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A revision of the genus *Aspilapteryx* SPULER (Lepidoptera, Gracillariidae)

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Abstract

The genus *Aspilapteryx* SPULER (1910) is revised and divided into two subgenera. Two new species are described: *A. inquinata* from Asia Minor and *A. magna* from Iran. The following new synonymies are established: *A. multipunctella* CHRÉTIEN (= *A. anagensis* KLIMESCH), *Caloptilia coruscans* WALSINGHAM (= *Gracilaria ferruginipennis* TURATI, *Gracilaria instincta* MEYRICK, *Caloptilia schinella* WALSINGHAM). *Aspilapteryx grypota* MEYRICK and *A. filifera* MEYRICK are transferred to *Caloptilia* HÜBNER.

Introduction

The genus *Aspilapteryx* was erected by SPULER (1910) for two European species: *tringipennella* ZELLER (type-species) and *limosella* DUPONCHEL. In the following years few authors recognized this genus (HERING, 1957), the majority ignored it completely: MEYRICK (1928), L'HOMME (1935) and CHRÉTIEN (1916), who described *multipunctella* as subspecies of *tringipennella* Z., placing it in *Gracillaria* s.l. VARI (1961), studying the South African fauna, reexamined *Aspilapteryx*, confirming its validity and assigning three further species (*seriata* MEYRICK, *grypota* MEYRICK and *filifera* MEYRICK) to it. With the exception of KUMATA's paper on the *Gracillaria*-group in Japan (1982), no further significant work on this subject has been published.

The examination of all these species shows that they have been assigned to *Aspilapteryx* on the basis of their wing venation. VARI (1961) emphasized the problem as follows: ". . . . the species placed in this genus are rather heterogenous as far as their general appearance and genitalia are concerned but they are grouped together on account of the wing venation".

Within the family Gracillariidae wing venation is a good generic character. ELY (1917) proposed a classification of the North American Gracillariidae based only on wing venation and, in the same way, VARI (1961) proposed a key to the world genera of that family. However, some genera comprise taxa differing remarkably either in morphological or biological characters. One might therefore ask whether they constitute monophyletic groups or whether the similarity of the wing venation is due to convergent evolution. KUMATA, studying the Gracillariidae fauna of Japan, emphasized that in these genera essential characters are provided by the genital structure and the larval chaetotaxy as well as the forewing venation. The genus *Aspilapteryx* SPULER, as previously understood, seems to confirm this supposition as, after study of all species so far known, it is possible to recognize three well defined groups of species, two of which are here considered as subgenera while the third is transferred to *Caloptilia* HB. The following characters have been used: genitalia, pregenital segments, wing venation, forewing pattern and, where known, the biology. Unfortunately I do not have sufficient data on the larval chaetotaxy and in this paper only *tringipennella* Z. is examined.

The genitalia were mounted on slides in the traditional dorso-ventral position as used by KUMATA (1982). The lateral position as used by VARI (1961) is less satisfactory as it does not permit a clear interpretation of all taxonomically important structures.

Genus *Aspilapteryx* SPULER

Aspilapteryx SPULER, 1910, Schmett. Eur. 2:407. Type-species: *Gracilaria tringipennella* ZELLER, 1839.

♂♀. Head and face smooth; scape with pecten of few hair-scales; labial palpi long, slender, terminal segment about as long as second, pointed, upturned; maxillary palpi smooth, from 1/3 to 1/4 as long as labial palpi. Forewings lanceolate, pointed apically, 12-veined, with M_2 and M_3 coincident; all veins well separated at their bases. Hindwings lanceolate, pointed; cell open between M_2 and M_3, the latter sometimes missing.

♂ Genitalia. Tegumen weakly sclerotized, no uncus produced; tuba analis moderate in length, with narrow subscaphium; aedoeagus thin, slender, bluntly pointed, with or without cornuti. 7th and 8th abdominal segment weakly membranous, with one or two pairs of coremata.

♀ Genitalia. Apophyses posteriores longer than anteriores; sterigma well sclerotized, ostium bursae in 7th sternite or on its caudal margin; corpus bursae with two horn-shaped signa, inner edge of signum smooth or serrulate.

Larva. The description is based on two larvae of *tringipennella* Z. L-group on prothorax and 1st to 8th abdominal segment bisetose, on meso- and metathorax trisetose. SV-group on 1st, 6th and 7th abdominal segment bisetose, on 2nd to 5th segment trisetose. Setal map as in *Gracillaria* HAW. and *Caloptilia* HB. but variability of position of SV-group on 6th and 7th abdominal segment and D-group on 9th requires further study.

Subgenus *Aspilapteryx* SPULER

Aspilapteryx SPULER, 1910, Schmett. Eur. 2:407. Type-species: *Gracilaria tringipennella* Z., 1893.

♂♀. Head as in generic description. Fore and middle legs brownish, mottled with pale scales; tarsi white, segments with brownish apices; hind legs whitish-ochreous, coxae and femora with some brownish irroration. Forewings lanceolate, pointed, from pale greyish-brownish to light ochreous-yellow; ill defined white costal streak from base to near apex, wide in *magna* n.sp., and two or more longitudinal rows of blackish dots. In some species strong colour polymorphism, with pale and dark forms. Forewing venation as in generic description. Vein M_3 in hindwings missing in *multipunctella* CHRÉT.

♂ Genitalia. Tegumen weakly sclerotized, no uncus produced; tuba analis with a narrow subscaphium; valva wide, rather squat in Palaearctic species, ventroapical corner supplied with a small lobe, more or less thorny; vinculum wide, rounded or truncated anteriorly; aedoeagus long, slender, bluntly pointed, sometimes coiled distally and with cornuti. 7th and 8th abdominal segment weakly membranous, with a pair of coremata on the former; 8th tergite reduced into a T-shaped sclerite.

♀ Genitalia. Ostium bursae placed on 7th segment or on its caudal margin; sterigma and antrum well sclerotized; corpus bursae always with two horn-shaped signa, inner edge of signum serrulate.

Biology. *A. tringipennella* and *A. multipunctella* on Plantaginaceae, the former a permanent miner, the latter, according to KLIMESCH (1979), a temporary miner.

Distribution: Europe to Central Asia. The distribution of *seriata* MEYR. in South Africa is still poorly known.

Key to the males of subgenus *Aspilapteryx*:

1. Aedoeagus straight; dorsal edge of valva strongly convex . . . . . *seriata* MEYR.
– Aedoeagus sinuous or coiled; dorsal edge of valva only slightly rounded 2

2. Aedoeagus sinuous . . . . . *tringipennella* Z.
– Aedoeagus coiled at apical half 3

3. Vein 4 missing in hindwings . . . . . *multipunctella* CHRÉT.
– Vein 4 present . . . . . *magna* n.sp.

Aspilapteryx (Aspilapteryx) tringipennella (ZELLER, 1839)

Gracilaria tringipennella ZELLER, 1839: 209.
Ornix fringilella DUPONCHEL, 1843: 303.

