1923). England.

The following description and drawings are made from a male specimen captured by Mr. D. E. KIMMINS at Oxchott, Surrey, 20. VI. 1929, and by him kindly presented to me.

2nd tergite and 2nd—5th sternites with transverse folds.

The parameres (pa) are of a very remarkable size. They are strongly bent so that the part (blp) that corresponds to the basal part in *persica* and *baltica*, is situated above the apical part. In this respect the species shows a relation to *B. subnebulosa* STEPH. The basal part (blp) is very large, sail-formed, and rounded, almost unpigmented. From its anterior lower edge arise the parts which correspond to the dorsal lobes (dlp) of other species, and the apical parts, the former of which are rather broad (in lateral aspect) with squarely truncated apex, and in their utmost part (in dorsal aspect) bent sideways almost at a right angle. The apical parts appear in lateral aspect very slender, in their middlemost part smoothly curved a little upwards, and the pointed apex also very little upwards bent. Seen from above or from below the apical parts appear to be very broad in their basal part, but before the

middle they suddenly taper to the pointed apex. The apical parts of the two parameres are situated close to one another.

The internal hypandrium (hy) lies behind the parameres, thus in an almost vertical position, with its apex directed downwards. In ventral aspect the base is very broad, the apex about half as broad, transverse and somewhat emarginated, the side-borders smoothly curved.

Superior appendages similar to those of *B. persica* and *baltica* but with the hind margin almost straight. The apex bends inwards and upwards as in those species and is furnished with two rows of lamellae. If the apex of the left superior appendage is seen from behind, there appear in the left row only two large lamellae before the apex, in the right row about six. On each of the superior appendages there are 11 trichobothria and about four strong and long hairs on the distal part.

10th sternit rather short with its basal part (in lateral aspect) almost semicircular and the mediuncus and the inferior appendages more ventrally directed than in *B. persica* and *baltica*. The mediuncus (mu) is very long, slender, and acute, nearly straight, without any dents or dilatations. The inferior appendages (ia) also very long, broad, with a small tooth-like apex, cf. fig. M. They are curved inwards very strongly, their apices almost meeting. 10th sternit from above and behind, cf. fig. K and L.

The female is unknown to me.

Explanation of plates.

Pl. I. *Boriomyia baltica* n. sp., holotype ♂.

- Fig. A. Apical part of abdomen from side.
 » B. Left superior appendage, inside.
 » C. Apex of ditto from behind and partly from within.
 » D. Right paramere from side.
 » E. Parameres from below.
 » F. Internal hypandrium from below.
 » G. " " " side.
 » H. 10th sternit from side.
 » J. " " " above.
 » K. " " " behind.
 » L. Apical part of right inferior appendage, inside.

Pl. II. *Boriomyia baltica* n. sp., allotype ♀.

- Fig. A. Apical part of abdomen from side.
 » B. 8th sternit from above.
 » C. " " " side.

Pl. III. *Boriomyia persica* MORT. ♂, Jerusalem.

- Fig. A. Apical part of abdomen from side.
 » B. » » » left superior appendage, inside.
 » C. Parameres from side.
 » D. 10th sternit from side.
 » E. Apical part of right inferior appendage, inside.

Pl. IV. *Boriomyia rava* WITH. ♂, Oxchott, Surrey.

