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JAPANESE SPECIES OF THE ACROCERCOPS-GROUP  
(LEPIDOPTERA : GRACILLARIIDAE)  
PART II\*

By TOSIO KUMATA, HIROSHI KUROKO  
and V.P. ERMOLAEV

*Abstract*

KUMATA, T., KUROKO, H. and ERMOLAEV, V.P. 1988. Japanese species of the *Acrocercops*-group (Lepidoptera: Gracillariidae), Part II. *Ins. matsum. n. s.* 40, 133 pp., 1 table, 59 figs. (33 text-figs., 26 pls.).

In Part II 25 species of *Acrocercops*-group occurring in Japan are dealt with and are arranged in 9 genera, that is, 5 in *Gibbovalva* (gen. nov.), 2 in *Melanocercops* (gen. nov.), 2 in *Phodoryctis* (gen. nov.), 2 in *Borboryctis* (gen. nov.), 2 in *Leucospilapteryx*, 1 in *Chrysocercops* (gen. nov.), 4 in *Telamoptilia* (gen. nov.), 6 in *Spulerina* and 1 in *Dendrorhycter*. Nine new species are described: *Gibbovalva kobusi* (host: *Magnolia kobus*), *G. magnoliae* (host: *Magnolia ovobata*), *Phodoryctis stephaniae* (host: *Stephania*), *Borboryctis euryae* (host: *Eurya*), *Chrysocercops castanopsidis* (host: *Castanopsis* & *Pasania*), *Telamoptilia tiliae* (host: *Tilia*), *Spulerina castaneae* (host: *Castanea* & *Quercus*), *S. virgulata* (host: *Quercus*) and *S. parthenocissi* (host: *Parthenocissus*). Of them, *Spulerina castaneae* and *S. virgulata* are stem-miners and the rest are leaf-miners. Two new associations of synonyms are proposed: *Gracilaria* (!) *ordinatella* Meyrick, 1880 = *Gibbovalva quadrifasciata* (Stainton, 1863), and *Spulerina lepedezifoliella* Kuroko, 1982 = *Spulerina dissotoma* (Meyrick, 1931). In connection with this study, *Acrocercops elaphopa* Meyrick, 1914 (occurring in India) is transferred to *Melanocercops*, and *Acrocercops malicola* Meyrick, 1921 (in India) to *Spulerina*.

All the genera, whether new or not, are described in detail, and every known species is given the original description followed by an additional description. Genitalia are illustrated for both sexes, and wing patterns are shown by photographs. The wing venation and larval body chaetotaxy are also illustrated for some species. Further the genitalia and wing venation of the type-species of the genera *Spulerina*, *Sauterina*, *Amblyptila* and *Lamprolectica* are illustrated for comparison.

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\* Part I: *Insecta Matsumurana* New Series 38: 1-111.

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## INTRODUCTION

This part, following Part I published in *Insecta Matsumurana New Series* 38, pp. 1-111, deals with the remaining 25 species of the *Acrocercops*-group occurring in Japan except for "*Acrocercops*" *albofasciella* Yazaki. These species are classified in 9 genera, that is, 5 in *Gibbovalva* (gen. nov.), 2 in *Melanocercops* (gen. nov.), 2 in *Phodoryctis* (gen. nov.), 2 in *Borboryctis* (gen. nov.), 2 in *Leucospilapteryx* Spuler, 1 in *Chrysocercops* (gen. nov.), 4 in *Telamoptilia* (gen. nov.), 6 in *Spulerina* Vári and 1 in *Dendrorhycter* Kumata.

## CORRIGENDA TO PART I

"Decheng", the author of *Cryptolectica ensiformis* (p. 17) and *Acrocercops unistriata* (p. 56), should be emended to "Yuan".

On this occasion we apologize to Mr. Yuan Decheng for our mistake.

## IX. GENUS GIBBOVALVA KUMATA ET KUROKO NOV.

Type-species: *Gracilaria* (!) *quadrifasciata* Stainton, 1863.

Etymology: *Gibbovalva* (L.) = *gibbus* (humped) + *valva* (valve); feminine.

♂ ♀. Face and head smooth-scaled, with neckplumes appressed; ocelli absent; proboscis moderately developed, naked. Labial palpus long, drooping or porrect, upturned, smooth or rarely very slightly roughened with scales below; apical segment 1.0-1.1 times as long as 2nd, pointed apically. Maxillary palpus minute, porrect or rarely drooping, smooth or roughened with scales, about 1/3 as long as apical segment of labial palpus. Antenna filiform, 1.0-1.1 times as long as fore wing, simple in both sexes; scape slightly flattened, with a moderately large ventral flap more or less pointed distad. Thorax smooth-scaled, without a dorsal crest. Legs rather long, smooth; middle femur slightly expanded with scales beyond middle; middle tibia thickened apically; hind tibia with a row of bristly scales above and 2 pairs of spurs below, the anterior pair of spurs at basal 1/4-1/3; hind tarsus 1.2-1.3 times as long as hind tibia, with a row of bristly scales on 1st segment like tibia.

Fore wing narrow, lanceolate, pointed or rarely acuminate apically; discoidal cell long, occupying basal 4/5-5/6 of wing, nearly parallel-sided, obliquely truncate distally, with upper vein obsolescent at proximal part far basal to a point where the vein  $R_1$  branches off; 13-veined;  $R_1$  rather short, running from basal 1/3 of cell to middle of costa of wing;  $R_2$  from upper angle of cell;  $R_5$  obsolescent basally, but surely stalked with  $R_4$ ;  $M_2$  from lower angle of cell, separated from or rarely connate with  $M_1$ ;  $M_3$  a little before lower angle;  $Cu_{1a}$  well remote from  $M_3$ , far basal to level of  $R_2$ ;  $Cu_{1b}$  obsolescent basally, probably remote from  $Cu_{1a}$ ;  $Cu_2$  distinct on apical part alone; An weakened entirely, probably connected with dorsal margin at basal 1/6-1/5 of wing. Hind wing linear, about 1/2 as wide as and about 5/6 as long as fore wing, long-pointed apically, with cell opened between  $M_2$  and  $M_3$ ; 7-veined, with venation similar to that of *Acrocercops* and *Dialectica*; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen elongate-oblong or spatulate in ventral view, weakly

sclerotized laterally, not squamose dorsally, with fine setae scattered on lateral areas; tuba analis with a slender subscaphium. Valva narrow, rather long, slightly upturned, usually round apically, with a calceoliform or cupuliform projection from middle of costa; fine setae occurring on inner surface densely; long linear androconial scales scattered on outer surface, especially densely aggregated near base. Vinculum U- or V-shaped, slightly widened ventrally, with a short round saccus. Diaphragma weakly sclerotized ventrally, but not forming a particular shape of juxta. Aedeagus narrow, tubular, attenuate apically, in most species with a flap-like subapical projection nearly encircled the aedeagus; vesica usually with spiniform cornuti; ductus ejaculatorius short to moderate, round cephalad. Eighth abdominal segment deeply notched ventrally; tergite with a slender anterior apodeme, of which the median sclerotization extends caudad near the apex of the tergite; a pair of long, slender, membraneous invaginations from cephalic end of ventral notch. Seventh segment normal in form as in preceding segments.

Female genitalia: Papilla analis moderate in length, blunt dorsally and ventrally in lateral view, setose as usual; apophysis posterioris moderately long, attenuate apically. Eighth abdominal segment shortly sclerotized dorsally, widely membraneous ventrally, with apophysis anterioris slender entirely, about as long as apophysis posterioris. Ostium bursae opened on ventrum of 8th segment, small in opening size, with a weakly sclerotized lamella antevaginalis in most species excluding type-species. Antrum shortly sclerotized, more or less ring-shaped; ductus bursae long, tubular, membraneous or partly sclerotized on caudal area in type-species, shagreened on almost whole length; corpus bursae pyriform, globular or elongate-ellipsoidal, membraneous, with signum absent in most species or present in *G. civica*.

Body chaetotaxy of last instar larva (Fig. 46): Prothorax with 11 tactile setae on each side, the seta L3 and all proprioceptors being absent; XD2 directly lateral to XD1; L1 and L2 anterior to spiracle. Mesothorax and metathorax with 8 tactile setae and 4 proprioceptors on each side, the seta L2 being absent; D1 and SD2 dorsal to D2 and SD1, respectively. First to 8th abdominal segments with 8 to 10 tactile setae and 1 to 2 proprioceptors on each side, seta L2 being absent on all the segments, SV2 and SV3 absent on 1st, 7th and 8th, while SV3 alone absent on 2nd, and V1 and MV3 absent on 8th; D1 anterolateral to D2; L3, if present, posterolateral or directly lateral to L1. Ninth abdominal segment with 5 tactile setae and 1 proprioceptor on each side, setae SD2, L2, L3, SV2, SV3 and V1, and proprioceptor MV3 being absent; D1 usually anterolateral to D2 as in other segments.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments with uniordinal crochets arranged in a circle as in larva of *Acrocercops* and *Dialectica*; anal proleg with crochets in a transverse or semicircular row likewise.

Larval habit: The larva of this genus is a leaf-miner throughout the feeding period; the mine is linear-blotchy and always occurs on the upper surface of young leaves. In the early instars the larva makes a linear gallery, which is epidermal, whitish with a brownish central line. In the late instars, it makes a large blotchy mine; at first the mine is epidermal, blister-like, whitish with an irregularly curved broad brownish line placed in central area, then it is changed to a full-depth type. When fully grown, the larva changes the body colour to crimson-red, then leaves the mine for a pupating site through a semicircular slit. In breeding condition the

cocoon is found on the wall of the case or rarely on the leaf-surface, boat-shaped with an elliptical outline, and covered with a few (usually 2) bubbles on the surface.

Remarks : The new genus *Gibbovalva* is similar to *Amblyptila* Vári (Fig. 58) and *Sauterina* Kuznetsov (Fig. 57) in having a costal projection on the male valva and in the structure of the male pregenital segments, but is at once distinguished from them by the antennal scape with a ventral flap, by the fore wing with the stalked veins  $R_4$  and  $R_5$  and the distinct vein  $Cu_{1b}$  and by the female corpus bursae with signum usually absent. In *Amblyptila* (Fig. 58) and *Sauterina* (Fig. 57), the antennal scape is smooth-scaled, without any hairy pecten or scaly flap; the veins  $R_4$  and  $R_5$  of the fore wing are well separated from each other at base; the vein  $Cu_{1b}$  of the fore wing absent or completely coincident with  $Cu_{1a}$ ; and the female corpus bursae usually has a pair of signa bearing some spiniform spines.

In larval chaetotaxy, on the other hand, *Gibbovalva* is very closely allied to *Eteoryctis* Kumata et Kuroko except for the presence of the proprioceptor MD1 on the 9th abdominal segment, but in wing venation and genital structure the former is very different from the latter, being distinguished by the free veins  $M_2$  and  $M_3$  of the fore wing, the presence of the costal projection of the male valva, the long median sclerotization of the anterior apodeme of the male 8th tergite, and the absence of the valve-like projections of the female ductus bursae.

Among the Japanese species of the *Acrocercops*-group, the following 5 are members of the present genus; 2 of them are associated with Lauraceae, and the others with Magnoliaceae.

#### Key to the Japanese species of *Gibbovalva*

1. Antenna with basal 5-7 segments snow-white. . . . . 2
- Antenna yellowish-ochreous to dark brownish except for white scape. . . . . 3
2. Fore wing with an interspace between 1st and 2nd white fasciae from base suffusedly irrorated with black scales and very contrasted with other ochreous interspaces; 5th or preapical white fascia of fore wing not mixed with blackish scales; male valva with inner surface covered with usual slender setae alone; aedeagus with cornuti very minute and sometimes not visible; female ductus bursae wholly membranous and lined with granules; leaf-miner on *Michelia* spp. . . . . *G. urbana* (Meyrick), comb. nov.
- Fore wing with an interspace between 1st and 2nd white fasciae dark brownish and concolorous with other interspaces; 5th or preapical white fascia of fore wing containing 2 or 3 blackish spots; male valva with inner surface covered with many small lanceolate setae near apex besides usual slender setae; aedeagus with cornuti of thorn-like and needle-shaped spines; female ductus bursae with its caudal 1/3 weakly sclerotized and longitudinally carinated, the remaining part membranous and lined with elongate spinules; leaf-miner on various species of Lauraceae. . . . . *G. quadrifasciata* (Stainton), comb. nov.
3. Thorax brownish, irrorated with dark fuscous; fore wing concolorous with thorax in ground; male aedeagus with cornuti minute and needle-shaped; female corpus bursae with a large patch of signum consisting of many asteriform carinae; leaf-miner on various species of Lauraceae. . . . . *G. civica* (Meyrick), comb. nov.
- Thorax white; fore wing yellowish-ochreous or ochreous-brownish in ground, irrorated with fuscous on costal area alone; male aedeagus with a number of thorn-like cornuti; female corpus bursae wholly membranous, without signum; leaf-miner on Magnoliaceae. . . . . 4
4. Fore wing with 5th or preapical white fascia containing a black median line as in preceding fasciae; male aedeagus rather small, about 6/7 as long as valva, with a semitubular projection enclosing median third of aedeagus; female ductus bursae with an interspace

- between ostium bursae and sclerotized antrum very short, at most twice as long as antrum ; leaf-miner on *Magnolia kobus*. . . . . *G. kobusi* Kumata et Kuroko, sp. nov.
- Fore wing with 5th or preapical white fascia not containing any trace of blackish scales, but internally margined with black very widely ; male aedeagus comparatively large, about as long as valva, without any projection ; female ductus bursae with an interspace between ostium bursae and sclerotized antrum very long, at least 8 times as long as antrum ; leaf-miner on *Magnolia obovata*. . . . . *G. magnoliae* Kumata et Kuroko, sp. nov.

19. *Gibbovalva quadrifasciata* (Stainton), comb. nov.

[Figs. 1, 2, 34(A-B), 41(A), 42(A), 46(A) and 51(A-B)]

*Gracilaria* (!) *quadrifasciata* Stainton, 1863, Trans. Ent. Soc. Lond. (3) 1 : 295, pl. 10(5) [India (W. Bengal) ; host : *Urena lobata* and an unidentified plant].

*Gracilaria* (!) *ordinatella* Meyrick, 1880, Proc. Linn. Soc. N.S. Wales 5 : 145 [Australia (Sydney)]. Syn. nov.

*Conopomorpha ordinatella* : Meyrick, 1907, Proc. Linn. Soc. N.S. Wales 32 : 54 [Australia (Queensland)].

*Acrocercops ordinatella* : Meyrick, 1908, Journ. Bomb. nat. Hist. Soc. 18 : 816 [Ceylon] ; Turner, 1913, Proc. Linn. Soc. N.S. Wales 38 : 177 [Australia (Queensland) ; host : *Litsea dealbata*] ; Meyrick, 1914, Exot. Microlep. 1 : 285 [Ceylon ; host *Litsea* sp.] ; Ibid., 1916, ditto 1 : 624 [India (Kanara, Coorg), Ceylon ; host : *Alseodaphne semecarpifolia*, *Litsea*] ; Fletcher, 1916, Pusa Bull. 59, Note 85 [India (Mysor), Burma ; host : *Litsea*, *Cinnamomum*] ; Ibid., 1920, Mem. Dept. Agr. India, Ent. Ser. 6 : 146 ; Ibid., 1933, Imp. Counc. Agr. Res., Sci. Monogr. 4 : 53 [India (Dehra Dun), Java ; host : *Litsea polyantha*] & 209 [India (Coorg) ; host : *Alseodaphne semecarpifolia*] ; Meyrick, 1936, Exot. Microlep. 5 : 34 [India ; host : *Phoebe lanceolata*] ; Issiki, 1957, Icones Heteroc. Jap. Col. Nat. 1 : 28, pl. 4 (102) [Japan (Honsyū), Taiwan, India ; host : *Persea thunbergii*, *Cinnamomum japonicum*, *C. camphora*, *Persea americana*] ; Kuroko, 1982, Moths Jap. 1 : 188, & 2 : pl. 6(16) [Japan (Nansei Is., Ryūkyū Is.), Sri Lanka, Australia ; host : *Cinnamomum camphora*].

Original description of *G. quadrifasciata* : “Exp. al. 3 lin. Head and face whitish. Labial palpi white, faintly spotted with pale grey. Maxillary palpi imperceptible. Antenna white at the base, then fuscous, with paler annulations. Anterior wings white, with four rather oblique tawny-brown fasciae (the 3rd and 4th united by a streak along the disc), and between them a few scattered black scales ; the first fascia lies near the base and is rather furcate towards the costa, inclosing a white spot there ; the second fascia is placed a little before, and the third a little beyond the middle ; from the middle of the latter a tawny-brown streak runs along the disc, connecting it with the fourth fascia ; this on one wing (the right one) is rather clearly furcate on both margins, but on the other wing this tendency is hardly perceptible ; in the apex is a small violet spot ; cilia pale grey, intersected by some dark scales around the hind margin. Posterior wings grey, with paler cilia. Abdomen above grey, beneath pearly-white, with black bars. Anterior legs : tibiae white, with dark grey patch at the base and another at the tip ; tarsi white, spotted with black ; middle legs — femora whitish ; tibiae white, with two black blotches ; tarsi white, with black spots. Posterior legs : femora whitish ; tibiae and tarsi white, with black spots.”