♂♀. Head and face whitish, slightly spotted with ochre; labial and maxillary palpi of same colour; median segment of labial palpi slightly edged with brownish apically, apical segment with white apex. Maxillary palpi 1/3 to 1/4 length of labial palpi. Scape brownish, slightly spotted with white; segments of antennae white-ochreous, edged with brown apically. Forewing pattern and wing venation as in description of subgenus. Alar expanse very variable: 9 to 14 mm.

♂ Genitalia. Subscaphium slender, widening at basal extremity; valva short and wide, with crested folds along costal edge at basal half and another parallely to the apical edge. Vinculum wide, rounded; aedoeagus slender and slightly sinuous, apex provided laterally with small thorny crest; four small cornuti present, probably lost during copulation and others, very small, in vesica.

♀ Genitalia. Ostium bursae very wide, antrum sclerotized; corpus bursae elongate with two small weakly curved signa.

Biology. The larva mines the leaves of *Plantago lanceolata* L., also *P. maritima* L. and *P. atrata* H. (HERING, 1957). It starts feeding under the upper surface, in a thin and tortuous mine that is followed by a large longitudinal whitish-brown blotch. It pupates in a white cocoon within the blotch (BROWN, 1946). There are two broods.

Distribution. Present in almost all of Europe, in Asia east to Afghanistan. CARADJA (1920) recorded *tringipennella* from Biskra (Algeria), but this may have been in error for *multipunctella* (see below).

Aspilapteryx (Aspilapteryx) magna n.sp.

Holotype ♂: Persia, Elburs, Kendevan ca 3000 m., 3-9.VII, coll. Wagner, Wien, Pr. Trb 583 ♂. Paratypes: 2 ♂♂, as above. Holotype and a paratype in coll. Naturhistorisches Museum Wien, a paratype in coll. Triberti.

♂♀. Head as in *tringipennella*; antennae whitish, with segments edged with ochreous in distal third of flagellum. In forewings, white costal streak very wide, so much that white colour seems to be the ground one; it is also present a irregular yellow-ochreous band following vein 1c and some yellowish blotches at apical third. Subcostal and median longitudinal rows of blackish dots are present and sometimes other dots on fold. Cilia nearly quite missing in type-specimens: they seem white apically and white-yellowish dorsally. Alar expanse 15-16 mm. Venation and hindwings as in *tringipennella* Z.

♂ Genitalia. Tegumen wide and rounded, weakly sclerotized; subscaphium narrow, weakly sclerotized. Valva rather short, wide, with a strong dorsal notch. Vinculum wide, triang-

ular, about 1/4 longer than tegumen. Aedoeagus long, slender, twice coiled at distal half, narrowing towards apex, no cornuti. Pregenital segments as in *tringipennella* Z.

♀ Genitalia. Unknown.
Biology. Unknown.
Distribution. Iran, Elburs.

Aspilapteryx (Aspilapteryx) multipunctella (CHRÉTIEN, 1916) stat.n., comb.n.

Gracilaria tringipennella multipunctella CHRÉTIEN, 1916: 497.
Aspilapteryx anagensis KLIMESCH, 1979: 153. Syn.n.

♂♀. Head and face white-greyish, strongly irrorated with brown. Labial and maxillary palpi are of the same colour, as in *tringipennella* Z. Maxillary palpi about 1/4 as long as labial palpi. Flagellum ochreous, segments brownish distally, scape white-ochreous. Forewing pattern as in *tringipennella* Z., but much more indistinct and variable. In hindwings vein 4 missing. Alar expanse 10-11 mm.

♂ Genitalia. Basic structure is very near *A. magna*. It can be distinguished from the lacking of dorsal notch on valva and the aedoeagus, that is twice coiled at distal third; a long thorn before coiling and a row of tooth-shaped cornuti are present. Their number seems to be variable: KLIMESCH (1979) pointed out five cornuti in *anagensis* whereas I noticed 8-10 in Mediterranean specimens.

♀ Genitalia. Ostium bursae wide, placed on caudal margin of 7th sternite; ductus bursae sclerotized and coiled posteriorly; bursa weakly membranous, elongate-pyriform, with two horn-shaped signa, rather big and curved.

Biology. CHRÉTIEN (1916) bred *multipunctella* from *Plantago albicans* L. and KLIMESCH (1979) from *P. arborescens* P. The latter observed it as a temporary miner, completing its larval development feeding among some leaves spun together.

Distribution. Canary Islands, North-Western Africa, South Spain.

Remarks. In Spanish specimens there is a greater spreading of greyish-brownish scales, that makes pattern very confused; Canaries population (KLIMESCH, 1979) seems to be nearer these. In most examined African specimens the head and palpi are white, forewings very light; probably CARADJA (1920) referred to these, writing about some specimens of *tringipennella* from Biskra „. . . . in einer weißen Wüstenform".

Aspilapteryx (Aspilapteryx) seriata MEYRICK, 1912)

Gracilaria seriata MEYRICK, 1912, I: 27.

Description. See VARI (1961).
Biology. Unknown.
Distribution. South Africa.

Subgenus *Sabulopteryx* nov.

Type-species: *Aspilapteryx limosella* DUPONCHEL, 1843.

♂♀. Head as in genus description. Forewings from brownish to light-ochreous, without costal streak; numerous brown dots and blotches irregularly arranged on whole surface of wings; in some specimens (particularly *limosella*) is visible their longitudinal ranging. In forewings discoidal cell slightly dilated distally; hindwings with vein 4 always missing.

♂ Genitalia. Tuba analis of moderate length, subscaphium long and thin. Tegumen membranous, weakly sclerotized only laterally; valva rather small, with finger-shaped processus at basal third; vinculum rather long and narrow; aedoeagus short, straight, with or without cornuti. 7th and 8th abdominal segments with sclerites little evident, each with pair of coremata, consisting of hairy long scales.

♀ Genitalia. Ostium bursae placed on caudal margin of 7th sternite or just above; antrum well sclerotized. Bursa with two signa, rather small and weakly curved, always smooth on inner curve.

Biology. See *A. limosella* DUPONCHEL.

Distribution. Central and South Europe, Asia Minor.

Aspilapteryx (Sabulopteryx) limosella (DUPONCHEL, 1843)

Ornix limosella DUPONCHEL, 1843:488 (nec ZELLER).

♂♀. Face and head yellow-ochreous; labial and maxillary palpi whitish, latter about 1/4 length of former; median and apical segments of labial palpi annulated with brown. Antennae light-ochreous, every segment annulated with brown apically. Forewing pattern and venation as above. Variability of ground colour very strong, with blotches and dark dots almost completely absent. Cilia yellow-greyish, spotted with brown apically. Hindwings grey, cilia as above. Alar expanse 8-10 mm.