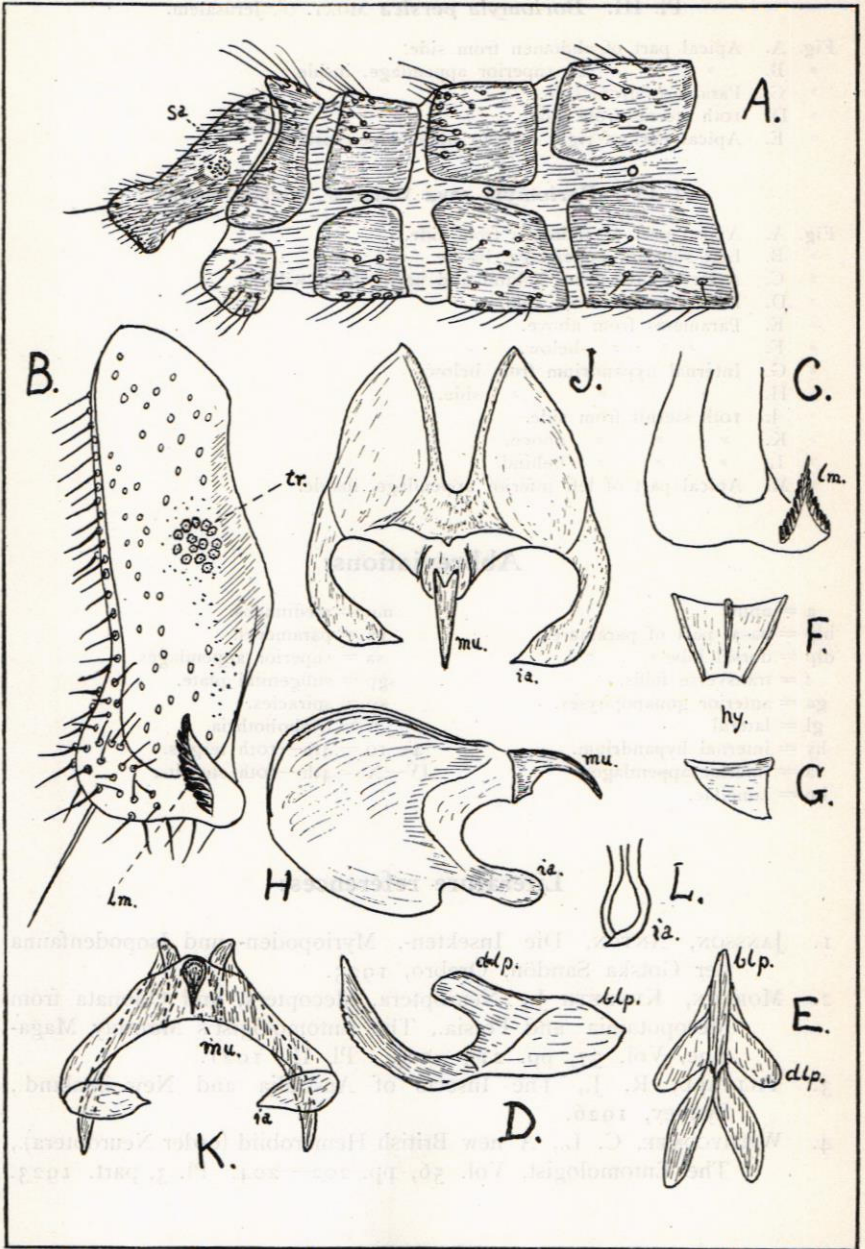
- Fig. A. Apical part of abdomen from side.
 » B. Left superior appendage, inside.
 » C. Apex of ditto from behind and partly from within.
 » D. Left paramere from side.
 » E. Parameres from above.
 » F. » » below.
 » G. Internal hypandrium from below.
 » H. » » » side.
 » J. 10th sternit from side.
 » K. » » » above.
 » L. » » » behind.
 » M. Apical part of left inferior appendage, inside.

Abbreviations:

a = anus.	mu = mediuncus.
blp = basal part of parameres.	pa = parameres.
dlp = dorsal lobe » »	sa = superior appendages.
f = transverse folds.	sgp = subgenital plate.
ga = anterior gonapophyses.	sp = spiracles.
gl = lateral » »	tr = trichobothria.
hy = internal hypandrium.	4—10 = 4th—10th tergits.
ia = inferior appendages.	IV—X = 4th—10th sternits.
lm = lamellae.	

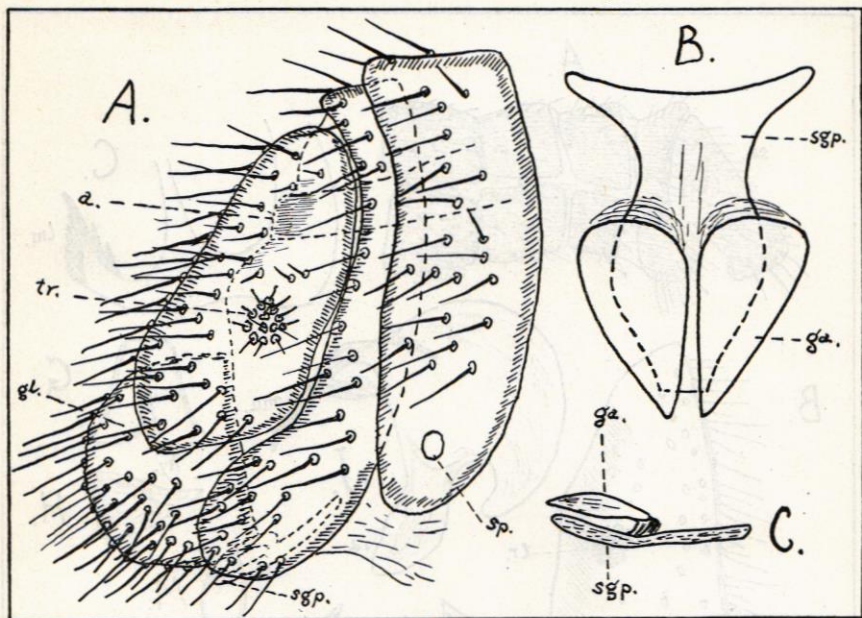
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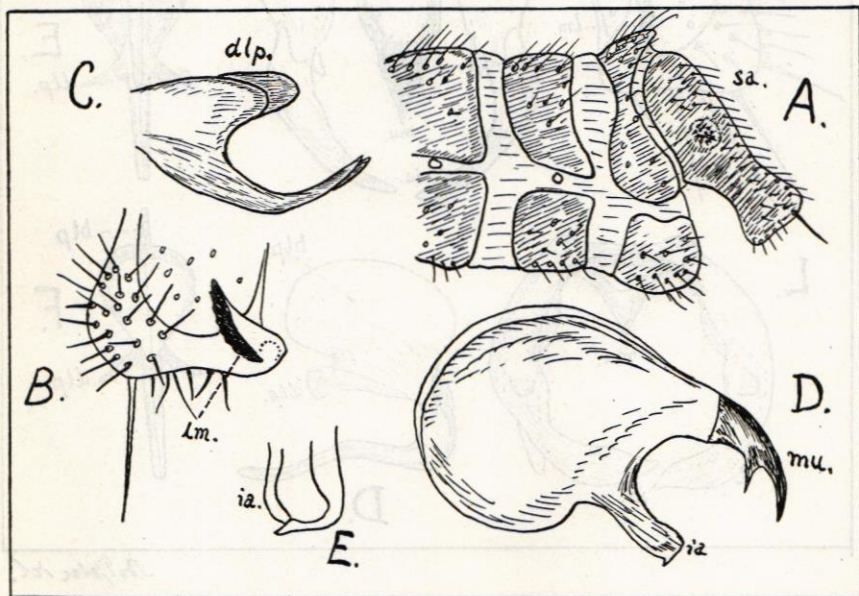
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Boriomyia baltica n. sp. holotype ♂.