Original description of *G. ordinatella* : “♀. 4”. Head and thorax ochreous-white. Maxillary palpi whitish, terminal joint fuscous. Labial palpi whitish, a broad apical ring on second joint, a median and an apical ring of terminal joint dark fuscous. Antennae ochreous-white, becoming obscurely dark fuscous at apex. Abdomen above fuscous-grey, beneath white with black rings. Legs white ; anterior and middle tibiae somewhat thickened, base narrowly and apex broadly black, tarsi with two black rings ; posterior tibiae stiff-haired above, with median and apical black bands, tarsi with bases of joints narrowly and central of first and second joints broadly black-banded. Fore-wings greyish-ochreous, irrorated with blackish, along costa suffused with blackish, with three fasciae and two spots white, spotted with black and edged with black scales ; first fascia at 1/4, perpendicular, broader on inner margin and suffusedly produced on inner margin towards base, containing costal, discal, and dorsal black spots ; the basally produced portion projects across disc close to base, between which and the fascia is white dot below costa ; second fascia from costa slightly before middle, outwardly oblique, evenly broad, irregularly margined, containing large

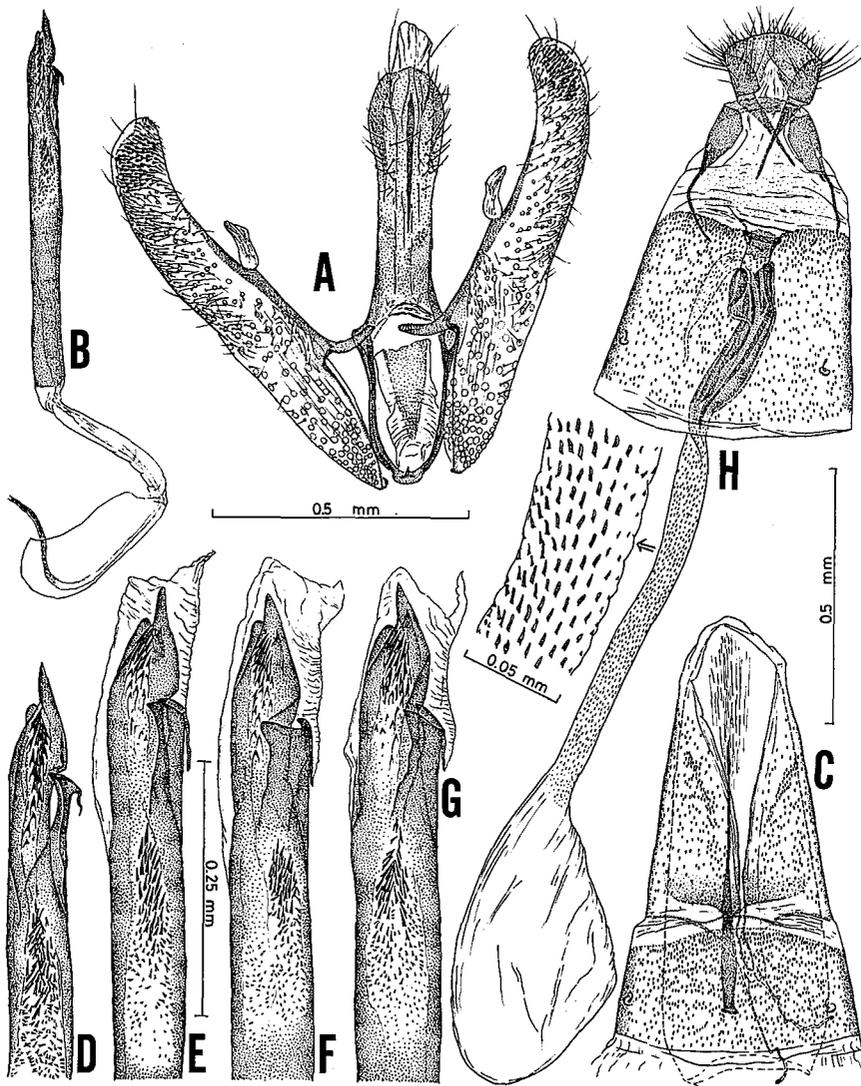


Fig. 1. *Gibbovalva quadrifasciata* (Stainton). A: Male genitalia in caudal view, aedeagus omitted [Grc-1756, Mugiō, Yaku-sima, Nansei Is., em. 2/xi/1973, ex *Persea thunbergii* (1195)] — B: Aedeagus [ditto] — C: Male 7th and 8th abdominal segments [ditto] — D: Apical part of aedeagus enlarged [ditto] — E: Ditto [Grc-3033, Tosasimizu, Kōti-ken, em. 11/xi/1980, ex *P. thunbergii* (2271)] — F: Ditto [BM-24135, determined as *Acrocercops ordinatella* by Meyrick, Kuranda, Queensland, N. Australia, vi/1904, Dodd leg.] — G: Ditto [BM-24137, syntype of *Gracilaria quadrifasciata*, India, Calcutta, 1858, Atkinson leg.] — H: Female genitalia in ventral view [Grc-1757, Mugiō, Yaku-sima, em. 2/xi/1973, ex *P. thunbergii* (1195)].

subcostal and discal black spots, and a few black scales on inner margin; third fascia from costa slightly before 3/4, parallel to second, narrower, and partially interrupted on disc, containing large subcostal black spot; a small irregular partially black-centred costal spot at 5/6; a rather large apical spot, containing a few black scales; cilia dark fuscous-grey, with a blackish line round apex.

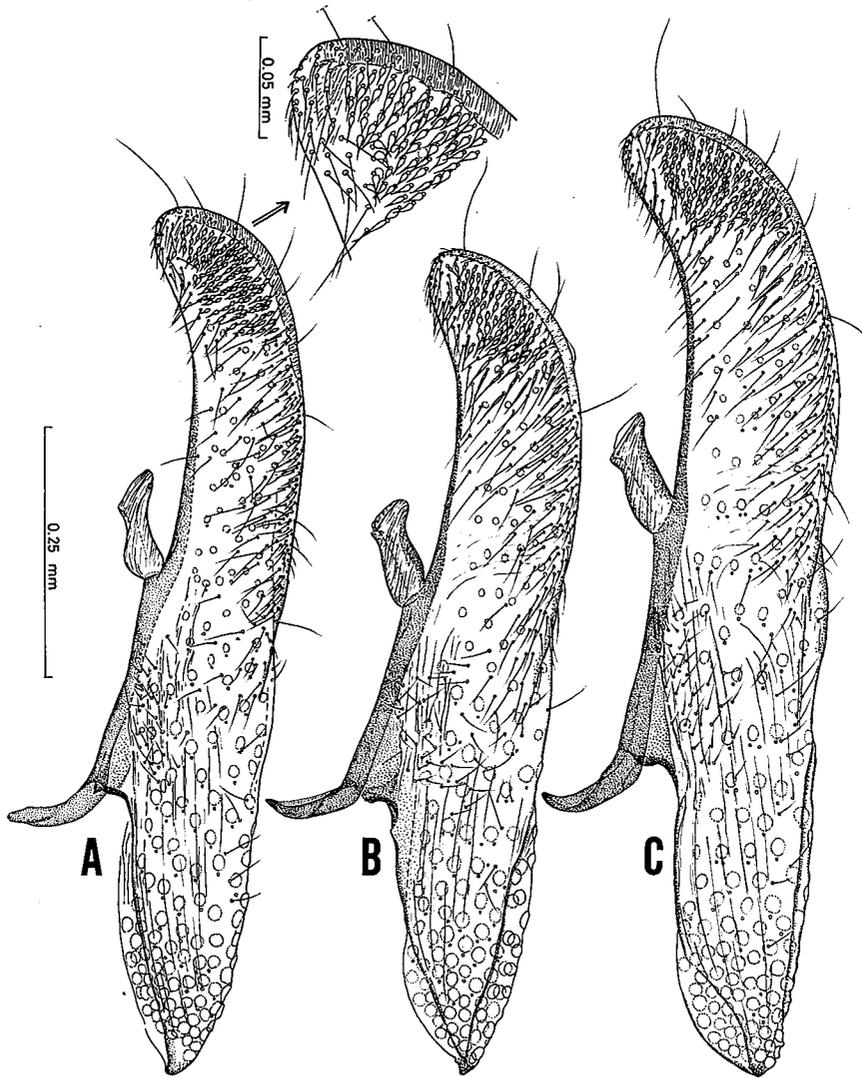


Fig. 2. *Gibbovalva quadrifasciata* (Stainton). A: Right valva [Grc-1756] — B: Ditto [BM-24137] — C: Ditto [BM-24135].

Hind-wings dark fuscous, cilia fuscous-grey.”

Additional description: ♂ ♀. Expanse of wings: 5.8–8.0 mm (7.00 mm on an average of 20 specimens). Length of fore wing: 2.8–4.0 mm (3.43 mm on an average of 20 specimens).

Colour-pattern of whole surface rather variable, especially in wing-markings which are sometimes slightly different between the left and right wings of the same specimen as mentioned in the original description of *quadrifasciata*. Face usually

grayish except on anterior margin; head whitish, slightly tinged with ochre in a few specimens. Antenna with basal 6 to 7 segments white, the remainings dark grayish-brown with faint paler annulations; scape white, with a tuft of scales grayish to blackish basally. Fore leg with coxa banded with black medianly and apically; hind leg with femur spotted with black medianly. Thorax whitish, slightly tinged with ochre in some specimens; tegulae blackish-brown except for white lateral margins. Fore wing with the 1st dark brown fascia near base usually detached from dorsal margin of wing; brownish lines connecting between the 3rd and 4th brownish fasciae, variable in width, sometimes wider than white parts; the 3rd fascia slightly detached from dorsal margin in about 10% of specimens examined; cilia with a curved apical fringe-line of black irrorations around apex of wing.

Male genitalia (Figs. 1: A-G, & 2): Tegumen elongate-spatulate in ventral view, densely covered with acute spines on lateral and dorsal surfaces and more minute spines on ventral surface near base; 20-25 fine setae scattered on each lateral surface near apex, apical setae and other 2-4 are longer; tuba analis with a long subscaphium. Valva about 1.5 times as long as tegumen, rather slender, slightly upcurved near apex, nearly parallel-sided or slightly tapering apically, with a calceoliform projection at middle of costal margin; small lanceolate setae clustered on inner surface near apex, and usual slender setae scattered near ventral and apical margins and costal area before calceoliform projection; long androconial scales scattered on outer surface, becoming denser towards base of valva. Vinculum short, with saccus minute. Aedeagus a little shorter than valva, tubular, bifurcated apically, one prong longer and acute and the other round; a semitubular short projection produced from subapex of aedeagus, hanging over a small concavity of aedeagus, with its lateral corners acute; vesica with 15-20 thorn-like cornuti near apex and many needle-shaped cornuti around median area. Eighth abdominal segment elongate, about twice as long as the 7th, deeply notched ventrally; dorsocephalic apodeme narrow, truncated apically, with a sclerotization extending to cephalic half of 8th tergite; a pair of ventral invaginations string-like, 1.5-2 times as long as dorsal apodeme. (Seven slides examined.)

Female genitalia (Fig. 1: H): Papilla analis rather short, obtuse dorsally and ventrally, covered with microspines around caudal area densely and usual setae rather sparsely; apophysis posterioris moderate in length, a little shorter than apophysis anterioris. Ostium bursae rather large; antrum shortly sclerotized; ductus bursae long, slender, with its caudal 1/3 a little widened, weakly sclerotized and longitudinally carinated, then remaining cephalic 2/3 membranous and rather densely scobinated with elongate spinules as shown in Fig. 1: H; corpus bursae pyriform, membranous, without scobination and signum. (Seven slides examined.)

Specimens examined: 73♂♂ & 86♀♀. SIKOKU — 8♂♂ & 5♀♀, Tosasimizu, Kōti-ken, em. 10-25/ix/1980, ex *Persea thunbergii* (2271). NANSEI Is. — 23♂♂ & 35♀♀, Mugiō, Yaku-sima, em. 31/x-9/xi/1973, ex *P. thunbergii* (1195); 8♂♂ & 15♀♀, ditto, em. 29/x-11/xi/1973, ex *Cinnamomum camphora* (1179); 22♂♂ & 16♀♀, Onoaida, Yaku-sima, em. 2-11/xi/1973, ex *Litsea japonica* (1222); 2♂♂, Yaku-sima, 14-19/x/1973. RYŪKYŪ Is. — 6♂♂ & 7♀♀, Bannadake, Isigaki, em. 20-24/iv/1985, ex *P. thunbergii* (2539), M. Takeda leg.; 1♂ & 5♀♀, Iriomote, 18/iv/1962, G. Kuno leg.; 1♂, Sonai-dake, Iriomote, em. 25/iv/1985, ex *Persea* sp. (2534), M. Takeda leg.; 1♀, Hunaura, Iriomote, 12/xi/1982, T. Tanabe leg. AUSTRALIA — 1♂, Kuranda, Queensland N., vi/1904, Dodd., Walsingham coll. 1910-427, *Acrocercops ordinatella* Meyr., Gen. sl. no. BM-24135; 1♀, Queensland, Att., 11/5/03, determined as *Acrocercops ordinatella* Meyr. by Meyrick, Gen. sl. no.

BM-24136 ; both deposited in British Museum (N.H.). INDIA — 1♂ & 1♀, syntypes of *Gracilaria quadrifasciata* Stainton, Calcutta, 1858, Atkinson, Stainton coll. 1893-134, Gen. sl. nos. BM-24137 (♂) and BM-24138 (♀) ; both in British Museum (N.H.).

Distribution : Japan (Honsyū ; Sikoku ; Nansei Is. ; Ryūsyū Is.) ; Taiwan ; Australia ; Indonesia (Java) ; Burma ; India ; and Sri Lanka.

Food plants : *Persea thunbergii* Kost., *Litsea japonica* Juss., *Cinnamomum camphora* Sieb., and *C. japonicum* Sieb. in Japan ; *Persea americana* Mill. in Taiwan ; *Litsea dealbata* in Australia ; *Alseodaphne semecarpifolia*, *Cinnamomum* sp., *Litsea polyantha*, and *Phoebe lanceolata* in India ; and *Litsea* sp. in Sri Lanka ; all belong to Lauraceae.

In his original description, Stainton (1863) gave *Urena lobata* (Malvaceae) and an unidentified plant as foods of this species. He stated that 5 specimens were bred from *Urena lobata* and 6 from an unidentified plant. All the specimens of the type series examined, however, should have reared from his "unidentified plant", which, according to our opinion, should be a kind of Lauraceae. [See also Remarks.]

Remarks : Although Meyrick (1916) stated that "the name [*quadrifasciata*] must be restricted to the specimens bred from . . . . *Urena lobata* (Malvaceae) ; Stainton erroneously included with them another set of specimens bred from . . . . an unidentified plant", we have found that all the syntypes of *Gracilaria quadrifasciata* Stainton deposited in British Museum (N.H.) should be conspecific. There were mixed no specimens to be determined as *Acrocercops cathedraea* Meyrick which is now well known as a leaf-miner specific to *Urena lobata* in tropical to subtropical Asia. These syntypes quite agree with the holotype of *Gracilaria ordinatella* Meyrick deposited in the Museum, so far as the colour-pattern is compared. Moreover, we have examined the genitalia of both the sexes of the Australian specimens determined by Meyrick as *ordinatella* and the syntypes of *quadrifasciata* from India, and then we have concluded that the specimens of both the series are conspecific. Based on these facts, we would propose here that *Gracilaria ordinatella* Meyrick, 1880 is a junior synonym of *Gracilaria quadrifasciata* Stainton, 1863.

This species is easily distinguished from the related species by the long whitish basal part of the antenna and by the presence of a group of small lanceolate setae on the apical area of the valva.

## 20. *Gibbovalva civica* (Meyrick), comb. nov.

[Figs. 3, 4, 34(C-D), 42(B) and 51(C)]

*Acrocercops civica* Meyrick, 1914, Journ. Bomb. nat. Hist. Soc. 23 : 119 [India (Kanara) ; host : *Cinnamomum zeylanicum*] ; Fletcher, 1920, Mem. Dept. Agr. India, Ent. Ser. 6 : 212.

Original description : "♂♀. 6 mm. Head whitish mixed with fuscous. Palpi with appressed scales, white, with two bands on second joint and three on terminal dark fuscous. Thorax brownish irrorated with dark fuscous. Abdomen grey, beneath white, sides irregularly barred with dark fuscous. Forewings extremely narrow, elongate-lanceolate ; brownish, irrorated with dark fuscous, costa suffused with dark fuscous, dorsum sometimes more or less strigulated with white ; four transverse fasciae composed each of a pair of white striae more or less connected in disc but separated with dark fuscous at extremities, more widely on dorsum, first at 1/3, second beyond middle, third at 2/3, fourth at 5/6, less well marked ; a slender white transverse bar before apex, enlarged on costa and sometimes containing a dark fuscous speck : cilia pale grey, round apex with two dark grey lines. Hindwings grey ; cilia light grey."

Additional description: ♂ ♀. Expanse of wings: 6.8–8.5 mm (7.46 mm on an average of 20 specimens). Length of fore wing: 3.3–4.2 mm (3.65 mm on an average of 20 specimens).

Face whitish, usually darkened posteriorly; maxillary palpus whitish, with apex blackish. Antennal scape whitish, narrowly blackish apically, with a lower tuft of dark fuscous scales; pedicel whitish; flagellum dark grayish-brown, obscurely annulated with pale colour. Legs brownish-black in ground; fore coxa whitish, with a median blackish blotch and an apical one; fore femur and middle tibia each with 3 small whitish spots; hind femur whitish, with apical and postmedian areas blackish; hind tibia with 2 narrow subbasal bands and a subapical one whitish, the median area between these bands widely grayish; all tarsi with 6 white rings at nearly equal intervals.