♂ Genitalia. Valva wide basally, then bluntly narrowing at median area, with apex rather small; a finger-shaped processus at basal third of costa. Aedoeagus short and straight, with small sclerotized crest subapically and two thin projections posteriorly; vesica with very small cornuti.

♀ Genitalia. Ostium bursae very wide, placed on caudal margin of 7th sternite; antrum well sclerotized and ductus bursae rather wide, membranous; corpus bursae small, with two signa, weakly curved and completely smooth.

Biology. *Teucrium chamaedrys* L. and *montanum* L. SPULER (1910) mentioned also *Genista* and *Jurinea*. The mine is found on the underside of the leaf, like those of *Phyllonorycter* HB. Usually *limosella* is a permanent miner but often the larva behaves like that of *multipunctella* CHRÉT. (HERING, 1957). The cocoon stays within a folded leaf (LHOMME, 1935-1949).

Distribution: Central and South Europe, rather rare and local, exclusively in xerothermic localities. KUZNETZOV (1979) recorded it from the South-West of the European regions of the USSR and from Asia Minor.

Aspilapteryx (Sabulopteryx) inquinata n.sp.

Holotype ♂: 2.VI.1969, Asia min. 40 km. östl. Ankara, F. Kasy leg., *limosella* L. det. Jaeckh 1974, Pr. Trb 1323 ♂ (coll. Nat. Mus. Wien). Paratypes: 2 ♂♂, as above (coll. Triberti); 3 ♂♂, as above (coll. Nat. Mus. Wien); 1 ♂, 9-16.V.1963, Libanon, O. v. Saida, Kasy & Vartian, Pr. Trb 814 ♂ (ibidem); 1 ♀, 24.6.69, Asia min. O. v. Ürgüp (östl. Nevschehir) F. Kasy leg., Pr. Trb 821 ♀ (ibidem); 2 ♂♂, 22.6.69, Asia min., W. v. Gürün, 1300 m. (100 km. NW. v. Malatya) F. Kasy leg. (one in coll. Triberti, the remainder in Naturhistorisches Museum Wien).

♂♀. Head and face yellow-ochreous. Labial and maxillary palpi whitish, spotted with brown, particularly apical segment latter. Antennae, tegulae and thorax as in *limosella* DUP. Forewing brown-ochreous, without costal streak; pattern and venation as in description of the subgenus; in type-series no variability of wing pattern. Legs as in *limosella*, colours deeper. Alar expanse 8-10 mm.

♂ Genitalia. Tuba analis and tegumen as in *limosella*. Valvae widening towards apex, wider than in proceeding species; dorsal edge almost straight, not convex; finger-shaped process less developed, in more median position. Vinculum concave laterally, apex rounded. Aedoeagus apically pointed, with row of 8-10 cornuti.

♀ Genitalia. Ostium bursae smaller than in *limosella*, positioned just above distal edge of 7th sternite. Signa as in *limosella*.

Biology. Unknown.

Distribution. Turkey and Libanon.

Remarks

KUMATA (1982) defined the *Gracillaria*-group as comprizing *Calybites* HB., *Eucalybites* KUM., *Caloptilia* HB., *Gracillaria* HAW. and *Aspilapteryx* SPULER. Within this group the genus *Aspilapteryx* may be characterized as follows:

1. Male genitalia with peculiar structure of valvae in both subgenera. *Sabulopteryx* with rather small valva with digitate process at basal third; in *Aspilapteryx* valva wide, ventro-apical corner with small thorny lobe.

2. Female genitalia with ostium bursae in 7th sternite. *A. inquinata* is very peculiar in the fact that it is placed just above the distal edge of 7th sternite. Position of ostium bursae is shared with *Calybites* and *Eucalybites* but the former is easily distinguished by the single signum in corpus bursae and the latter by ostium bursae located under a lobe of caudal margin of 7th sternite. In *Gracillaria* and *Caloptilia* it is always found in the inter-segmental area between 7th and 8th abdominal segment.

3. Forewings with veins M_2 and M_3 coincident, as in *Calybites* and *Eucalybites*. Venation of hindwings quite variable, with the vein M_2 sometimes missing. Such variability is also in *Caloptilia* (see KUMATA, 1982).

4. Body chaetotaxy of larva is as in *Gracillaria* and *Caloptilia* but its variability requires further study. However, the genus *Aspilapteryx* is well distinguished from *Calybites* and *Eucalybites* by the SV-group trisetose on the 2nd abdominal segment and bisetose on the 6th and 7th whereas is respectly bisetose and reduced to a single SV_1 in the other genera.

On this ground, *Aspilapteryx* is related to the genera *Calybites* and *Eucalybites* in features of the adult stage, especially in the venation and female genitalia. In the larval chaetotaxy it is clearly related to the genera *Caloptilia* and *Gracillaria*. Further data (particularly biological observations) are necessary to define the position of *Aspilapteryx* within the *Gracillaria*-goup.

Within the genus *Aspilapteryx*, the two subgenera are distinguished by the following characters:

1. Forewing pattern. *Aspilapteryx* is recognized by the white costal streak, that is very wide in *magna* n.sp.

2. Male pregenital abdomen. In the subgenus *Aspilapteryx* a pair of coremata is present; the 8th tergite is reduced to a T-shaped sclerite. In *Sabulopteryx* there are two pairs of coremata and no T-shaped sclerite.

3. Male genitalia. The valvae differ in the two groups as stated above.

4. Female genitalia. Signa serrulate on inner curve in *Aspilapteryx*, completely smooth in *Sabulopteryx*.

5. Biology. Only a few data are known for these species. However, specialization of *tringi-*

pennella and *multipunctella* on Plantaginaceae seems to point out the monophyletic character of subgenus *Aspilapteryx*.

According to these observations I believe that *Sabulopteryx* and *Aspilapteryx* might be better treated as distinct genera. However I have no sufficient data about larval chaetotaxy and the biology, so I prefer deferring their generic description.

In the above mentioned groups I have not included *grypota* MEYR. and *filifera* MEYR. These two species are characteristic in lacking the vein M_2 in the forewing. That suggests they would be confirmed in *Aspilapteryx*, according to the key of the genera given by VARI (1961). However, I am inclined to conclude, through the examination of various characters, that they fall under the genus *Caloptilia*. Such convinction has been strengthened by the surprising relationship I found to exist between *grypota* MEYR. and the European *Caloptilia coruscans* WALSINGHAM. Male and female genitalia and wing venation are identical; forewing pattern very similar in some specimens. Biology seems to be only distinguishing character: *coruscans* feeds on Anacardiaceae and *grypota* on Salicaceae. The wing venation of *C. coruscans*, to my knowledge, has never been described and for that reason the generic position of this species has never been disputed. The following characters were examined:

1. Forewing pattern. In *coruscans* and *grypota* it is typical of *Caloptilia* HB., with more or less triangular and pale blotch about on middle of costa while in *filifera* it is more peculiar. No affinity with the genus *Aspilapteryx*.