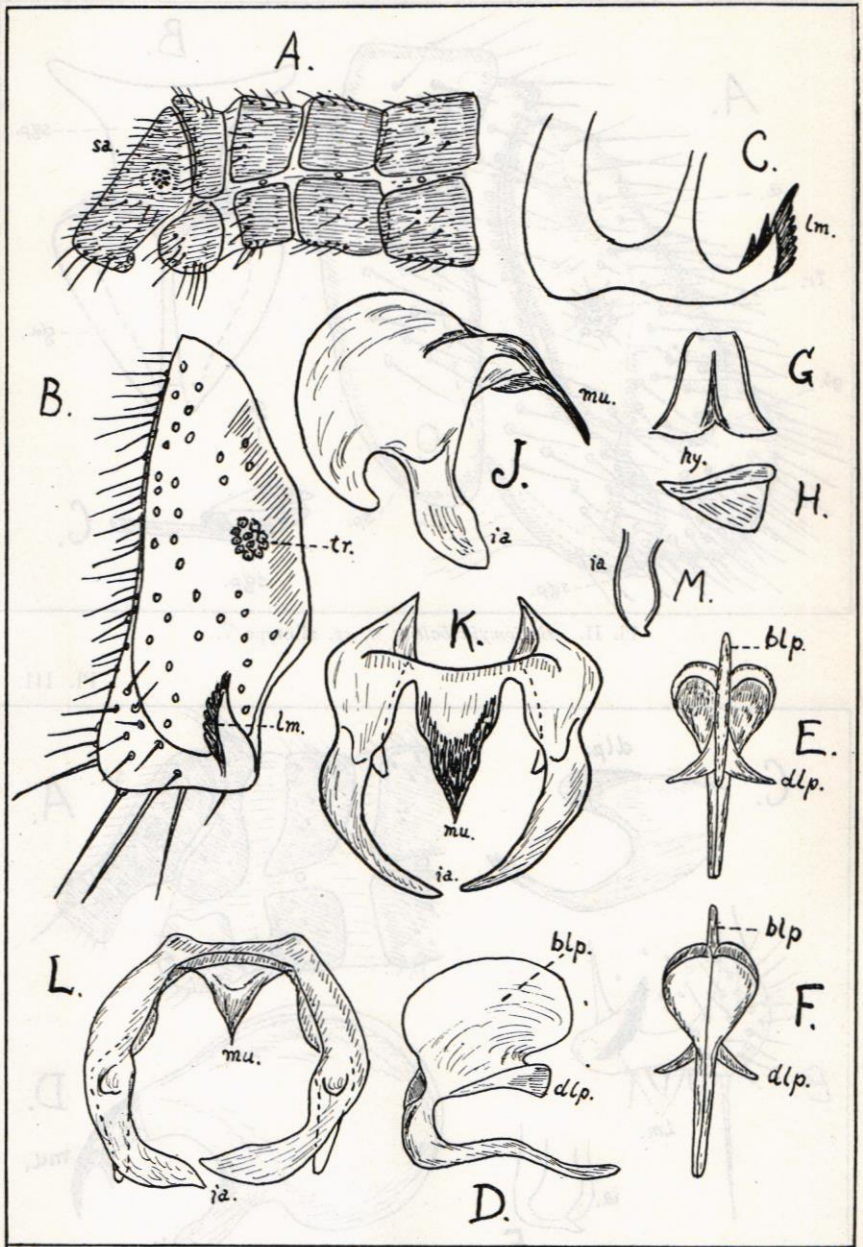
Pl. II. *Boriomyia baltica* n. sp. allotype ♀.

Pl. III.



Pl. III. *Boriomyia persica* MORT. ♂, Jerusalem.

Bolffeta del.



Boromyia rava rel.

Boromyia rava WITH. ♂, Oxchott, Surrey.