Fore wing with white markings tinged with ochre in some specimens, but the shape and position well fitted with the original description; a small, round, dark fuscous spot situated at apex of wing just beyond preapical whitish transverse bar, and containing a few brownish scales in its centre; cilia around apex of wing pale

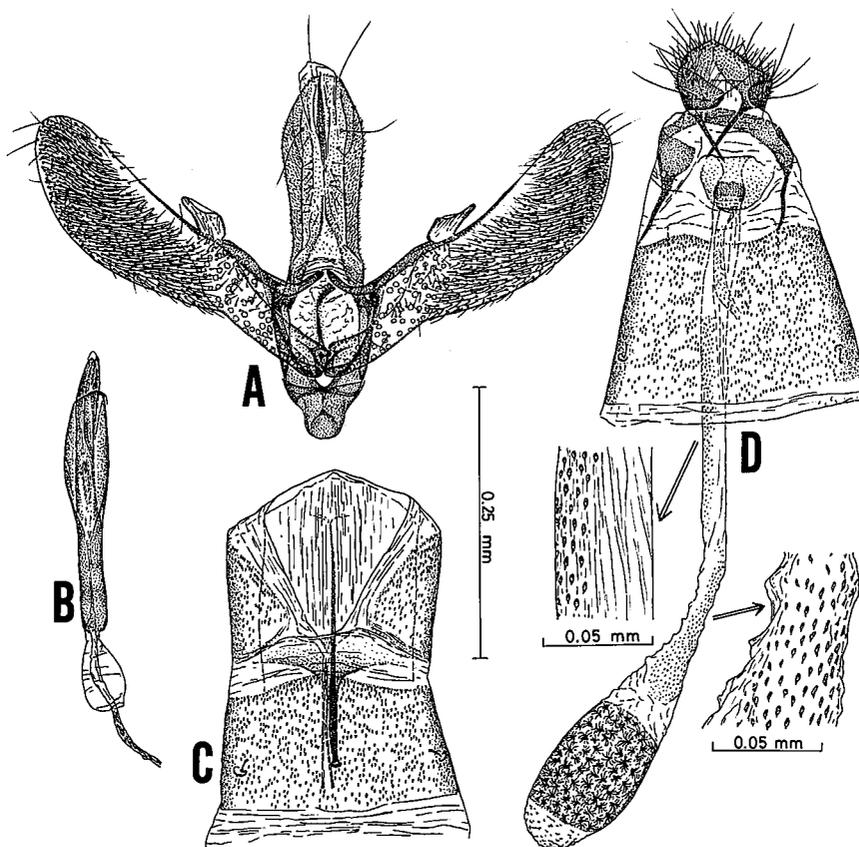


Fig. 3. *Gibbovalva civica* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-1776, Kuriô, Yaku-sima, Nansei Is., em. 11/xi/1973, ex *Cinnamomum daphnoides* (1217)] — B: Aedeagus [ditto] — C: Male 7th and 8th abdominal segments in ventral view [ditto] — D: Female genitalia in ventral view [Grc-1779, ditto, em. 3/xi/1973].

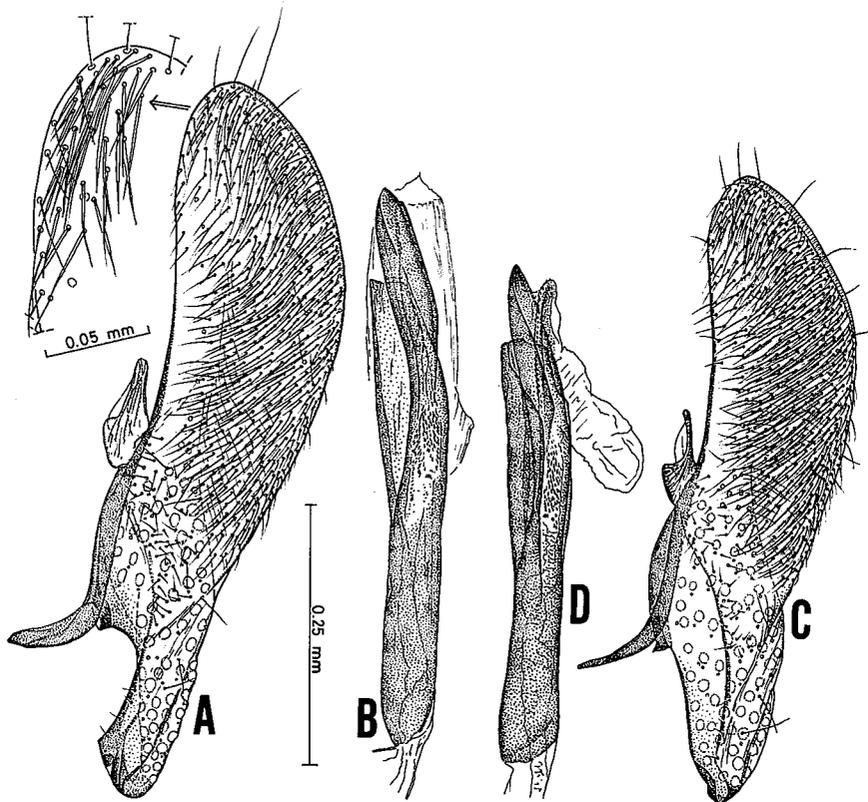


Fig. 4. *Gibbovalva civica* (Meyrick). A : Right valva [Grc-1776] — B : Aedeagus [ditto]  
 — C : Right valva [BM-24134, syntype of *Acrocercops civica*, Karwar, Kanara, 27/vii/  
 '11] — D : Aedeagus [ditto].

gray, with 2 dark gray fringe lines, which are sometimes interrupted with 2 whitish dashes at middle of termen and at the tornus; cilia along dorsal margin gray with ochreous tinge.

Male genitalia (Figs. 3: A-C, & 4): Tegumen moderate in length, nearly parallel-sided and round apically in ventral view, covered with spinules on almost whole surface; 10-15 fine setae scattered in a row on each lateral surface, the apical seta and subapical one being longer; tuba analis with a narrowly sclerotized subsca-phium. Valva about 1.5 times as long as tegumen, very slightly upcurved, widely round on ventral margin beyond basal 1/4, covered with usual slender setae on inner surface very densely and long androconial scales on outer surface near base rather sparsely, with a cupuliform projection produced just before middle of costal margin. Vinculum rather wide, with saccus short and round apically. Anellus with a narrowly sclerotized ventral juxta. Aedeagus about 3/4 as long as valva, tubular, slightly curved, bluntly pointed apically, with semitubular flap-like projection produced from basal 1/3 of aedeagus, the projection reaching apical 1/6 of aedeagus and round apically; vesica with very minute spines arranged in a double or triple row near apex of aedeagus and very short needle-shaped spines clustered in a group

near the middle. Eighth abdominal segment a little longer than the 7th, deeply notched ventrally; dorsocephalic apodeme narrow, more or less capitated apically, with a slender sclerotization extending onto cephalic 2/3 of 8th tergite; a pair of ventral invaginations very slender, a little longer than dorsal apodeme. (Six slides examined.)

Female genitalia (Fig. 3 : D) : Papilla analis short, covered with spinules densely and usual setae sparsely; apophysis posterioris moderate in length, about as long as apophysis anterioris, slender, straight. Ostium bursae rather small, with a weakly sclerotized, large lamella antevaginalis. Antrum shortly sclerotized, ring-shaped; ductus bursae slender, membranous, partly scobinated with spinules from caudal 1/5 to cephalic end along one side, the spinules becoming larger caudad and cephalad; corpus bursae rather small, ellipsoidal, with a large patch of signum consisting of many small asteriform carinae. (Seven slides examined.)

Specimens examined: 52♂♂ & 68♀♀. HONSYŪ — 3♂♂ & 6♀♀, Kii-Ōsima, Wakayama-ken, em. 7-11/x/1974, ex *Cinnamomum camphora* (1341). SIKOKU — 7♂♂ & 2♀♀, Ino, Kōti-ken, em. 1-7/xi/1980, ex *C. camphora* (2216); 3♂♂ & 6♀♀, Usa, Kōti-ken, em. 31/x-6/xi/1980, ex *C. camphora* (2220); 7♂♂ & 11♀♀, Tosasimizu, Kōti-ken, em. 4-10/xi/1980, ex *C. japonicum* (2235 & 2270); 7♂♂ & 8♀♀, Asizuri, Kōti-ken, em. 6-10/xi/1980, ex *C. japonicum* (2251). KYŪSYŪ — 5♂♂ & 4♀♀, Hukuoka-si, em. 21/vi/1957, ex *Persea thunbergii* (229). TUSIMA — 1♀, Kamitusima, 19/x/1977; 8♂♂ & 13♀♀, Mine, em. 2-12/xi/1977, ex *C. sieboldii* (2110). NANSEI Is. — 4♂♂ & 5♀♀, Kuriō, Yaku-sima, em. 3-12/xi/1973, ex *C. daphnoides* (1217). RYŪKYŪ Is. — 1♂, Naze, Amami-Ōsima, 26/iv-5/v/1967, ex *Neolitsea sericea* (880), H. Takizawa leg.; 6♂♂ & 11♀♀, Sueyosi, Okinawa, em. 2/iv-7/v/1985, ex *N. sericea* (2547), M. Takeda leg. INDIA — 1♂ & 1♀, Kanara, Karwar, 6, 27/7/11, Pres. by Sir R. Maxwell 1951-22, *Acrocercops civica* Meyrick, Gen. sl. nos. BM-24134 (♂) and BM-24133 (♀).

Distribution: Japan (Honsyū; Sikoku; Kyūsyū; Tusima; Nansei Is.; Ryūkyū Is.); and India (Kanara).

Food plants: *Cinnamomum camphora* Sieb., *C. daphnoides* Sieb. et Zucc., *C. japonicum* Sieb., *C. sieboldii* Meisn., *Neolitsea sericea* Koidz., and *Persea thunbergii* Kost. in Japan; and *Cinnamomum zeylanicum* in India; all belong to Lauraceae.

Remarks: *G. civica* is closely related to the preceding *G. quadrifasciata* which is another upper leaf-miner of Lauraceae, but is separated from the latter by the antenna with scape and pedicel alone whitish, by the ground colour of the fore wing a little more ochreous than that of *G. quadrifasciata*, by the male valva covered with normal setae alone on the inner surface and lacking small lanceolate steae as seen in *G. quadrifasciata*, and by the female corpus bursae having a large signum consisting of small asteriform carinae.

## 21. *Gibbovalva urbana* (Meyrick), comb. nov.

[Figs. 5, 34(E-F), 41(B), 42(C) and 46(B)]

*Acrocercops urbana* Meyrick, 1908, Journ. Bomb. nat. Hist. Soc. 18: 816 [India (Khasi Hills)].

Original description: "♀. 9 mm. Head white. Palpi white, second joint with two dark grey rings, apical scales somewhat projecting, terminal joint with traces of a grey median ring. Antennae light greyish, white towards base. Thorax white, anteriorly mixed with blackish. Abdomen grey, beneath white with median and apical black bands. Legs white ringed with black. Forewings very narrow-lanceolate; white; four rather oblique parallel fasciae; first almost basal, light yellow-brownish, very undefined, second broad, blackish, third moderate, light brownish, becoming black on costa, fourth narrow, light brownish, mixed with black on costa; between each

pair of these fasciae is a series of three small black dots, costal, discal, and dorsal; a blackish apical patch, preceded by a slender oblique pale brownish streak, and some scattered blackish scales: cilia whitish-ochreous, round apex greyish with a black postmedian line, at apex with a white basal spot followed by blackish. Hindwings grey; cilia light grey."

Additional description: ♂ ♀. Expanse of wings: 6.0-9.0 mm (7.54 mm on an average of 20 specimens). Length of fore wing: 2.9-4.4 mm (3.70 mm on an average of 20 specimens).

Face white, mixed with grayish scales posteriorly; head snow-white; maxillary palpus white, blackish at apex. Antenna with basal 5-6 segments whitish, remaining segments pale ochreous-gray with slightly paler annulations; scape and its ventral tuft of scales snow-white, with a very small blackish spot at apex of scape. Thorax white dorsally, blackish laterally, with a narrow, oblique white streak on each side; tegulae white, mixed with blackish scales anteriorly. Legs white; fore coxa with a median blackish band and an apical one ventrally; anterior 4 femora and tibiae blackish, with 1 or 2 small spots, while the middle tibia with a broad median ring and a narrow subapical one white; hind coxa with a small subapical spot, the femur with a median band, the tibia with a small basal band, a large median one and a moderate apical one, all these marks are blackish; all tarsi with 5 or 6 blackish rings equidistantly. Abdomen grayish dorsally, white ventrally, with 3 blackish lateral bands.

Fore wing white in ground colour, with 4 light yellowish-brown, slightly oblique, parallel fasciae; the 1st almost basal, but detached from base and dorsal margin of wing, widened costally, mixed with black scales and enclosing 1 or 2 white spots on its costal area; the 2nd premedial, rather broad, always darker than other fasciae, usually suffusedly mixed with black scales entirely or rarely margined with black scales costally, internally and externally; the 3rd postmedial, moderate in width, becoming black towards costa; the 4th broadest of fasciae, extending on wing from basal 4/6 to 5/6, slightly sinuate, edged with black on internal and external margins, and enclosing a white, black-edged costal strigula and 1 or 2 white dorsal spots; interspaces between these fasciae each with a series of small black dots as described originally; preapical fascia of white ground colour much narrowed dorsally, never mixed with blackish scales, and followed by a blackish apical patch, which encloses brownish scales in its centre; cilia as in original description.

Male genitalia (Figs. 5: A-E): Tegumen elongate-spatulate with a blunt apex in ventral view, densely covered with acute spinules on dorsal and lateral surfaces and more minute spinules on basal area of ventral surface; a long apical seta and 15-20 shorter ones arranged in a row along each lateral edge of tegumen; tuba analis with a slender subscaphium. Valva about 1.7 times as long as tegumen, very slightly incurved, widely round on ventral margin at postmedian area, covered with usual setae on almost whole inner surface densely and long androconial scales on basal area of outer surface rather sparsely, with a short jar-shaped projection situated just before middle of costal margin. Vinculum moderate in length, with a round saccus. Aedeagus about 4/5 as long as valva, tubular, almost straight, acutely pointed apically, with a semitubular flap-like projection enveloping aedeagus from apical 4/7 to 2/7; vesica with cornuti of a few minute spines arranged in a row at median area of aedeagus, but sometimes hardly visible. Eighth abdominal

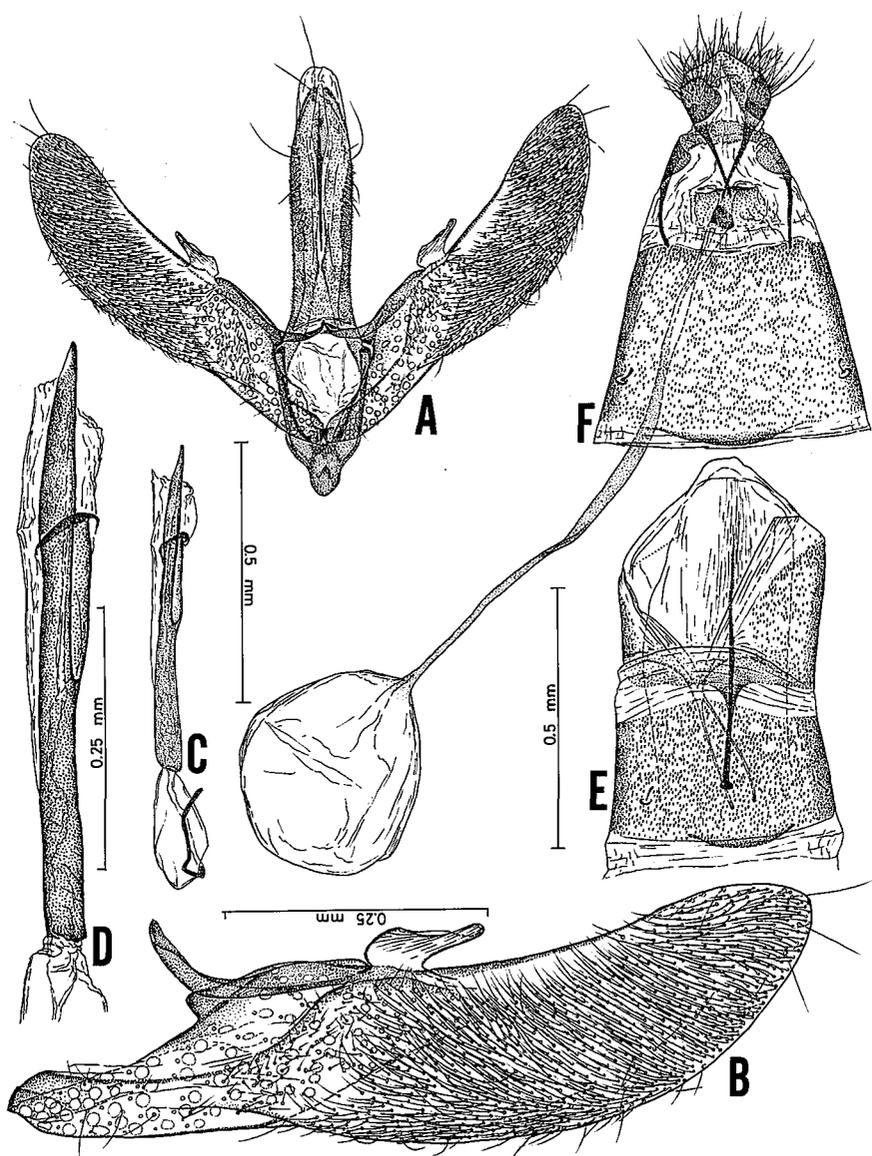


Fig. 5. *Gibbovalva urbana* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-1759, Mugiō, Yaku-sima, Nansei Is., em. 3/xi/1973, ex *Michelia compressa* (1194)] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Aedeagus enlarged [Grc-1758, ditto, em. 7/xi/1973] — E: Male 7th and 8th abdominal segments in ventral view [Grc-1759] — F: Female genitalia in ventral view [Grc-1760, ditto, em. 3/xi/1973].

segment a little longer than the 7th, deeply notched ventrally; dorsocephalic apodeme bar-shaped, more or less capitated apically, with a slender sclerotization extending to cephalic 3/4 of 8th tergite; a pair of ventral invaginations string-like, slightly longer than dorsal apodeme. (Three slides examined.)