2. Wing venation. As in *Aspilapteryx*.

3. Male genitalia. Valvae of these species are closely allied to *Caloptilia* and they have nothing in common with *Aspilapteryx*.

4. Female genitalia. Ostium bursae placed at intersegmental area between 7th and 8th abdominal segment, as in *Caloptilia*.

On the ground of these considerations I deem opportune to transfer *grypota* and *filifera* to *Caloptilia* HB. and to confirm *coruscans* in the same genus.

Studying *Caloptilia coruscans* WLSGHM., the following synonymies have been ascertained: *Caloptilia schinella* (WLSGHM., 1907), *Gracilaria instincta* MEYRICK, 1922 and *Gracilaria ferruginipennis* TURATI, 1924 are new synonyms of *C. coruscans* (WLSGHM., 1907). All type-species have been examined except that of *C. schinella*. This species has been studied by many specimens coming from Canary Islands and reared from *Schinus molle* L.

Check-list of the species of *Aspilapteryx* SPULER

Subgenus *Aspilapteryx* SPULER:	*tringipennella* ZELLER
	multipunctella CHRÉTIEN (stat.n., comb.n.)
	anagensis KLIMESCH (syn.n.)
	magna n.sp.
	seriata MEYRICK
Subgenus *Sabulopteryx* nov.:	*limosella* DUPONCHEL
	inquinata n.sp.

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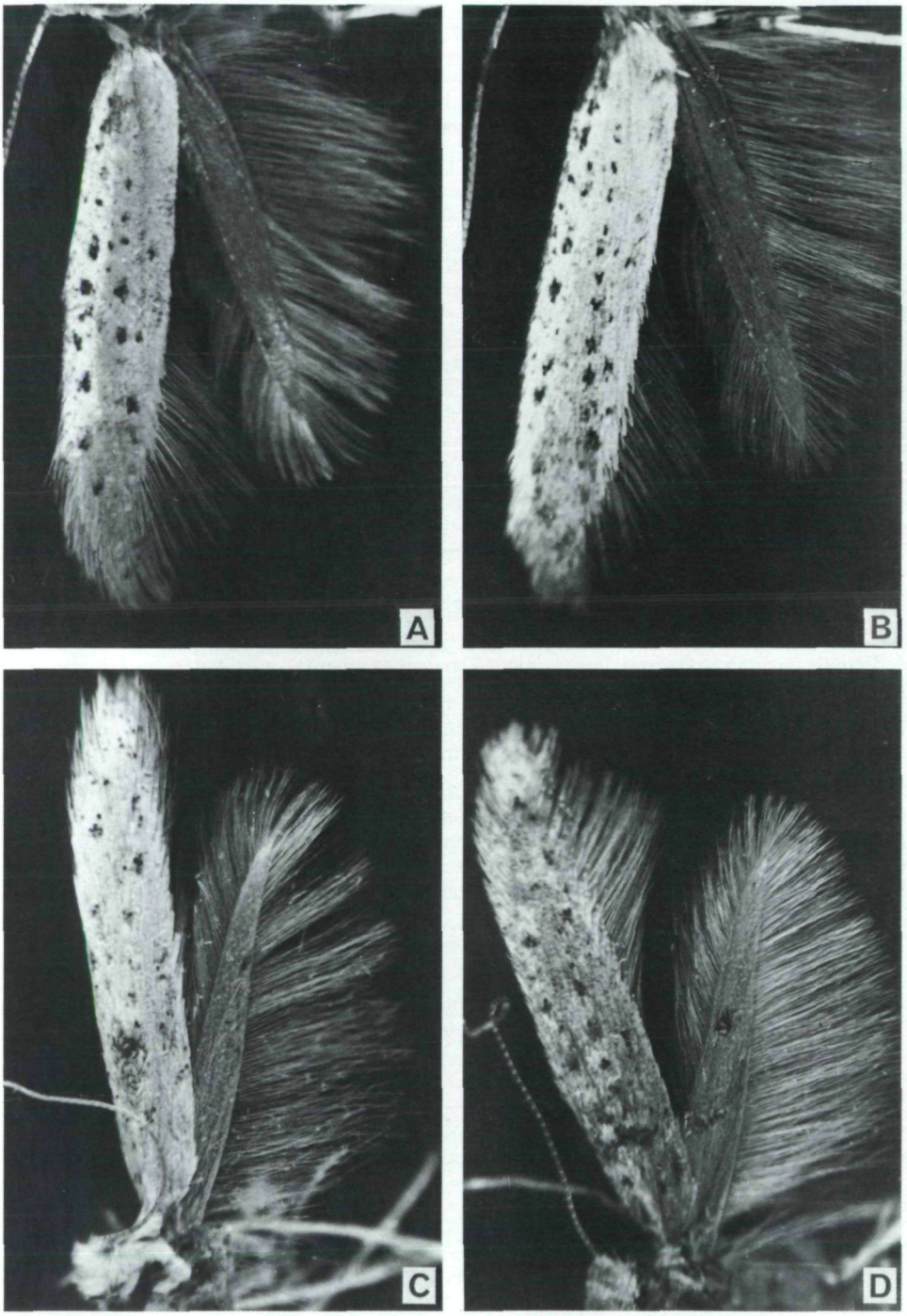

PLATE I. A-B: *Aspilapteryx tringipennella* Z. A: Jugoslavia, Croazia: B: Italy, Gargano. – C-D: *A. multipunctella* CHRÉT. C: Tunisia; D: Spain, Andalusia.