Female genitalia (Fig. 5 : F) : Papilla analis rather short, oblong in lateral view, covered with spinules and usual setae rather densely ; apophysis posterioris moderate in length, nearly as long as apophysis anterioris, and narrowed apically. Ostium bursae small, covered with weakly sclerotized lamella antevaginalis, which is finely spinulate. Antrum shortly sclerotized, ring-shaped, but always tapering caudally ; ductus bursae long, tubular, narrowing towards corpus bursae, membraneous, lined with dense granules except for caudal 1/4, the granules becoming more minute towards corpus bursae, which is globular, wholly membraneous without any signum and granulation. (Five slides examined.)

Specimens examined : 17 ♂♂ & 13 ♀♀. HONSYŪ — 2 ♀♀, Kii-Ōsima, Wakayama-ken, em. 6/viii/1955, ex *Michelia compressa*, S. Issiki leg., determined as *Acrocercops ordinatella* by Issiki, 1957 ; 2 ♂♂ & 1 ♀, ditto, em. 11-14/x/1974, ex *M. compressa* (1340). TUSIMA — 5 ♂♂ & 4 ♀♀, Taturayama, Izuhara, em. 30/x-6/xi/1977, ex *M. compressa* (2040). NANSEI IS. — 10 ♂♂ & 6 ♀♀, Mugiō, Yaku-sima, em. 30/x-7/xi/1973, ex *M. compressa* (1194).

Distribution : Japan (Honsyū ; Tusima ; Nansei Is.) ; and India (Khasi Hills).

Food plant : *Michelia compressa* Sarg. (Magnoliaceae) in Japan.

Remarks : *G. urbana* is very similar to the preceding 2 species in the basic colour-pattern of the fore wing, but is distinguished from them by the following points : the premedial fascia of the fore wing is much darker brown (even blackish in most specimens) than the others which are pale yellowish-brown ; the preapical white fascia is triangular and does not enclose blackish spot ; and the ventral scale-tuft of the antennal scape is white as well as the scape itself. Moreover, it is easily separated from *G. quadrifasciata* by the valva without small lanceolate scales in the male and by the wholly membraneous ductus burase in the female ; and from *G. civica* by the aedeagus without distinctly needle-shaped cornuti in the male and by the globular corpus bursae without any signum in the female. *G. urbana* is a leaf-miner on *Michelia* belonging to the family Magnoliaceae, while *G. quadrifasciata* and *G. civica* are leaf-miners on various species of the family Lauraceae.

## 22. *Gibbovalva kobusi* Kumata et Kuroko, sp. nov.

[Figs. 6, 34(G-H), 42(D), 46(C-D) and 51(D-F)]

♂♀. Expanse of wings : 6.5-9.2 mm (8.2 mm in holotype, 8.18 mm on an average of 16 specimens). Length of fore wing : 3.2-4.5 mm (4.0 mm in holotype, 4.01 mm on an average of 20 specimens).

Face and head white, each mixed with grayish scales posteriorly in some specimens. Palpi white ; maxillary palpus medianly, 2nd segment of labial palpus apically, and the apical segment basally and medianly ringed with fuscous. Antenna ochre-brown, becoming paler towards base ; scape white, narrowly ringed with black apically, with a ventral tuft of scales dark gray. Thorax whitish, sparsely mixed with grayish scales in some specimens, with tegulae brownish fuscous anteriorly and whitish posteriorly ; pleural surface with a narrow, oblique, fuscous band. Legs whitish ; fore coxa with a blackish median band and a similar but smaller apical one ; fore and middle femora blackish, with 2 or 3 white spots on lower surfaces ; fore tibia blackish except on base ; middle tibia blackish on apical half with a trace of postmedian white ring ; hind coxa apically, the femur medianly and subapically, and the tibia subbasally, medianly and apically banded or spotted with

black on outer surfaces ; all tarsi with 1st segments medianly and the others sub-basally ringed with black.

Fore wing ochreous-brown in ground colour, tinged with yellow in a few specimens, usually darkened costally and apically, with 5 white fasciae arranged nearly equidistantly, each fascia moderate in width, slightly oblique and margined with blackish irrorations internally and externally, the irrorations being usually conspicuous on costal half ; the 1st fascia at about basal  $1/5$ , slightly widened dorsally, enclosing a series of black spots, costal, discal and dorsal, the dorsal spot often divided into 2 or 3 marks on dorsal margin ; the 2nd premedian and the 3rd post-median, both nearly parallel-sided, with a series of blackish spots like the 1st ; the 4th at about apical  $2/7$ , a little more strongly oblique, sometimes interrupted by ground colour near dorsal margin, with a conspicuous blackish line in middle ; the 5th preapical, narrow, sometimes lunar in shape, with a blackish line in centre like the 4th, but often irregularly interrupted by black scales into small fragments ; ochreous spaces before and beyond the 5th fascia usually suffusedly irrorated with black scales ; besides 5 white fasciae, a whitish, irregular dorsal mark and a costal spot are situated near base of wing, and a minute white spot also at apical extremity of wing ; cilia at apex of wing white, those along termen blackish, with a curved, whitish subapical line and 2 white dashes stretched from white marks, and those along dorsal margin dark gray. Hind wing and its cilia dark gray.

Male genitalia (Fig. 6 : A-E) : Tegumen moderate in length, spatulate in outline in ventral view, covered with dense, acute spinules on dorsal and lateral surfaces, with 15-22 (18 in holotype) fine setae arranged in 1 or 2 rows along each lateral edge, the apical setae and 2 or 3 others are longer ; tuba analis covered with spinules laterally, with subscaphium slender. Valva about 1.4 times as long as tegumen, slightly incurved, widely round on ventral margin beyond basal  $1/4$ , with a short jar-shaped projection produced from costa just before middle ; moderately long setae occurring densely on almost whole inner surface of valva and long androconial scales also rather sparsely on outer surface near base. Vinculum moderately long, with saccus short and round. Aedeagus about  $6/7$  as long as valva, straight, tubular, tapering apically, with a semitubular projection enclosing median third of aedeagus, the projection being apically round ; vesica with acute, thorn-like cornuti arranged in irregular rows from basal  $1/4$  to apex of aedeagus, the cornuti gradually becoming smaller towards apex of aedeagus and those on basal half of aedeagus minute and arranged in an imbricate pattern. Eighth abdominal segment about as long as the 7th, deeply notched ventrally ; dorsocephalic apodeme bar-shaped, with a median sclerotization extending onto almost whole length of 8th tergite ; a pair of ventral invaginations string-like, a little longer than dorsal apodeme. (Six slides examined.)

Female genitalia (Fig. 6 : F) : Papilla analis moderate in length, covered with spinules rather sparsely and fine setae rather densely ; apophysis posterioris widened basally, a little longer than apophysis anterioris. Ostium bursae small, with lamella antevaginalis weakly sclerotized, trapezoid in form and covered with very fine granules ; antrum shortly sclerotized, cup-shaped ; interspace between ostium and antrum short, about twice as long as antrum ; ductus bursae membranous, tubular, but slightly dilated at caudal  $1/3$ , then narrowing towards corpus bursae, rather heavily lined with obtuse spinules throughout its length, the spinules becoming smaller towards corpus bursae, which is rather small, globular, and wholly mem-

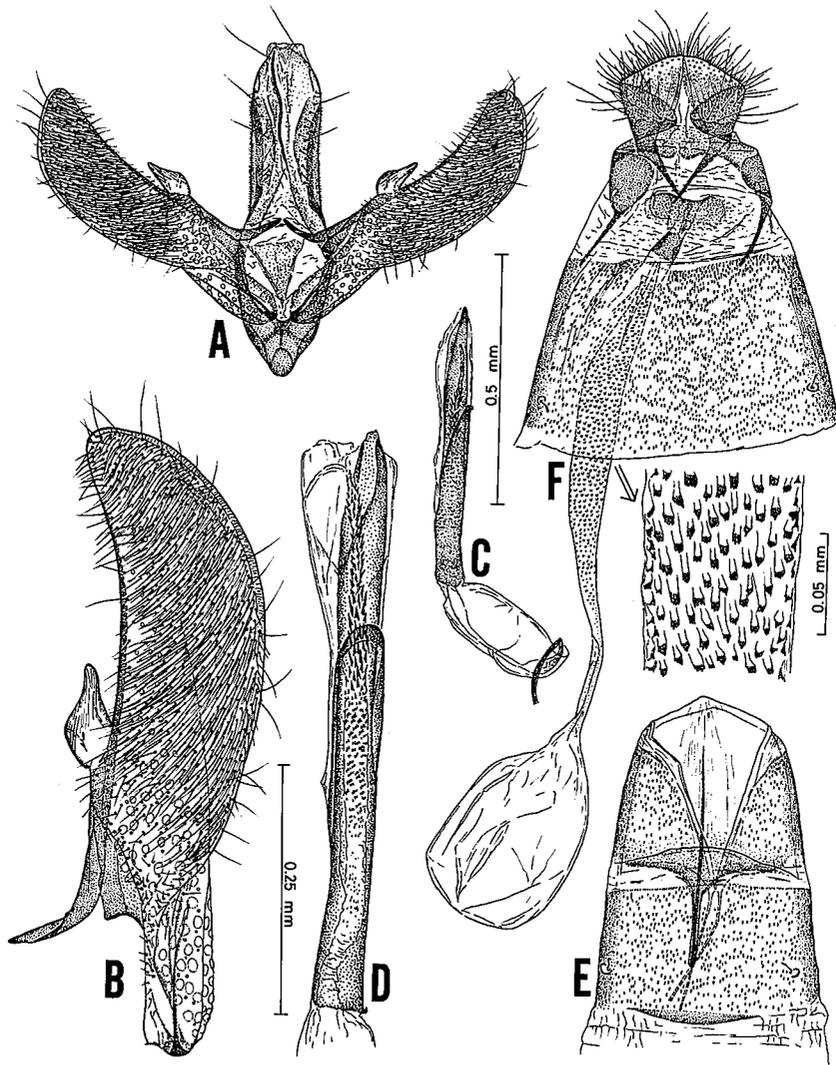


Fig. 6. *Gibbovalva kubusi* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-3048, holotype] — B: Right valva enlarged [ditto] — C: aedeagus [ditto] — D: Aedeagus enlarged [Grc-2012, Moiwa, Sapporo, Hokkaidō, em. 27/iv/1979, ex *Magnolia kobus* (930)] — E: Male 7th and 8th abdominal segments in ventral view [holotype] — F: Female genitalia in ventral view [Grc-1909, ditto, em. 30/iv/1979].

braneous without any signum or scobination. (Eleven slides examined.)

Specimens examined: 7♂♂ & 12♀♀. Holotype: ♂, Kōsyunai, Bibai, Sorati, Hokkaidō, em. 21/vii/1981, ex *Magnolia kobus* (2317), Gen. sl. no. Grc-3048. Paratypes: HOKKAIDŌ — 1♂ & 1♀, same data with holotype except on dates emerged, 20-27/vii/1981; 1♂, Apoi, Hidaka, em. 16/viii/1963, ex *M. kobus*; 1♀, ditto, 28/vi/1981, T. Tanabe leg.; 1♀, Katurasawa, Sorati, 24/v/1959; 1♀, Nopporo, em. 8/vii/1966, ex *M. kobus*; 1♀, ditto, 7/vi/1977; 2♂♂, Sapporo, em. 12-19/vii/1956, ex *M. kobus* (120); 1♂ & 2♀♀, Moiwa, Sapporo, em. 27/iv-4/v/1970, ex *M. kobus* (930); 1♀, ditto, em. 4/vii/1972, ex *M. kobus*; 1♂, ditto, em. 21/ix/1975, ex *M. kobus* (1482); 1♀, ditto, em. 19/vii/

1977, ex *M. kobus* (1707); 1 ♀, Teine, 20/v/1961. HONSYŪ — 1 ♀, Kaida, Kiso, Nagano-ken, em. 26/vii/1975, ex *M. kobus* (1449); 1 ♀, Katuragisan, Ōsaka, 27/iv/1982, T. Tanabe leg.

Distribution: Japan (Hokkaidō; Honsyū).

Food plant: *Magnolia kobus* DC. (Magnoliaceae).

Remarks: *G. kobusi* is very similar to the preceding *G. urbana*, but is distinguished from the latter by the following points: — In the fore wing, the ground colour between 1st and 2nd white fasciae ochre-brown and never suffused with blackish scales, and the 4th and 5th white fasciae each enclosing a conspicuous blackish central line; ventral tuft of antennal scape usually dark gray; in male genitalia, the aedeagus with rather large cornuti arranged on the apical half and with semitubular flap-like projection narrowly rounded apically; and in female genitalia, the ductus bursae lined with rather large, obtuse spinules densely on almost the whole length.

23. *Gibbovalva magnoliae* Kumata et Kuroko, sp. nov.

[Figs. 7 and 35(A-C)]

♂ ♀. Expanse of wings: 6.8-9.2 mm (9.0 mm in holotype, 8.24 mm on an average of 19 specimens). Length of fore wing: 3.3-4.5 mm (4.4 mm in holotype, 4.06 mm on an average of 20 specimens).

Face and head white, the former becoming gray posteriorly in a few specimens including holotype. Palpi white entirely, but in a few specimens including holotype maxillary palpus basally, 2nd segment of labial palpus subbasally and the apical segment basally ringed with fuscous indistinctly. Antenna yellowish-ochreous, becoming paler towards base; scape white, with ventral tuft consisting of white and black-tipped scales. Thorax white dorsally and ventrally, with tegulae mixed with brownish or blackish scales anteriorly. Legs white; fore coxa spotted below with fuscous at middle and apex; fore femur and tibia fuscous, with 1 or 2 white spots in each; middle femur thickened with blackish scales below beyond middle; middle tibia narrowly ringed with fuscous medianly and apically; hind coxa subapically, the femur medianly and the tibia basally, medianly, subapically and apically banded with fuscous narrowly; all tarsi with 3 blackish rings at nearly same intervals. Abdomen dark gray dorsally, whitish ventrally, with 6 lateral bands narrow and fuscous.

Fore wing yellowish-ochreous in most specimens or ochre-brownish in a few specimens including holotype, in both cases always darkened costally and apically, with a V-shaped mark and 5 fasciae snow-white, the fasciae being arranged at nearly same intervals, moderate in width, slightly oblique, and very sparsely margined with blackish irrorations internally and externally; the V-shaped mark situated at base of wing, always detached from costa, often confluent to the 1st fascia through a white dorsal line between them; 1st fascia at about basal 1/6, slightly widened dorsally, containing a series of blackish spots, costal, discal and dorsal, the discal spot often disappearing; the 2nd and 3rd nearly parallel-sided, containing blackish spots like the 1st; the 4th often interrupted by ground colour near dorsal margin, the costal fragment containing a conspicuous black line in middle, and the dorsal fragment very small without any trace of black scales; the 5th narrowing dorsally, internally margined with black widely, never containing blackish scales in its space;

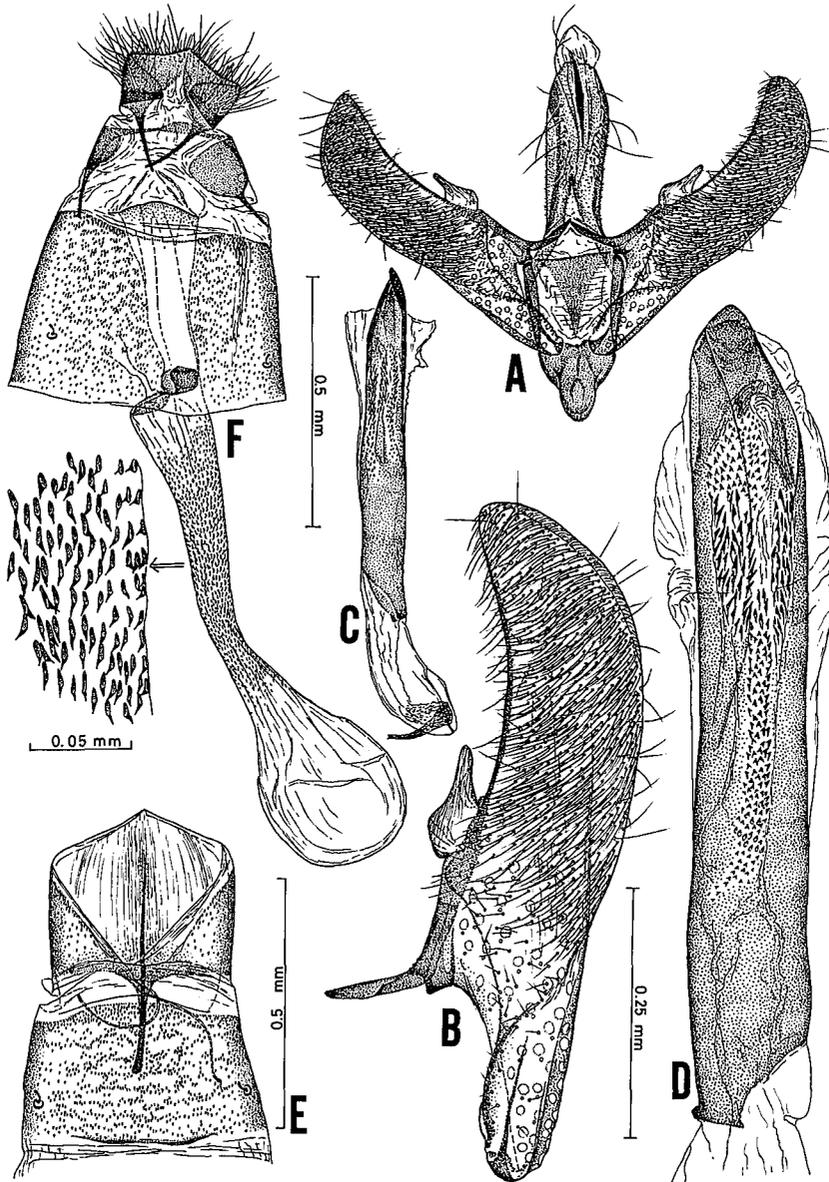


Fig. 7. *Gibbovalva magnoliae* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-1597, holotype] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Aedeagus enlarged [Grc-3044, Siriuti, Osima, Hokkaidō, em. 4/vii/1976, ex *Magnolia obovata* (1685)] — E: Male 7th and 8th abdominal segments in ventral view [Grc-1905, Apoi, Hidaka, Hokkaidō, em. 15/vii/1967, ex *M. obovata* (868)] — F: Female genitalia in ventral view [Grc-1903, Nopporo, Hokkaidō, em. 18/vii/1966, ex *M. obovata*].

a space between the 5th fascia and a minute white apical spot jet-black ; cilia around apex of wing and along termen whitish, with a median line and a subapical one of blackish irrorations round, the median line being often interrupted by blackish or brownish dashes ; cilia along dorsal margin light gray. Hind wing gray ; cilia light gray.

Genitalia (Fig. 7) : The genitalia of both the sexes are very similar to those of the preceding *G. kobusi*, but are characterized by the following points : — In male, aedeagus comparatively large, about as long as valva, tubular, bluntly pointed apically, without a semitubular projection seen in *G. kobusi* ; vesica with cornuti of a number of acute, thorn-like spines, some cornuti arranged between apical 3/5 and 4/5 of aedeagus are much larger than those on other parts ; in female, interspace between ostium burase and sclerotized antrum very long, about 2/3 as long as ductus bursae, which is abruptly widened beyond antrum, then gradually narrowing towards corpus bursae, and is densely lined with acute and long spinules (see Fig. 7 : F). (Six and 10 slides of male and female genitalia are examined, respectively.)

Specimens examined : 20♂♂ & 17♀♀. Holotype : ♂, Tunagi, Morioka, Iwate-ken, Honsyū, em. 2/v/1970, ex *Magnolia obovata*, Gen. sl. no. Grc-1597. Paratypes : HOKKAIDŌ — 9♂♂ & 2♀♀, Apoi, Hidaka, em. 11-17/vii/1967, ex *M. obovata* (868) ; 1♂ & 1♀, Nopporo, em. 16-18/vii/1966, ex *M. obovata* ; 1♀, Sapporo, em. 23/vi/1956, ex *M. obovata* (46a) ; 1♀, Tomakomai, em. 17/v/1970, ex *M. obovata* ; 4♂♂ : 5♀♀, Siriuti, Osima, em. 4-5/vii/1970, ex *M. obovata* (1685) ; 1♀, Okusiri-tō, Osima, 14/vii/1958. HONSYŪ — 1♂ & 2♀♀, with same data as holotype except on dates emerged, 30/iv-7/v/1970 ; 1♂ & 2♀♀, Siobara, Totigi-ken, em. 22-29/vii/1975, ex *M. obovata* (1479) ; 1♀, Hikagedaira, Gihu-ken, 23-26/ix/1980, T. Tanabe leg. ; 3♂♂ & 1♀, Kozagawa, Wakayama-ken, em. 8-9/vi/1970, ex *M. obovata* (1043).

Distribution : Japan (Hokkaidō ; Honsyū).

Food plant : *Magnolia obovata* Thunb. (Magnoliaceae).

Remarks : *G. magnoliae* is undoubtedly closely related to *G. kobusi* in colouration and genital structures. Furthermore, both the species are leaf-miners of *Magnolia*-species in the larval stage. The rearing records, however, show that they are different in food preference within the genus *Magnolia* : *G. magnoliae* is exclusively reared from *M. obovata*, while *G. kobusi* from *M. kobus*. *G. magnoliae* may be distinguished from *G. kobusi* by the fact that the 5th white fascia of the fore wing is wholly white and not mixed with any blackish scales at all as well as by the genitalia, of which the distinguishing characters are given in the description of the former species.

## X. GENUS MELANOCERCOPS KUMATA ET KUROKO NOV.

Type-species : *Acrocercops ficuorella* Yazaki, 1926.

Etymology : *Melanocercops* (G.)=melanos (black)+cercos (tail)+ops (eye) ; feminine.

♂♀. Face and head smooth-scaled ; ocelli absent ; proboscis moderately developed, faintly scaled at base. Labial palpus moderately long, drooping, smooth-scaled entirely ; apical segment about as long as the 2nd, very slightly upturned, acutely pointed apically. Maxillary palpus minute, porrect, smooth, 1/3-1/2 as long as apical segment of labial palpus. Antenna long, 1.0-1.3 times as long as fore wing, filiform, simple in both sexes ; scape slightly thickened, without any pecten, flap or tuft. Legs rather long, slender, smooth-scaled except for hind tibia and 1st segment of hind tarsus which are covered with a row of bristly scales above ;

hind tibia with anterior pair of spurs at about basal 1/4 ; hind tarsus about 1.2 times as long as hind tibia.

Fore wing narrow, lanceolate, rather bluntly pointed apically ; discoidal cell long, occupying about basal 5/6 of wing, nearly parallel-sided, obliquely truncated apically, with upper vein obsolescent on proximal part ; 12-veined, with  $Cu_{1b}$  absent ;  $R_1$  running from basal 2/5 of cell to middle of costa ;  $R_2$  and  $R_3$  around upper angle of cell ;  $R_5$  obsolescent basally, probably stalked with  $R_4$  ;  $M_2$  and  $M_3$  separated basally and arising from lower angle of cell ;  $Cu_{1a}$  well apart from  $M_3$ , far basal to level of  $R_2$  ;  $Cu_2$  weakened entirely ; An very weakened, probably connected with dorsal margin at basal 1/6-1/5 of wing. Hind wing rather linear, about half as wide as and about 6/7 as long as fore wing, long-pointed apically, with cell opened between  $M_2$  and  $M_3$  ; 7-veined, with venation not obviously different from that of *Acrocercops* ; cilia long, 4-5 times of wing-width.

Male genitalia : Tegumen moderate to long, oblong in ventral view, weakly sclerotized laterally, with fine setae along lateral margins and at apex ; tuba analis membranous, without sclerous subscaphium. Valva moderately long, somewhat wing-shaped, round on ventral and apical margins, sinuate on costal margin, with a small comma-shaped projection protruded from pocket-like incision at middle of costa ; fine setae occurring on inner surface especially densely on ventral area ; long, linear androconial scales scattered on outer surface ; 2-5 elongate scales stretched from base of costa and joined with those from another valva behind tegumen. Vinculum V-shaped, well prolonged ventrally, then gradually narrowing into round apical saccus. Diaphragma membranous, without particular sclerite. Aedeagus moderately long, straight, tubular ; vesica with cornuti various in shape ; ductus ejaculatorius moderate to very long. Eighth abdominal segment widely and rather shallowly concaved ventrally ; tergite with a narrow anterior apodeme, of which the median sclerotization extends caudad onto the tergite ; sternite with a pair of very shallow anterior invaginations which have a small tuft of strings at apex. Seventh abdominal segment normal in form as in preceding ones.

Female genitalia : Papilla analis short, obliquely transverse in lateral view, blunt dorsally and ventrally, setose as usual ; apophysis posterioris slender, moderate in length. Eighth abdominal segment rather short, weakly sclerotized dorsally, widely membranous ventrally ; apophysis anterioris similar to apophysis posterioris in shape and length. Ostium bursae opened on ventrum of 8th segment, rather small, without genital plate ; antrum shortly sclerotized just before opening of ductus seminalis ; ductus bursae slender, tubular, membranous or partly sclerotized beyond ductus seminalis, shagreened on cephalic half ; corpus bursae elongate-pyriform, shagreened, with a small plate-like signum covered and surrounded by many minute spines.

Body chaetotaxy of last instar larva (Fig. 47 : A-B) : Very similar to that of preceding *Gibbovalva* except for the absence of seta SV3 on 6th abdominal segment and proprioceptor MD1 on the 9th.

Arrangement of crochets : Ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in a transverse row as seen in larva of *Deoptilia* Kumata et Kuroko ; anal proleg with crochets absent or 2 or 3 vestigial crochets in a transverse row.

Larval habit : The larva of this genus is a leaf-miner, and makes a linear-

blotchy, blister-like mine on the upper surface of leaves as in the larvae of the preceding *Gibbovalva*; the linear part of the mine is purely epidermal, irregularly curved, with a rather broad, brownish central line, and the blotchy part is usually smeared with frass into brownish or brownish-black except for the margin. The mine is sometimes contracted to form a tentiform type in the fully matured stage. When fully grown, the larva changes the body colour to crimson-red, then leaves the mine for a pupating site through a semicircular slit. The cocoon is boat-shaped with an elliptical outline, covered with a few bubbles on the surface, and often placed on the surface of the leaf neighbouring the mine, sometimes on the mine in breeding condition.

Remarks: This new genus is separated from the preceding *Gibbovalva* by the simple antennal scape, by the smooth-scaled middle femur, by the absence of the vein  $Cu_{1b}$  of the fore wing, by the shallow and apically tufted anterior invaginations of the male 8th abdominal segment, by the different shape of signum of the female corpus bursae, by the absence of the seta SV3 on the 6th abdominal segment of the larva, and by the transverse row of crochets of the larval ventral prolegs, though it is very similar to *Gibbovalva* in the basic wing-venation and male genital structure.

It is also at once distinguished by the stalked veins  $R_4$  and  $R_5$  of the fore wing from *Sauterina* Kuznetsov and *Amblyptila* Vári, both of which bear a costal projection on the male valva like the present genus.

Besides the 2 Japanese species mentioned below, *Acrocercops cyclopa* Meyrick, 1908, *A. elaphopa* Meyrick, 1914 and *A. desiccata* Meyrick, 1916, all described from India, should be transferred to the present new genus. All the species of *Melanocercops*, including the 3 Indian species mentioned above, are leaf-miners on *Ficus* spp. (Moraceae).

#### Key to the Japanese species of *Melanocercops*

1. Basal 3/4 of fore wing with costal half fuscous gray and dorsal half whitish to pale ochreous; male aedeagus with 4 spiniferous, round cornuti and 1 large spatulate cornutus besides thorn-shaped and needle-shaped spines; female corpus bursae with a signum of narrow, spiniferous plate, which is about 1/3 as long as 7th abdominal segment.  
 ..... *M. ficvorella* (Yazaki), comb. nov.
- Fore wing light ochreous-gray in ground colour; male aedeagus with a single mushroom-shaped cornutus; female corpus bursae with a signum of clavate plate which is about 3/4 as long as 7th abdominal segment. .... *M. phractopa* (Meyrick), comb. nov.

#### 24. *Melanocercops ficvorella* (Yazaki), comb. nov.

[Figs. 8(A-E), 9(A), 35(D-E), 41(C), 42(E), 47(A) and 52(A)]

*Acrocercops ficvorella* Yazaki, 1926, Bull. Kagoshima Imp. Coll. Agr. Forest 6: 35 & 38, pl. 5(1-7) [Japan (Honsyū, Kyūsyū); host: *Ficus carica*]; Inoue, 1954, Check List Lep. Jap. 1: 27; Issiki, 1957, Icones Heteroc. Jap. Col. Nat. 1: 27, pl. 4(101) [Japan (Honsyū, Sikoku, Kyūsyū); host: *Ficus carica*, *F. erecta*]; Kuroko, 1982, Moths Jap. 1: 187, & 2: pl. 6(14) [Japan (Honsyū, Sikoku, Kyūsyū, Nansei Is., Ryūkyū Is.); host *Ficus carica*, *F. erecta*, *F. nipponica*, *F. pumila*].

Original description: "Face, vertex, thorax, tegulae blanches; antennes couleur sombre; yeux brun clair; palpes labiales blanches, dernière phalange quelque sombre; proboscides jaunes,

ayant des écailles à leur base seulement. La partie dorsale de l'abdomen, d'un brun noirâtre, jointure des phalanges argentée ; la partie ventrales argentée, mais d'un brun noirâtre à la jointure des phalanges. Franges anales tous noirs. Pieds argentés, quelque peu bruns. Tibiae et tarsi marqués de plusieurs joncs noirs, aux tibiae des pattes de dernier des pectens blancs.

"Ailes antérieures, d'un noir un peu pâle, mais les 3/4 de leur bord intérieurs est blanc. Faisant suite à cette partie blanche, une ceinture blanche traverse l'aile d'un côté à l'autre ; de même tout près de l'apex enore une autre ceinture blanche. En outre sur l'apex, un gros point noir et luisant, et vis-à-vis cette figure noire, longeant le bord intérieur de l'aile, il y a des franges brunes. Les franges sont un peu sombres, mais ceux qui sortent de l'apex sont couverts par une écaille toute noire qui les traverse. Ailes postérieures, couleur quelque peu sombre, avec leurs franges de même couleur. L'envergure des ailes est de 7.5 mm. La larva de ce papillon mine la feuille de *Ficus carica* L."

Additional description : ♂ ♀. Expanse of wings : 6.0-8.2 mm (7.02 mm on an average of 20 specimens). Length of fore wing : 2.9-4.0 mm (3.44 mm on an average of 20 specimens).

Face brilliant white, with a narrow, grayish mesal line in most specimens ; head whitish, more or less tinged with ochre-gray in most specimens. Palpi white ; apical segment of labial palpus fuscous below. Antenna dark fuscous, with faintly pale annulations in some specimens ; scape slightly paler than other segments. Thorax white, slightly tinged with gray in some specimens ; tegulae usually dark fuscous. Legs whitish ; fore coxa ventrally and fore and middle femora dorsally tinged with ochre or pale brown ; fore tibia dorsally blackish ; middle tibia with a blackish subapical ring ; hind tibia laterally darkened, with an apical blackish spot ; all tarsi with 5 rather broad blackish rings at nearly equal intervals. Abdomen dorsally ochreous-gray, ventrally silvery-whitish with 4 dark gray segmental bands ; anal extremity blackish in both male and female.

Fore wing fuscous gray in ground colour, broadly whitish to pale ochreous below wing-fold from base to apical 1/3 of wing, this pale area sometimes occupying more than half width of wing and usually darkened costally, thus its costal boundary is obscure ; a very narrow dark fuscous line running below this whitish mark along dorsal margin of wing ; a narrow, white, transverse fascia at apical 1/4, slightly angulated outwardly in disc, often interrupted by ground colour at the angle in most specimens ; a large, round, jet-black blotch placed just before apex, preceded by a narrow white 2nd fascia and followed by a white apical spot ; cilia whitish with a blackish basal mark at apex of wing, those along termen brownish, becoming paler apically, with a blackish subapical band forming a straight transverse fringe line together with blackish mark in apical cilia, and those along dorsal margin gray. Hind wing dark gray ; cilia gray.

Male genitalia (Fig. 8 : A-E) : Tegumen moderate in length, slightly dilated medianly in ventral view, with a pair of long apical setae and 6-8 pairs of similar ones on median area of lateral margins ; tuba analis wholly membranous. Valva a little longer than tegumen, slightly upcurved, widest at median part, then gradually narrowing towards round apex ; costal margin slightly convex at postmedian part, with a small concavity at basal 3/5 ; a comma-shaped projection obliquely lying on this concavity ; many slender setae rather densely on inner surface except on costal area ; long, slender androconial scales on outer surface especially densely near base ; 1 to 3 (usually 2) elongate scales originating near costal base, extending behind tegumen, then usually forming a reversed V-shape together with those from another

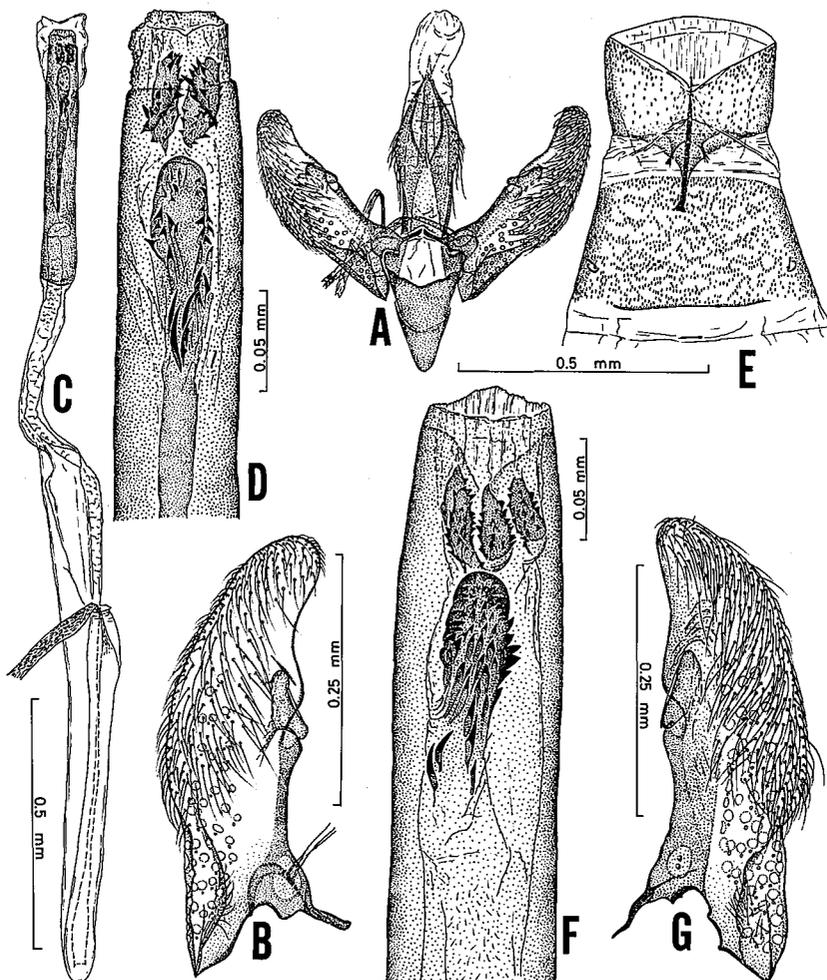


Fig. 8. A-E: *Melanocercops ficuvorella* (Yazaki). A: Male genitalia in caudal view, aedeagus omitted [Grc-1953, Amami-Ōsima, Ryūkyū Is., em. 4/iv/1964, ex *Ficus erecta* (634), H. Takada leg.] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Apical part of aedeagus enlarged [ditto] — E: Male 7th and 8th abdominal segments in ventral view [ditto].  
 F-G: *Melanocercops elaphopa* (Meyrick). F: Apical part of aedeagus [BM-23997, Malhaon, 24, 31/v/'33, determined as *Acrocercops elaphopa*] — G: Right valva [ditto].