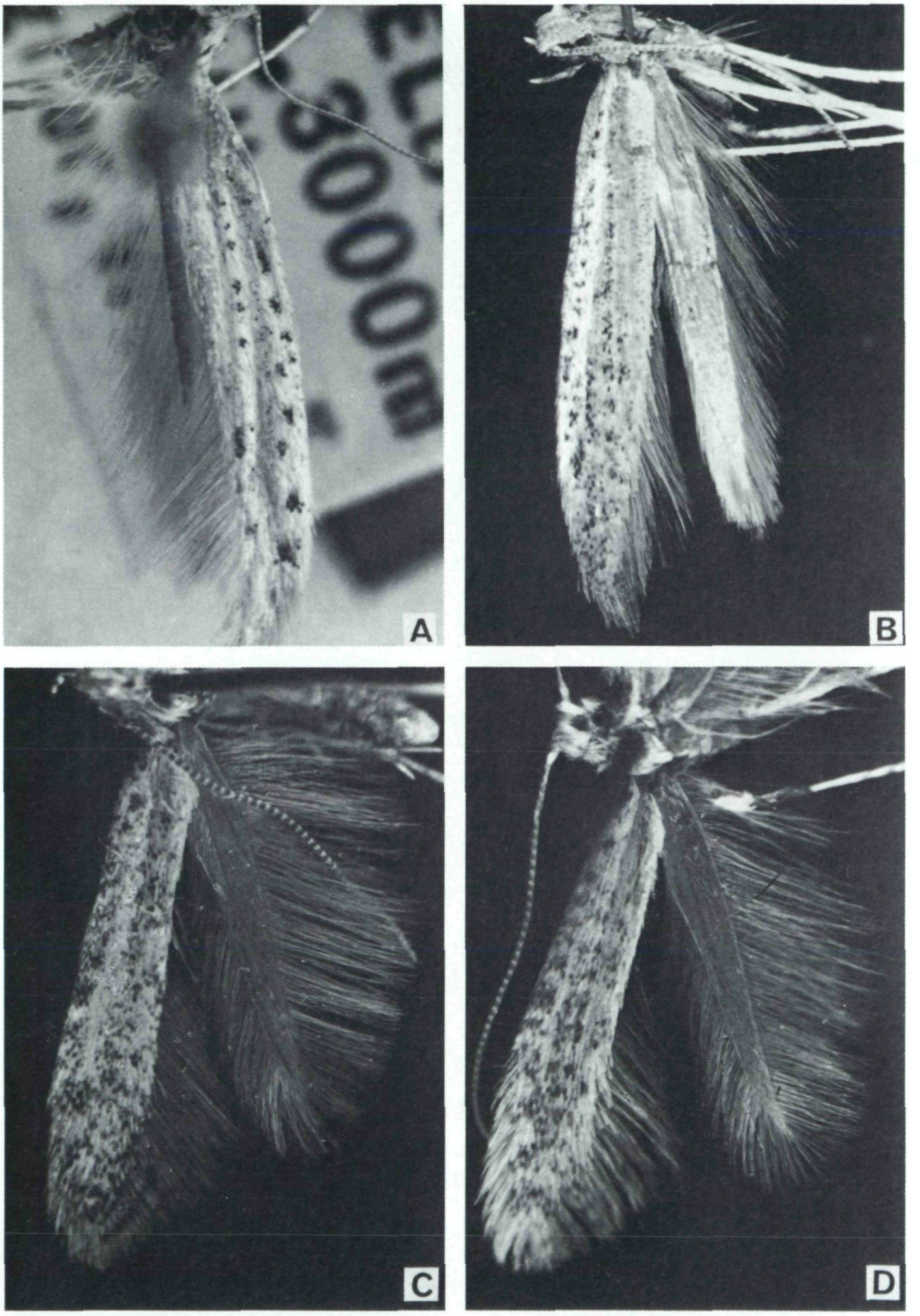

PLATE II. A: *Aspilapteryx magna* n.sp. Persia, Elburs. – B: *A. seriata* MEYR. South Africa. – C: *A. inquinata* n.sp. Turkey. – D: *A. limosella* DUP. Italy, M. Lessini.

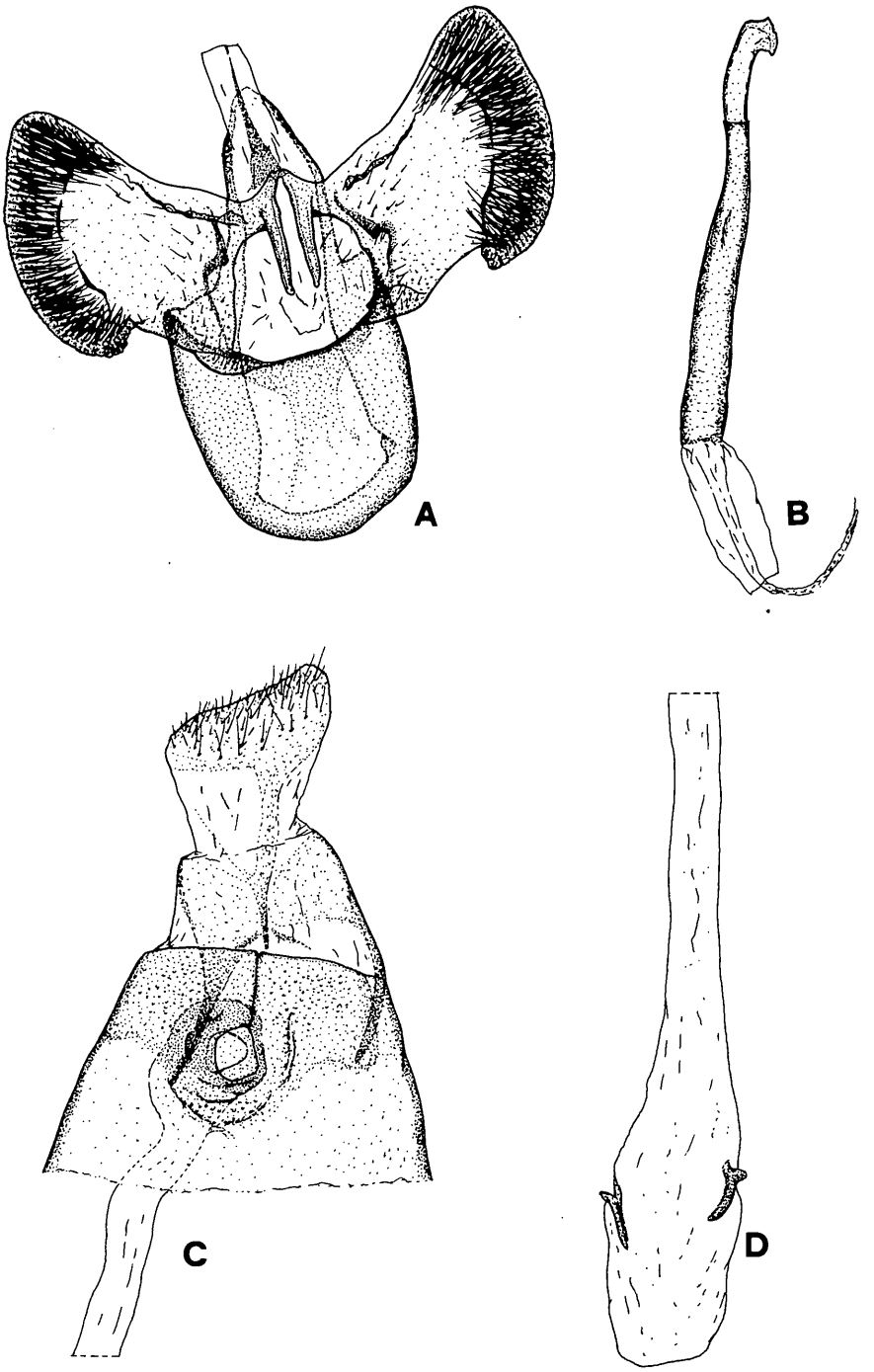

PLATE III. A - D: *Aspilapteryx tringipennella* Z. A: Male genitalia; B: Aedoeagus; C: Female genitalia; D: Bursa copulatrix.

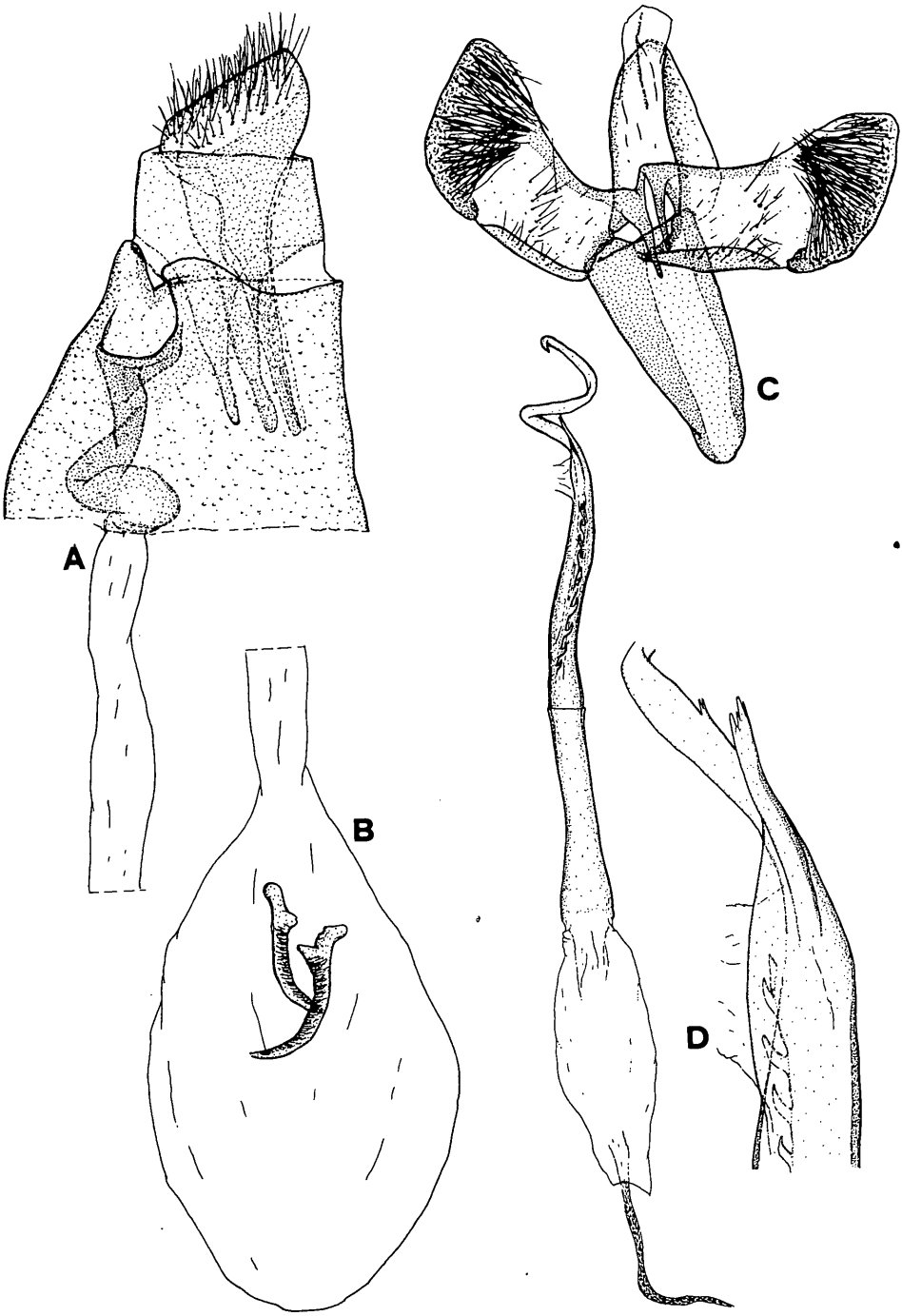

PLATE IV. A - D: *Aspilapteryx multipunctella* CHRÉT. A: Female genitalia; B: Bursa copulatrix; C: Male genitalia; D: Aedoeagus.