valva. Vinculum elongate-triangular, about a half as long as valva. Aedeagus a little longer than valva, tubular, truncated apically; vesica with 4 spiniferous, small, round plates and 1 large, spatulate plate, further with a double row of 8 to 10 acute, thorn-like spines situated before the spatulate plate and a number of minute, needle-shaped spines scattered around base of aedeagus; ductus ejaculatorius very long, about 2.5 times as long as aedeagus. Eighth abdominal segment about as long as 7th, moderately notched ventrally; dorsomedian apodeme slender on apical half, then widened basally, more or less capitated apically, with a narrow sclerotization extending to anterior 1/2 of tergite; a pair of ventral invaginations very short, less

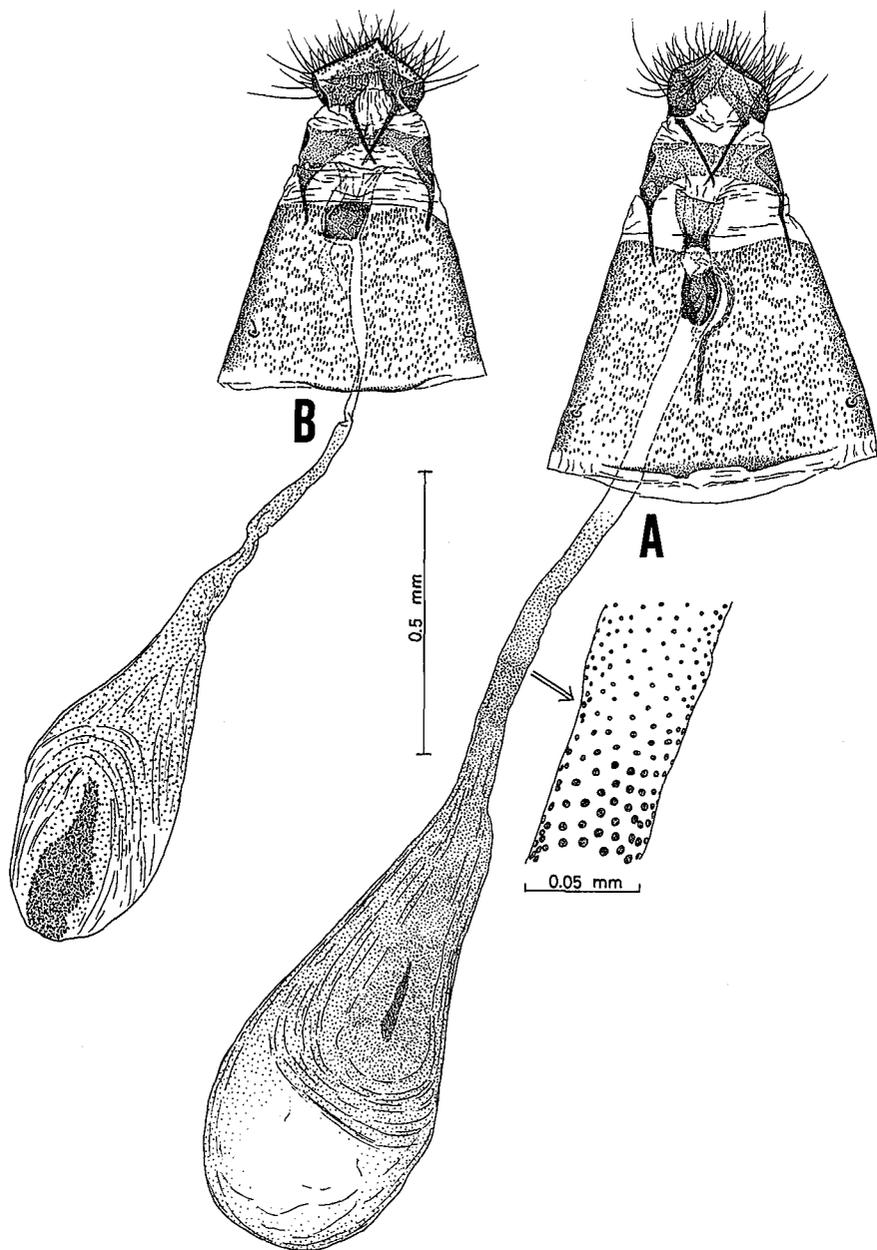


Fig. 9. A: *Melanocercops ficuorella* (Yazaki), female genitalia in ventral view [Grc-1989, Kii-Ōsima, Wakayama-ken, em. 8/vi/1964, ex *Ficus erecta* (664)].  
 B: *Melanocercops phractopa* (Meyrick), female genitalia in ventral view [Grc-1894, Onoaida, Yaku-sima, Nansei Is., em. 30/x/1973, ex *Ficus microcarpa* (1200)].

than 1/5 as long as dorsal apodeme, slightly thickened apically, with an apical tuft of short strings. (Thirteen slides examined.)

Female genitalia (Fig. 9: A): Papilla analis rather short, covered with usual slender setae; apophysis posterioris slender, a little longer than apophysis anterioris. Ostium bursae moderate in opening size; antrum shortly sclerotized; ductus bursae long, tubular, shortly sclerotized and carinated near caudal end, the sclerotization about twice as long as antrum; dense granules distributed on cephalic 2/3 of ductus bursae and smaller ones on almost whole surface of corpus bursae, which is elongate-ovate in form; signum is a spiniferous, elongate-oblong plate, which is about 2/5 as long as 7th abdominal segment and surrounded by 8 to 10 rows of ovate granules. Ductus seminalis arising from a membranous part between antrum and caudal sclerotization of ductus bursae. (Thirteen slides examined.)

Specimens examined: 48♂♂ & 57♀♀. HONSYŪ — 1♂ & 5♀♀, Kozagawa, Wakayama-ken, em. 28/v-3/vi/1964, ex *Ficus erecta* (664); 1♀, ditto, em. 6/vi/1970, ex *F. erecta* (1022); 1♂ & 1♀, ditto, em. 2-15/x/1974, ex *F. erecta* (1302); 3♂♂ & 3♀♀, ditto, em. 14-19/x/1974, ex *F. nipponica* (1332); 4♂♂ & 7♀♀, Kii-Ōsima, Wakayama-ken, em. 8-13/vi/1964, ex *F. erecta* (664a). SIKOKU — 2♂♂ & 1♀, Ino, Kōti-ken, em. 29/vi/1957, ex *F. nipponica* (273); 1♂ & 1♀, ditto, em. 13-15/xi/1980, ex *F. erecta* (2211); 2♂♂ & 1♀, Tosasimizu, Kōti-ken, em. 10-27/xi/1980, ex *F. erecta* (2231 & 2264); 1♂ & 2♀♀, Asizuri-misaki, Kōti-ken, em. 21-25/vi/1957, ex *F. nipponica* (273a); 2♀♀, ditto, em. 30/vi/1957, ex *F. erecta* (227a); 1♀, ditto, 18/vi/1957. KYŪSYŪ — 5♂♂ & 5♀♀, Hukuoka-si, em. 25/vi/1957, ex *F. erecta* (227); 1♂, ditto, 7/vi/1957; 2♂♂ & 3♀♀, Amakusa, Nagasaki-ken, 20/iv 1967, ex *F. erecta*, M. Suwa leg.; 2♂♂, Taniyama, Kagosima-ken, 21/iv/1966, K. Kusigemati leg.; 1♂, Kagosima-si, 8/viii/1970, K. Kusigemati leg. TUSIMA — 2♂♂, Mine, em. 19/xi-7/xii/1979, ex *F. erecta* (2092). NANSEI IS. — 1♂ & 2♀♀, Anbō, Yaku-sima, em. 24-25/vi/1965, ex *F. erecta* (639); 2♀♀, Kosugidani, Yaku-sima, 7-23/vi/1965; 10♂♂ & 7♀♀, Mugiō, Yaku-sima, em. 31/x-5/xi/1973, ex *F. erecta* (1192). RYŪKYŪ IS. — 4♂♂ & 4♀♀, Amami-Ōsima, 4/iv/1964, ex *F. erecta* (643), H. Takada leg.; 5♂♂ & 2♀♀, Sueyosi, Okinawa, em. 30/iv-9/v/1985, ex *F. virgata* (2548), M. Takeda leg.; 7♀♀, Bannadake, Isigaki, em. 25/iv-7/v/1985, ex *F. erecta* (2540), M. Takeda leg.

Distribution: Japan (Honsyū; Sikoku; Kyūsyū; Tusima; Nansei Is.; Ryūkyū Is.).

Food plants: *Ficus carica* Linn., *F. erecta* Thunb., *F. nipponica* Franch et Savat., *F. pumila* Linn. and *F. virgata* Reinw. (Moraceae).

Remarks: The type specimens of *Acrocercops ficuvorella* seem to have been lost, for we could not find them in the insect collection of the Entomological Laboratory, Faculty of Agriculture, Kagosima University, formerly Kagosima Imperial College of Agriculture and Forest, where the species was originally studied. The identification of the present material is, therefore, based on the original description and figures.

*M. ficuvorella* is very similar to and hardly distinguishable from *M. elaphopa* (Meyrick)<sup>1)</sup> in the genital structures. On the other hand, it is at once separated from *M. elaphopa* by the broadly whitish or ochreous dorsal area of the fore wing; in *M. elaphopa* the fore wing is entirely dark fuscous on its basal 2/3. *M. ficuvorella* may be a local variation of *M. elaphopa*, but is tentatively treated here as a distinct species.

It is also similar to *Acrocercops desiccata* Meyrick mining in leaves of *Ficus* in India and Ceylon, but may be distinguished from the latter by the absence of a

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1) See p. 28.

preapical blackish mark between the 1st and 2nd whitish fasciae of the fore wing.

25. *Melanocercops phractopa* (Meyrick), comb. nov.

[Figs. 9(B), 10, 35(G-H), 42(F), 47(B) and 52(B-C)]

*Acrocercops phractopa* Meyrick, 1918, Exot. Microlep. 2: 177 [India (Bengal); host: *Ficus infectoria*]; Fletcher, 1920, Mem. Dept. Agr. India, Ent. Ser. 6: 152; Ibid., 1933, Mem. Imp. Council. Agr. Res., Sci. Monogr. 4: 54, pl. 53 [India (Bengal); host: *Ficus bengalensis*, *F. indica*.].

Original description: "♂. 5 mm. Head, thorax white. Palpi slender, white. Forewings narrow-lanceolate; white; a narrow direct transverse light fuscous fascia at 3/4; a slender darker fuscous direct transverse line beyond this; a conspicuous jet-black round apical spot: cilia whitish-grey, round apex white, a transverse rather dark fuscous fine bar near beyond apical spot, and a slighter mark beyond this. Hindwings light grey; cilia whitish-grey, opposite apex white."

Additional description: ♂ ♀. Expanse of wings: 5.2-6.8 mm (6.07 mm on an average of 11 specimens). Length of fore wing: 2.5-3.3 mm (2.97 mm on an average of 14 specimens).

Face silvery-whitish, with a grayish mesal line widened posteriorly. Head and thorax silvery-whitish, tinged with ochre-gray in most specimens; tegulae dark ochreous-gray. Palpi whitish; maxillary palpus light grayish apically; 2nd segment of labial palpus grayish apically on outer surface, and the apical segment widely dark gray beneath. Antenna brilliant fuscous, without distinct annulations; scape whitish beneath. Legs silvery-whitish; fore femur, and middle femur and tibia tinged with ochreous gray on upper sides; fore tibia dark fuscous except on lower side narrowly; hind tibia light ochreous-gray on outer surface, with bristly scales white; all tarsi with 4 to 5 rather broad, blackish rings at nearly equal intervals. Abdomen dorsally light gray, ventrally silvery-whitish with ochreous segmental bands; anal extremity black.

Fore wing light ochreous-gray in ground colour, not white as described originally, but more or less lightening towards costa in some specimens, with 3 direct, transverse, white fasciae arranged from apical 3/4 to apex at nearly same intervals, the 1st fascia more or less widened on costal and dorsal margins, the 2nd usually

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1)

*Melanocercops elaphopa* (Meyrick), comb. nov.

[Figs. 8(F-G) & 35(F)]

*Acrocercops elaphopa* Meyrick, 1914, Journ. Bomb. nat. Hist. Soc. 23: 120 [India (Karnataka)]; Fletcher, 1920, Mem. Dept. Agr. India, Ent. Ser. 6: 158; Meyrick, 1926, Exot. Microlep. 3: 294 [host: *Ficus asperrima*]; Fletcher, 1933, Imp. Council. Agr. Res., Sci. Monogr. 4: 49 [India (Coorg, Kumaon); host *F. asperrima*].

Specimens examined: 14♂♂ & 20♀♀. INDIA — 1♀, determined as *Acrocercops elaphopa* Meyr., Karwar, 4, 1/ix/'24, Gen. sl. no. BM-23992; 1♂, determined as *A. elaphopa* Meyr., Mulhaon, 24, 31/v/'33, Gen. sl. no. BM-23997; 13♂♂ & 17♀♀, Solan, U.P., em. 26/x-17/xi/1978, ex *Ficus palmatus* (Ind-125). NEPAL — 1♀, Gokarna, Kathmandu, Bagmati, em. 15/x/1983, ex *Ficus* sp. (Npl-705); 1♀, ditto, 29/ix/1983.

Distribution: India and Nepal (new record).

Food plants: *Ficus asperrima* and *F. palmatus* (Moraceae) in India and *Ficus* sp. in Nepal.

Remarks: Having examined the specimens mentioned above, we have concluded that *elaphopa* is undoubtedly a member of the genus *Melanocercops* on account of the wing venation and the male and female genitalia.

narrower than the 1st and slightly arched inwardly, and the 3rd situated apical extremity of wing, about as wide as the 1st, and margined outwardly with a dark fringe line; interspace between 2nd and 3rd fasciae almost wholly occupied by a round, jet-black spot; cilia at wing apex and along termen whitish, with a vertical, nearly straight, fuscous fringe line and 2 brownish dashes stretched from bands of ground colour, and those along dorsal margin entirely light gray. Hind wing gray, with its cilia light gray.

Male genitalia (Fig. 10): Tegumen a little longer than valva, more or less strongly sclerotized on lateral surfaces, with an apical seta and 4 ones arranged in a row on slightly convex median area of each lateroventral margin; tuba analis without sclerous subsclaphium. Valva very similar to that of the preceding *F. ficuovorella* in form and structure, but more widely round apically, with a comma-

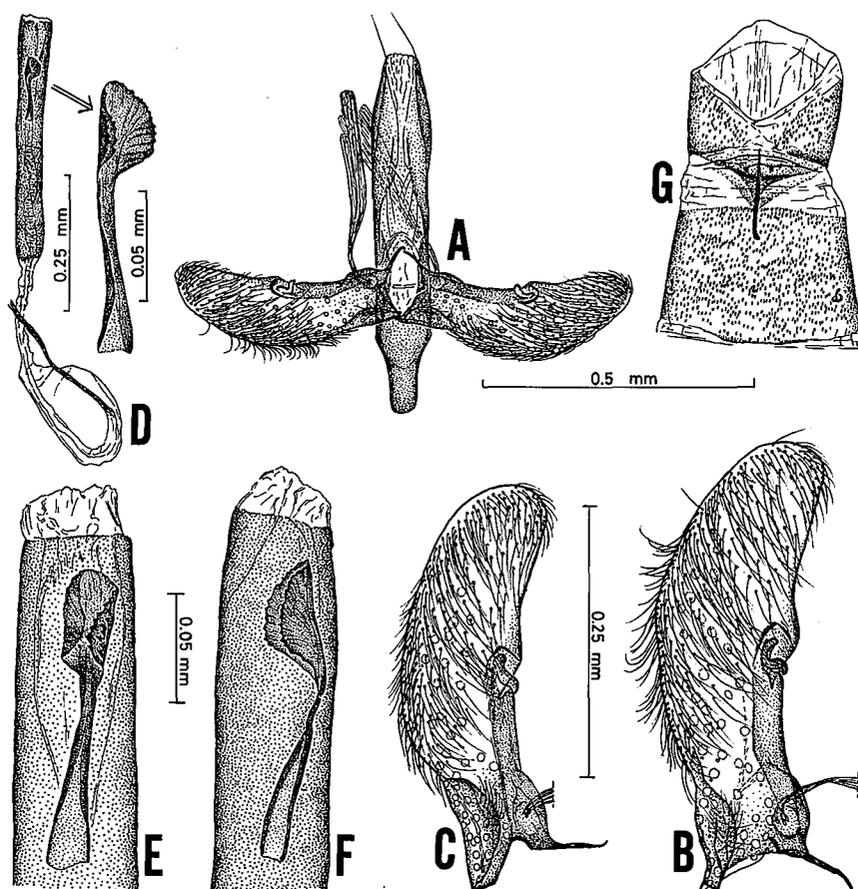


Fig. 10. *Melanocercops phractopa* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-802, Isigaki, Ryūkyū Is., 14/iv/1962, G. Kuno leg.] — B: Right valva enlarged [ditto] — C: Ditto [Grc-1891, Onoaida, Yaku-sima, Nansei Is., em. 2/xi/1973, ex *Ficus microcarpa* (1200)] — D: Aedeagus and cornutus enlarged [Grc-803, Isigaki, 14/iv/1962, G. Kuno leg.] — E: Apical part of aedeagus [Grc-802] — F: Ditto [Grc-1891] — G: Male 7th and 8th abdominal segments in ventral view [Grc-1892, Onoaida, Yaku-sima, em. 2/xi/1973, ex *F. microcarpa* (1200)].

shaped projection at middle of costa comparatively small, and usually with 3 long scales near costal base. Vinculum a little more than half length of aedeagus, with its apical half narrowed and nearly parallel-sided. Aedeagus about as long as valva, straight, tubular, truncated apically; vesica with a single cornutus of large, mashroom-shaped plate; ductus ejaculatorius short, about as long as valva, widened basally. Eighth abdominal segment about as long as the 7th, rather deeply notched ventrally; dorsocephalic apodeme slender on its apical 2/3, then widened basally, with a narrow sclerotization extending merely to anterior 1/4 of the tergite; a pair of ventral invaginations reduced into thickened points, without apical tuft. (Four sildes examined.)