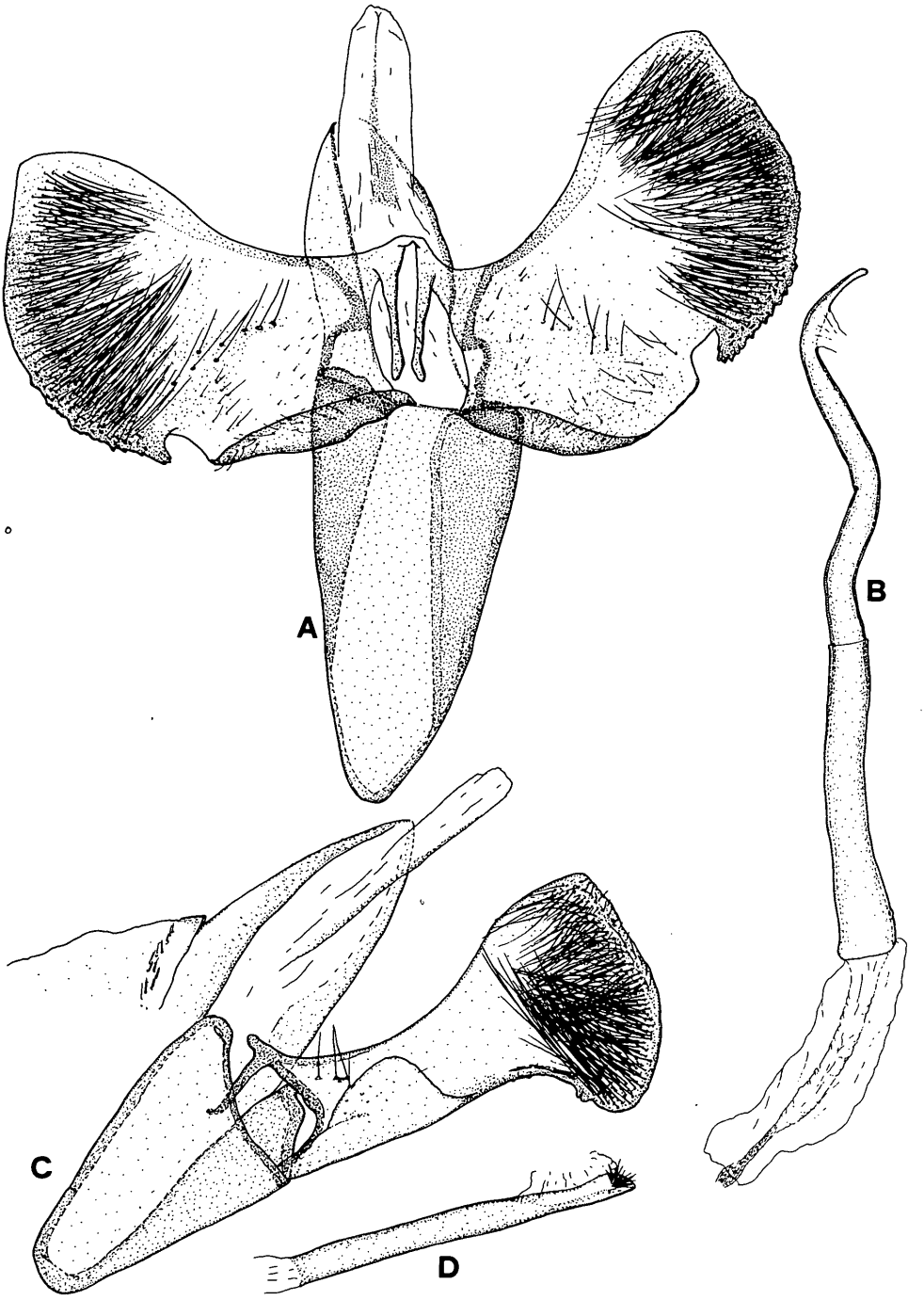

PLATE V. A - B: *Aspilapteryx magna* n. sp. A: Male genitalia; B: Aedoeagus. – C - D: *A. seriata* MEYR. C: Male genitalia; D: Aedoeagus.

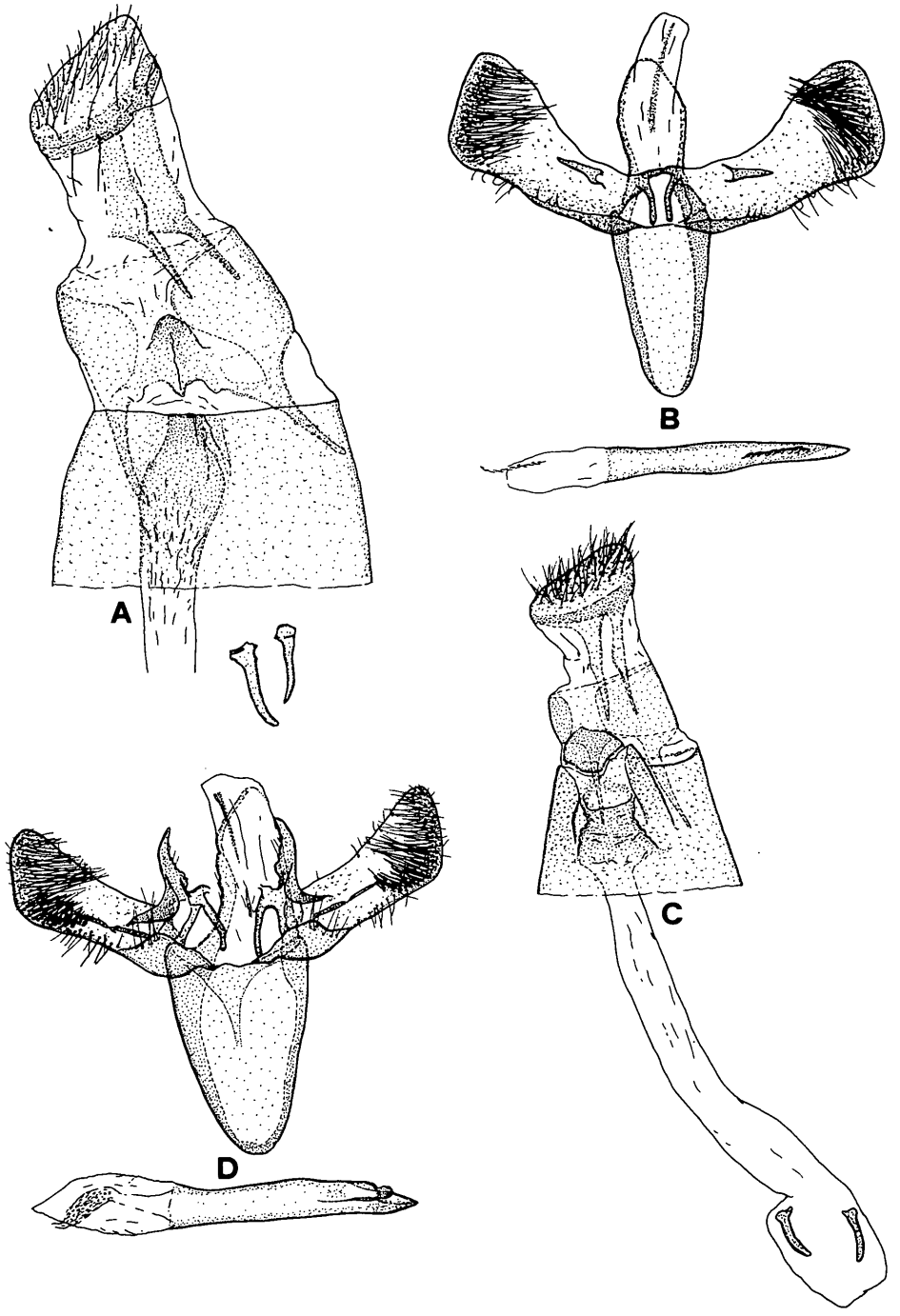

PLATE VI. A - B: *Aspilapteryx inquinata* n. sp. A: Female genitalia; B: Male genitalia. – C - D: *Aspilapteryx limosella* DUP. C: Female genitalia; D: Male genitalia.