Female genitalia (Fig. 9: B): Papilla analis short, about as long as 8th abdominal segment, covered with spinules rather densely and slender setae rather sparsely on anal margin; apophysis posterioris a little thicker and longer than apophysis anterioris. Ostium bursae moderate; antrum shortly sclerotized and ring-shaped; ductus bursae much slenderer than antrum, tubular, membraneous on entire length, lined with granules rather sparsely on cephalic half; corpus bursae elongate-pyriform, almost lined with granules which are a little larger than those on ductus bursae; signum is a spiniferous, large, clavate plate which is about as long as 7th abdominal segment. (Two slides examined.)

Specimens examined: 7♂♂ & 7♀♀. NANSEI IS. — 5♂♂ & 7♀♀, Onoaida, Yaku-sima, em. 24/x-5/xi/1973, ex *Ficus microcarpa* (1200). RYŪKYŪ IS. — 2♂♂, Miyako, 24/iv/1962, G. Kuno leg.

Distribution: Japan (Nansei Is.; Ryūkyū Is.); and India (Bengal).

Food plants: *Ficus microcarpa* Linn. (Moraceae) in Japan; *Ficus infectoria* Roxb., *F. bengalensis* Linn. and *F. indica* Linn. in India.

Remarks: The specimens examined are slightly different from the original description, especially in the ground colour of the fore wing. The present identification, however, is based on a direct comparison with specimens (1♂, labelled "6.x.1928, mining tender leaves of *Ficus bengalensis*, Pusa, Hag. Coll., Gen. sl. no. BM-14768", and 5 other specimens, all determined as *Acrocercops phractopa*) deposited in the British Museum (N.H.), London. Unfortunately, we have missed comparing them with the types of *A. phractopa*. Therefore, the present identification of Japanese material is temporary.

## XI. GENUS PHODORYCTIS KUMATA ET KUROKO NOV.

Type-species: *Cyphosticha caerulea* Meyrick, 1912.

Etymology: Phodoryctis (G.)=phodos (blister)+oryctis (digger, miner); feminine.

♂♀. Very similar to the preceding genus *Melanocercops* in many features of the adult stage except for the following points. Antenna as long as or a little longer than fore wing. Middle femur expanded with scales beyond middle as in *Gibbovalva*. Fore wing with veins  $M_1$  and  $M_2$  connate at base. In male genitalia, tegumen slightly dilated on apical half in ventral view, with more numerous fine setae along lateral margins; valva attenuate towards round apex; costal margin lobated before middle, with a lobe-like projection protruded from distal end of this lobated part; cucullus with a small, round subapical furrow not covered with setae; aedeagus with a pair of long projections stretched from base and reaching near apex of aedeagus;

8th abdominal sternum with a pair of long, stringy anterior invaginations. In female genitalia, antrum tubular, usually longer than wide; ductus bursae merged into slightly wider corpus bursae, both being entirely membraneous, not shagreened, without signum; 7th sternite with a large, well-sclerotized part where is not covered with scales.

Body chaetotaxy of last instar larva (Fig. 47: C-D): The body chaetotaxy is also somewhat similar to that of *Melanocercops*, but is more clearly distinguished from the latter by the following points. Prothorax without supposed seta XD2 as in *Acrocercops*. Sixth abdominal segment with setae SV1, SV2 and SV3 as in *Gibbovalva*. Seta V1 and proprioceptor MV3 absent on 7th abdominal segment in addition to the 8th and 9th; the proprioceptor MV3 is absent further on 2nd to 6th abdominal segments in *P. stephaniae* sp. nov.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments with crochets sparsely arranged in a circular row in the holotype, the anterior half of crochets becoming smaller and vestigial; in another species, *P. stephaniae*, crochets arranged in a posterior semicircular row alone. Anal proleg with crochets arranged in transverse or semicircular row in both species as usual to the most larvae of the *Acrocercops*-group.

Larval habit: The larva of this genus is a leaf-miner throughout the larval stage, and pupates outside the mine in the type species or inside the mine in *P. stephaniae*. The mine is always situated on the upper surface of the leaf; it is at first narrow, linear, and entirely epidermal, then suddenly widened into a large blotch with a blister-like upper surface in the type-species; in *P. stephaniae*, on the other hand, the mine starts in a small blotch on the upper surface of the leaf. When full-grown, the larvae of both the species change the body colour from creamy-white to crimson-red; then the larva of the type-species leaves the mine for a pupating site through a semicircular slit, while in *P. stephaniae* the larva makes a cocoon inside the mine. In both the species the cocoon is boat-shaped with an elliptical outline.

Remarks: In having the costal projection of the male valva, this new genus is somewhat related to the genera *Amblyptila* Vári, *Sauterina*, Kuznetsov, *Gibbovalva* (gen. nov.) and *Melanocercops* (gen. nov.), and it may form a group together with these genera. It is, however, distinguished from *Amblyptila* and *Sauterina* by the fore wing venation: in the former the veins R<sub>4</sub> and R<sub>5</sub> are long-stalked basally, while in the latter two they are separated from each other at their bases. From *Gibbovalva* it is also at once distinguished by the smooth antennal scape, by the absence of vein Cu<sub>1b</sub> on the fore wing, by the presence of the paired long projections of the aedeagus, and by the presence of the naked and sclerotized area on the female 7th abdominal sternite in addition to the difference in the larval body chaetotaxy. In the adult characters it may be most closely related to *Melanocercops*, from which it cannot clearly be separated except for the genital characters as mentioned in the description; on the other hand, in the larval stage it can be distinguished from *Melanocercops* by the absence of seta XD2 on the prothorax and the presence of SV3 on the 6th abdominal segment.

Among the Japanese members of the *Acrocercops*-group the following 2 species are undoubtedly members of the present genus, one feeding on Leguminosae and the other on Menispermaceae. In addition to them, 2 South African species, *Acrocer-*

*cops thrypticosema* Vári, 1961 and *A. dolichophila* Vári, 1961, are referable to *Phodoryctis*, though the former was once transferred to *Saulerina* by Kuznetsov (1979); these South African species are also leaf-miners of leguminose plants.

#### Key to the Japanese species of *Phodoryctis*

1. Male valva with a round incision just before round apex of ventral margin; costal process of valva more or less trapeziform; male aedeagus outward-obliquely truncated apically, with a pair of long basal processes having many minute, acute projections along outer margins around their apices; female 7th abdominal sternum with a large, trapeziform sclerite, of which the cephalic margin is deeply incised or concaved; leaf-miner on wild and cultivated beans of Leguminosea. .... *P. caerulea* (Meyrick), comb. nov.
- Male valva without any incision along ventral margin; costal process of valva smaller and somewhat comma-shaped; male aedeagus inward-obliquely truncated apically, with a pair of basal processes having a few minute, round or acute projections at apices; female 7th abdominal sternum with a trapeziform or pentagonal sclerite, of which the cephalic margin is convex or sinuate; leaf-miner on *Stephania* spp. of Menispermaceae. .... *P. stephaniae* Kumata et Kuroku, sp. nov.

#### 26. *Phodoryctis caerulea* (Meyrick), comb. nov.

[Figs. 11, 36(A-B), 43(A), 47(C) and 52(D-E)]

*Cyphosticha caerulea* Meyrick, 1912, Exot. Microlep. 1: 26 [India (Bengal): host: *Crotalaria juncea*, *Vigna sinensis*]; Fletcher, 1920, Mem. Dept. Agr. India, Ent. Ser. 6: 161 [India (Bengal, Tamil Nadu); host: *Vigna catjang*, *Vicia faba*, *Dolichos lablab*, *Cajanus indicus*, *Phaseolus mungo*].

*Acrocercops caerulea*: Fletcher, 1933, Imp. Counc. Agr. Res., Sci. Monogr. 4: 47 [West Africa, Fiji, India (Bengal); host: *Tinospora cordifolia*, *Stephania hernandifolia*, *Dioscorea deltoidea*, *Carissa carandas*]; Meyrick, 1934, Exot. Microlep. 4: 473 [India (Bombay); host: *Cissampelos pareira*]; Kuroko, 1961, Sci. Bull. Fac. Agr. Kyushu Univ. 18: 315 [Japan (Nansei Is.); host: *Vigna marina*]; Ibid., 1982, Moths Jap. 1: 188, & 2: pl. 6 (11) [Japan, Taiwan; host: *Phaseolus vulgaris*].

*Acrocercops caerulea* (!): Bradley, 1961, Bull. Brit. Mus. (N.H.) Ent. 10: 157 [Solomon Is. (Ontong Java)].

*Cyphosticha centrometra* Meyrick, 1920, Exot. Microlep. 2: 296 [Fiji; host: *Phaseolus semirectus*, *Caravalia* sp.].

Original description of *Cyphosticha caerulea*: "♂. 7 mm. Head and thorax shining whitish-fuscous, with violet-blue reflections, face whitish. Palpi whitish, terminal joint with dark fuscous suprmedian band. Abdomen bluish-fuscous. Legs white, anterior and middle tibiae and femora violet-blackish. Forewings very narrow, long-pointed; light grey with strong shining violet-blue reflections, irrorated with blackish; four whitish costal spots, first at 1/4, last towards apex: cilia pale grey, sprinkled with blackish towards base, at apex with two blackish lines. Hindwings grey; cilia pale grey."

Original description of *Cyphosticha centrometra*: "♂. 6 mm. Head, thorax whitish mixed leaden-grey. Palpi whitish, tips of second and terminal joints dark grey. Abdomen grey, beneath whitish, sides obliquely marked dark fuscous. Anterior and middle femora and tibiae dark fuscous, tarsi white, middle femora with apical tuft of scales beneath. Forewings narrowly elongate-lanceolate; dark purple-fuscous, whitish-speckled; round whitish dots on costa at middle, 3/4, and near apex: cilia light grey. Hindwings and cilia grey."

Additional description: ♂ ♀. Expanse of wings: 5.4-6.5 mm (6.06 mm on an average of 5 specimens). Length of fore wing: 2.5-3.1 mm (2.81 mm on an average of 8 specimens).

Face gray-whitish, fuscous laterally; head brilliantly gray, darker posteriorly.

Maxillary palpus dull whitish, with apical segment fuscous; labial palpus dull whitish, with tips of 2nd and apical segments dark fuscous as in original description of *C. centrometra*. Antenna about as long as fore wing, fuscous, feebly annulated with paler colour, beneath buff whitish; scape smooth, fuscous. Thorax fuscous dorsally, with median area slightly paler in some specimens; ventrum dull whitish, with an oblique fuscous band laterally. Legs buff whitish; anterior 4 femora and tibiae dark fuscous, the middle femur being slightly thickened with raised scales below apically; hind tibia very slightly darkened at median area laterally; all tarsi indistinctly ringed with darker colour. Abdomen dorsally dark grayish or fuscous,

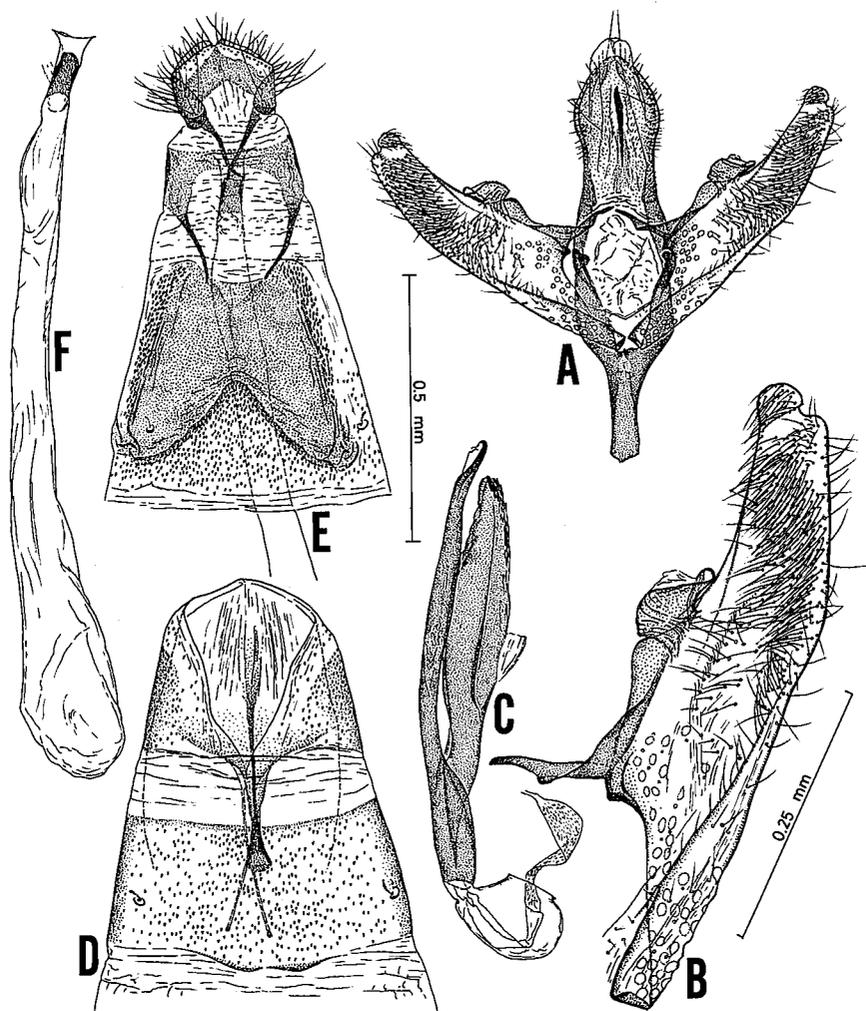


Fig. 11. *Phodoryctis caerulea* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-1764, Onoaida, Yaku-sima, Nansei Is., em. 9/xi/1973, ex *Vigna marina* (1221)] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view, apical part of bursa copulatrix omitted [Grc-1765, ditto] — F: Bursa copulatrix [ditto].

ventrally dull whitish, with a narrow ventromedian blackish line, without oblique lateral bands.

Fore wing as in original description of *C. caerulea* in ground colour, with 4 small, whitish to pale ochreous costal spots, the 1st spot at basal 1/4 being usually indistinct or rarely absent as in *C. centrometra*, and the 3rd and 4th spots connected with each other through ochreous line along costal margin in a few specimens; cilia as in original description of *C. caerulea*.

Male genitalia (Fig. 11 : E-F): Tegumen moderate in length, spatulate in ventral view, with about 20 pairs of fine setae along lateral margins beyond middle and with microspines on lateral margins before apical 1/4; tuba analis with a slender subscaphium, and with microspines scattered on sides of subscaphium. Valva a little longer than tegumen, rather narrow, tapering apically, with a small round incision near apex of ventral margin; costa moderately lobated just before middle of valva, with a trapeziform process projected from distal end of the lobated part; fine setae occurring on inner surface of round apex and on that from subapical incision to basal 1/3 rather densely; long linear androconial scales scattered on outer surface near base. Vinculum Y-shaped, with saccus about 1/3 as long as valva and blunt apically. Aedeagus about 1.3 times as long as valva, tubular, tapering apically, slightly sinuate, with a pair of long processes produced from base, reaching near apex of aedeagus and bearing a series of acute, minute projections along outer margins and around apices; vesica without any cornutus; ductus ejaculatorius short, round. Eighth abdominal segment about as long as the 7th, deeply notched ventrally; dorsocephalic apodeme about 3/4 as long as 7th abdominal segment, capitated apically, with median sclerotization extending to middle of 8th segment; a pair of ventral invaginations extremely slender, connate at base, about 1.5 times as long as dorsal apodeme. (Three slides examined.)

Female genitalia (Fig. 11 : A-D): Papilla analis rather small, obliquely transverse in lateral view, covered with microspines on whole surface and usual fine setae along caudal margin rather densely; apophysis posterioris slender, moderate in length, a little shorter than apophysis anterioris. Ostium bursae rather small in opening size, without sclerous genital plate; antrum moderately long, tubular; ductus bursae and corpus bursae membranous, with signum absent. Sternum of 7th abdominal segment more or less sclerotized in a trapeziform on its most part, the sclerotized part being not covered with scales and rather deeply incised on its cephalic margin. (Six slides examined.)