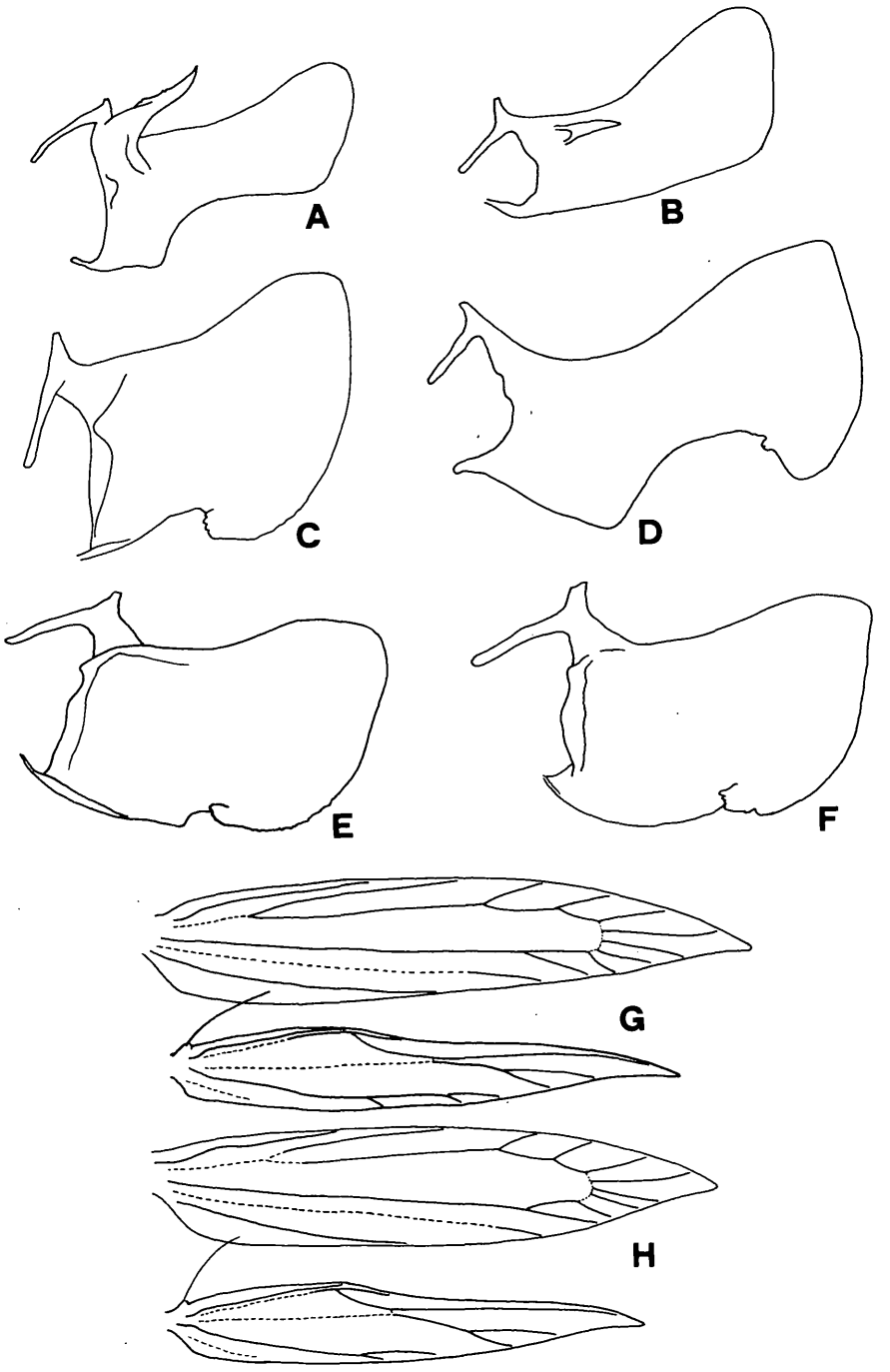

PLATE VII. A-F: valvae. A: *A. limosella* DUP.; B: *A. inquinata* n. sp., C: *A. tringipennella* Z.; D: *A. seriata* MEYR.; E: *A. multipunctella* CHRÉT.; F: *A. magna* n. sp. – G-H: wing venation. G: *A. tringipennella* Z.; E: *A. limosella* DUP.

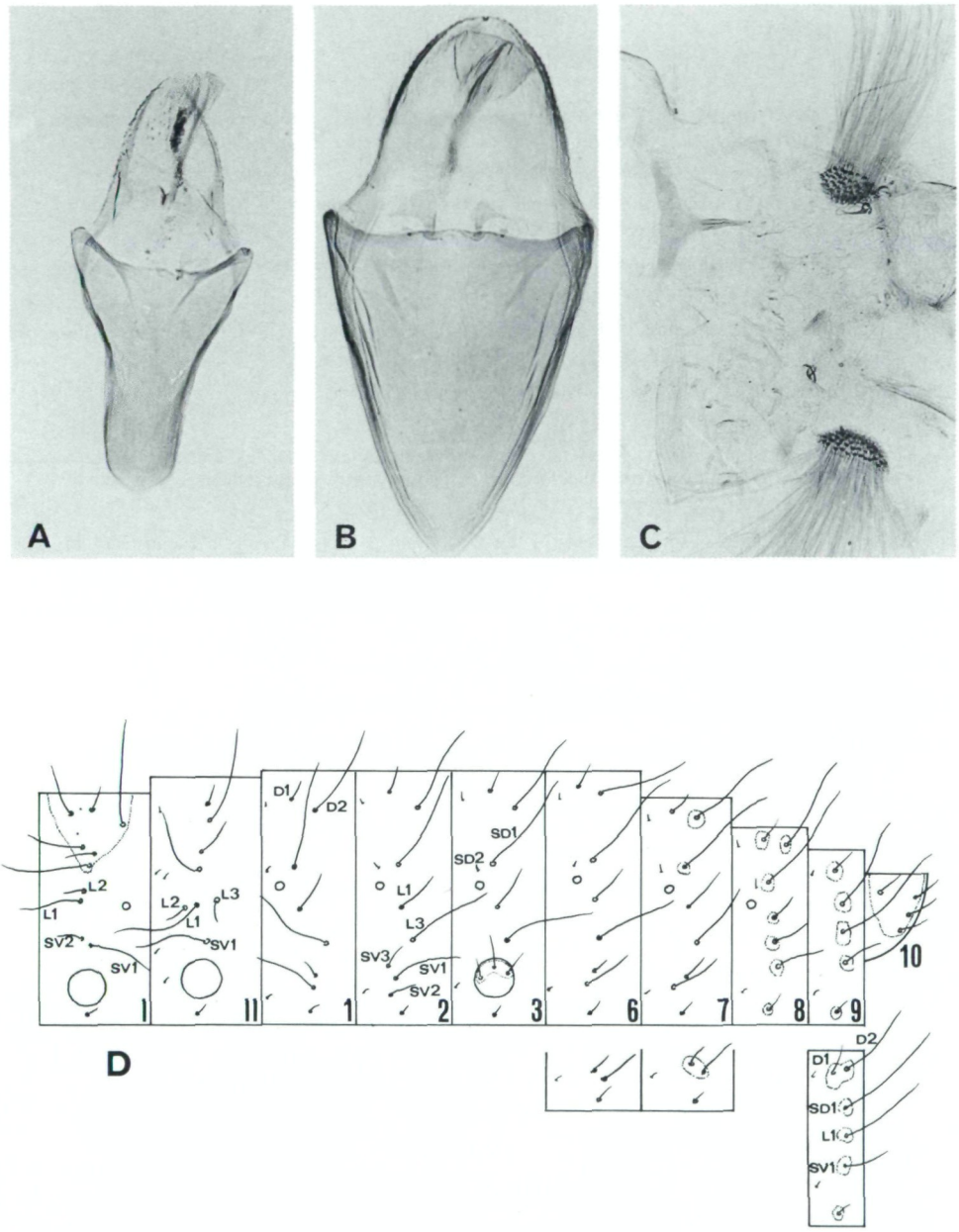

PLATE VIII. A-B: tegumen-vinculum complex. A: *A. inquinata* n.sp.; B: *A. magna* n.sp. – C-D: *A. tringipennella* Z. C: 7th and 8th abdominal segments; D: larval chaetotaxy.

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