Specimens examined: 9♂♂ & 13♀♀. NANSEI IS. — 1♂ & 2♀♀, Onoaida, Yaku-sima, em. 9-11/xi/1973, ex *Vigna marina* (1221). TAIWAN — 2♀♀, Oulanpi, Pintung, em. 22/vii/1979, ex *Dumais bicolor* (1994). INDONESIA — 8♂♂ & 7♀♀, Maura, Bogor, W. Java, 12/viii/1985, ex Soya bean (*Glycine max*), K. Homma leg. INDIA — 2♀♀, Bangalore, Karnataka, em. 14/ii/1978, ex *Dolichos lablab* (Ind-16).

Distribution: Japan (Nansei Is.); Taiwan; Fiji; Solomon Is.; Guam; Indonesia (Java) (new record); India; and West Africa.

Food plants: *Vigna marina* Merr. (Leguminosae) in Japan. *Dumais bicolor* Hayata and *Phaseolus vulgaris* Linn. (Leguminosae) in Taiwan. *Phaseolus semierectus* Linn. and *Caravalia* sp. (Leguminosae) in Fiji. *Glycine max* Merr. (Leguminosae) in Indonesia. *Cajanus indicus* Sprengel (= *C. cajan* Mill.), *Crotalaria juncea* Linn., *Dolichos lablab* Linn., *Phaseolus mungo* Linn., *Vigna sinensis* Savi and

*V. catjang* Walp. (Leguminosae); *Stephania hernandifolia* Walp., *Tinospora cardifolia* Miers. and *Cissampelos pereira* Linn. (Menispermaceae); *Dioscorea deltoidea* Wallich (Dioscoraceae); and *Carissa carandas* Linn. (Apocynaceae) in India. The plants other than Leguminosae might be omitted from the food of *P. caerulea* (see Remarks).

Remarks: This species is distributed widely in tropical and subtropical areas of the Old World in association with cultivated and wild beans. Though it is sometimes a severe pest of soya-bean, pigeon-pea and long-bean in tropical Asia, in Japan we have collected it mining in leaves of wild bean (*Vigna marina*) alone on seashores.

The insects mining in leaves of the plants belonging to Menispermaceae, Dioscoraceae and Apocynaceae might be referred to other species, respectively. In fact, we have many other specimens which are reared from Menispermaceae and are different from the present species only in the genital structure; a new species for them will be described in the following lines.

27. *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov.

[Figs. 12, 36 (C-D), 41(D), 43(B), 47(D) and 52(F)]

♂ ♀. Expanse of wings: 5.8-8.1 mm (7.2 mm in holotype, 6.63 mm on an average of 23 specimens). Length of fore wing: 2.4-3.8 mm (3.4 mm in holotype, 3.17 mm on an average of 23 specimens).

Face and head buff-whitish, somewhat grayish laterally, the latter becoming leaden-grayish with bluish reflections posteriorly. Palpi buff-whitish; apical segment of maxillary palpus blackish; apex of 2nd segment of labial palpus narrowly and that of apical segment rather broadly blackish. Antenna about as long as fore wing, dark fuscous, becoming paler towards base, feebly annulated with paler colour; scape smooth, entirely blackish. Thorax leaden-grayish with purple reflections, the posterior half of ventrum being buff-whitish. Anterior 4 legs dark fuscous or blackish, the coxae becoming whitish basally, the tibiae with 1 or 2 narrow white lateral bands, the tarsi whitish, with 4 or 5 fuscous bands beneath; middle femur slightly thickened with raised scales beneath apically. Hind leg buff-whitish, irrorated with a few fuscous speckles at median parts of coxa, femur and tibia, the tarsus with 5 fuscous rings in most specimens including holotype or with 5 fuscous bands beneath in some specimens. Body dorsally dark leaden-grayish, ventrally buff-whitish with a narrow fuscous median line; sides irrorated with fuscous speckles, which form indistinct lateral bands in a few specimens.

Fore wing ochre-grayish, heavily speckled with dark fuscous, with bluish or purplish iridescence in ground colour; 4 buff-whitish or ochre-whitish costal spots at basal 1/4, middle, a little before 3/4 and near apex, the first 3 spots extending obliquely towards disc to various extent in most specimens, and the last spot oblique inwardly; in a few specimens 2 additional ochreous spots placed on dorsum, nearly opposite to the first 2 costal spots; a very small whitish spot placed at apex of wing in most specimens; cilia around apex of wing and along termen gray-whitish, with 2 or 3 lines of blackish irrorations, and those along dorsal margin ochre-whitish and becoming pale grayish apically. Hind wing dark gray, with cilia pale gray.

Male genitalia (Fig. 12: A-D): Tegumen rather short, spatulate in ventral view, with apical half widely dilated and basal half partly lobated laterally; 15-20 pairs of

fine setae arranged in a row along lateral margins of dilated apical half; acute microspines occurring on lateral margins of apical 2/3. Valva about 1.5 times as long as tegumen, slightly upturned, tapering towards round apex, with a shallow, round hollow on inner surface near apex; costa rather strongly lobated at basal 1/3, with a comma-shaped process projected from distal end of this lobated part; a number of fine setae occurring on inner surface rather densely except on the subapical hollow; long linear androconial scales scattered on outer surface near base. Vinculum Y-shaped, rather widened on ventrum, with a shortly acuminate saccus. Aedeagus a little longer than valva, slender-tubular, slightly arched, with a pair of long processes projected near base, reaching near apex of aedeagus and bearing a few round or acute, minute projections at apices; vesica without any

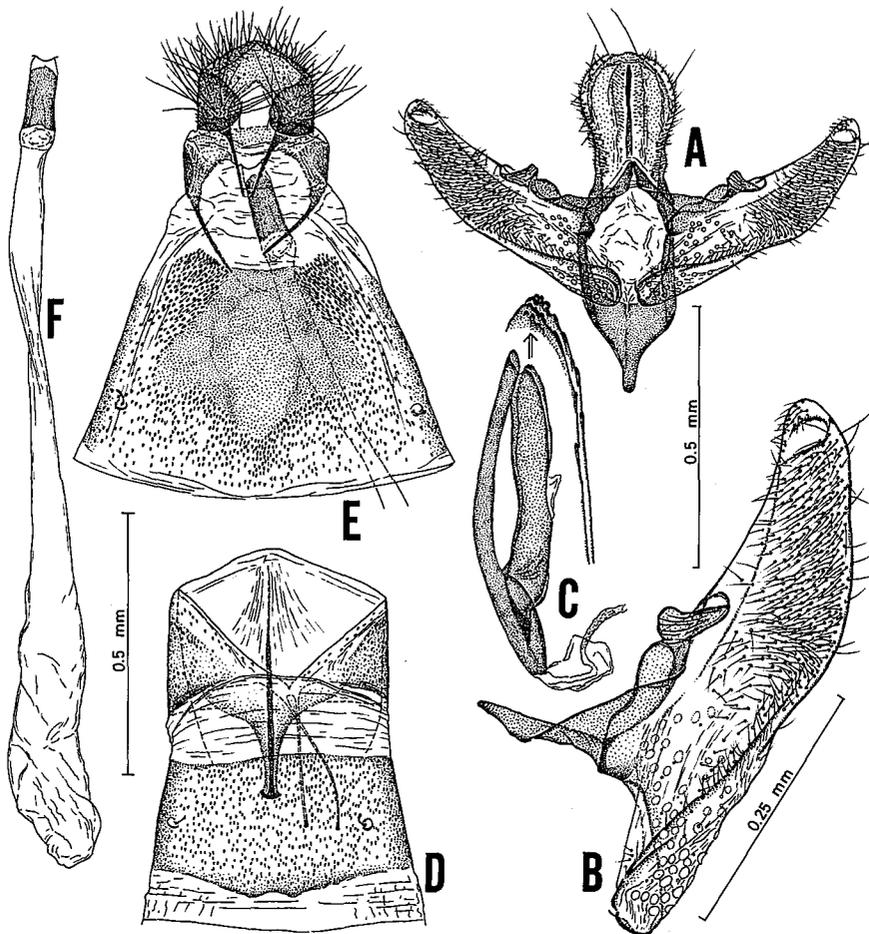


Fig. 12. *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-1762, holotype] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view, apical part of bursa copulatrix omitted [Grc-1763, Anb6, Yaku-sima, Nansei Is., em. 14/xi/1973, ex *Stephania japonica* (1232)] — F: Bursa copulatrix [ditto].

cornutus; ductus ejaculatorius short, round. Eighth abdominal segment about as long as the 7th, deeply incised ventrally; dorsocephalic apodeme moderate in length, narrowing towards truncate apex, with a median sclerotization extending to middle of 8th abdominal segment; a pair of ventral invaginations slender, convergent basally, 1.7-2 times as long as dorsal apodeme. (Eleven slides examined.)

Female genitalia (Fig. 12: E-F): Papilla analis rather short, obliquely transverse in lateral view, covered with microspines on whole surface and with usual fine setae along caudal margin rather densely; apophysis posterioris moderate in length, a little shorter than apophysis anterioris, slender, but slightly widened at base. Ostium bursae small in opening size, without sclerous genital plate; antrum tubular, moderately long, nearly as long as apophysis posterioris; ductus and corpus bursae membranous, without any signum. Seventh sternum with a large trapeziform or pentagonal sclerotized plate, which is not covered with scales and more or less straight or convex cephalad on its cephalic margin. (Eight slides examined.)

Specimens examined: 79♂♂ & 62♀♀. Holotype: ♂, Anbō, Yaku-sima, Nansei Is., Japan, em. 11/xi/1973, ex *Stephania japonica* (1232), Gen. sl. no. Grc-1762. Paratypes: HONSHŪ — 3♂♂, Nati, Wakayama-ken, em. 5-12/xi/1966, ex *S. japonica*; 14♂♂ & 23♀♀, Kii-Ōsima, Wakayama-ken, em. 7-26/x/1974, ex *S. japonica* (1339). SIKOKU — 11♂♂ & 9♀♀, Tosasimizu, Kōti-ken, em. 27/x-20/xi/1980, ex *S. japonica* (2230); 4♂♂ & 2♀♀, Asizuri-misaki, Kōti-ken, em. 20/vi/1957, ex *S. japonica* (281); 12♂♂ & 8♀♀, ditto, em. 27/x-21/xi/1980, ex *S. japonica* (2243). NANSEI IS. — 14♂♂ & 4♀♀, Mugiō, Yaku-sima, em. 1-17/xi/1973, ex *S. japonica* (1182); 8♂♂ & 6♀♀, Anbō, Yaku-sima, em. 6-16/xi/1973, ex *S. japonica* (1232). TAIWAN — 1♂, Lienhuachih, Nantou, em. 10/vii/1979, ex *S. japonica* (1866); 1♂, Lushan, Nantou, em. 10/vii/1979, ex *S. japonica* (1928a). NEPAL — 4♂♂ & 3♀♀, Suri Dhoban-Gongar (alt. 1100-1300 m), Janakpur, em. 3-11/xi/1983, ex *S. japonica* (Npl-407); 1♀, Malipu-Suri Dhoban (alt. 1000-1100 m), em. 2/ix/1983, ex *S. japonica* (Npl-303); 4♂♂ & 3♀♀, Balaju (alt. 1400 m), Kathmandu Valley, Bagmati, em. 9-10/viii/1983, ex *S. japonica* (Npl-232); 1♀, Balaju-Jamachok (alt. 1400-2000 m), em. 5/x/1983, ex *S. japonica* (Npl-651); 2♀♀, Kuinibisona (alt. 2000 m), No. 1 West, 22/vii/1968, ex *Stephania* sp. (Npl-129); 2♂♂, Adhabar, Terai Forest, em. 1/viii/1968, ex *Stephania* sp. (Npl-154).

Distribution: Japan (Honsyū; Sikoku; Nansei Is.); Taiwan; and Nepal.

Food plants: *Stephania* spp. including *S. japonica* Miers (Menispermaceae) in Japan, Taiwan and Nepal.

Remarks: This new species is so closely similar to the preceding species, *P. caerulea*, in colour pattern, that it was confused with the latter (Fletcher, 1933; Meyrick, 1934). It is, however, clearly distinguished from *P. caerulea* by the genital structures as mentioned in the key. Moreover, it may be different from *P. caerulea* in the food plant preference: all the specimens of *P. stephaniae* emerged from *Stephania* spp., family Menispermaceae, while authentic specimens of *P. caerulea* examined here were reared from wild and cultivated beans of Leguminosae. The specimens recorded from Dioscoraceae and Apocynaceae and determined as *A. caerulea* by Fletcher, 1933 may also represent different species, respectively.

## XII. GENUS BORBORYCTIS KUMATA ET KUROKO NOV.

Type-species: *Borboryctis euryae* Kumata et Kuroko, sp. nov.

Etymology: *Borboryctis* (G.)=borbos (fleshy, swollen)+oryctis (digger, miner); feminine.

♂♀. Face and head smooth-scaled; ocelli absent; proboscis moderately developed, naked. Labial palpus usually drooping, slightly upturned, rather long, entirely smooth; apical segment a little longer than the 2nd, pointed apically.

Maxillary palpus usually porrect, slightly roughened below apically, about half as long as apical segment of labial palpus. Antenna 1.2-1.4 times as long as fore wing, filiform, simple in both sexes; scape slightly thickened, simple, without any pecten or flap. Thorax smooth-scaled, without a dorsal crest. Legs rather long, smooth-scaled except for hind tibia which has a row of bristly scales above; middle tibia slightly thickened apically; hind tarsus smooth, as long as or a little shorter than hind tibia.

Fore wing narrow, lanceolate, rather obtuse or blunt at apex; discoidal cell occupying about basal 5/7 of wing, slightly dilated apically, truncated distally, with upper vein obsolescent on proximal part; 13-veined;  $R_1$  moderately long, running from about basal 1/3 of cell to about middle of costa;  $R_2$  from a little before upper angle of cell;  $R_3$  from upper angle;  $R_4$  and  $R_5$  stalked;  $M_1$  freely from distal margin of cell;  $M_2$  and  $M_3$  connate or separate at base, and from around lower angle;  $Cu_{1a}$  apart from  $M_3$ ;  $Cu_{1b}$  obsolescent basally, running in parallel with  $Cu_{1a}$ ; An weakened entirely, probably connected with dorsal margin at basal 1/4 of wing. Hind wing very narrow, nearly linear, 2/5-1/2 as wide as and about 7/8 as long as fore wing, with cell opened between  $M_2$  and  $M_3$ ; 7-veined, with venation not obviously different from that of *Acrocercops*; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen long, slender, sclerotized laterally, strongly dilated around median part in ventral view, with fine setae along lateral margin around dilated part and at apex; tuba analis with or without subscaphium. Valva slender, long, nearly parallel-sided, round apically, with a finely striated and fan- or tongue-shaped small plate projected from median area near costal margin; fine seta occurring on apical half of inner surface densely and along ventral margin sparsely; long, linear androconial scales on outer surface near base densely and near ventral margin sparsely. Vinculum V-shaped, with lateral arms slender and long, and without a distinct saccus in type-species. Diaphragma membranous, without any particular sclerite. Aedeagus long, narrow, tubular, usually attenuate apically; vesica without cornuti; ductus ejaculatorius moderate to long. Eighth abdominal segment deeply notched ventrally; tergum with a narrow anterior apodeme of which the median sclerotization narrowly extends caudad onto the tergite; sternum with a pair of anterior invaginations very slender, membranous, usually longer than dorsal apodeme.

Female genitalia: Papilla analis small, obliquely transverse in lateral view, blunt dorsally and ventrally, setose as usual; apophysis posterioris slender, moderate in length. Eighth abdominal segment short, weakly sclerotized dorsally and widely membranous ventrally; apophysis anterioris slender, slightly widened basally, usually longer than apophysis posterioris. Ostium bursae opened near caudal area of ventrum of 8th segment, small to moderate in opening size; antrum shortly sclerotized, ring-shaped, usually as long as wide; ductus bursae long, tubular, membranous, strongly shagreened on almost whole length; corpus bursae comparatively small, usually recurved, with many spine-like small signa.

Body chaetotaxy of last instar larva (Fig. 48: A): The larva of the type-species alone is available; the body chaetotaxy is very similar to that of the genus *Acrocercops* except that the seta SV3 is absent on the 2nd abdominal segment. It is also different from that of the preceding genus *Phodoryctis* in the presence of the following setae and proprioceptors: the seta V1 on the 7th to 9th abdominal segments, the

proprioceptor MV3 on the 7th, and the proprioceptor MD1 on the 9th.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments and anal proleg on the 10th each with a few crochets arranged in a transverse row as in *Deoptilia* Kumata et Kuroko.

Larval habit: The larva of the type-species is a leaf-miner throughout its feeding period. The larva at first makes an epidermal, linear and serpentine mine on the upper side of the leaf, thereupon it enters into a layer between the upper and lower parenchymal tissues, and makes an elongate blotch-mine with swollen surfaces on the leaf. The linear part of the mine is whitish with a glassy lustre, while the blotchy and swollen part is usually pale yellowish or sometimes reddish in colour. The upper side of mining part is finally loosened by the feeding of the upper layer of parenchymal tissues. When full-grown, the larva changes the body colour from creamy-white to red, then leaves the mine through a semicircular slit made on the loosened upper epidermis. The cocoon is usually found on the upper surface of leaves neighbouring the mined leaf, and boat-shaped with an elliptical outline, with a single whitish and minute bubble on the surface.

Remarks: This new genus is very closely related to the preceding genus *Phodoryctis* in the wing venation, male pregenital segments and larval chaetotaxy, but is immediately distinguished from the latter by the blunt or obtuse apex of the fore wing, by the simple aedeagus, by the V-shaped vinculum with long lateral arms, and by the normal structure of the female 7th abdominal sternite, in addition to the presence of the vein  $Cu_{1b}$  of the fore wing and the seta V1 on all the abdominal segments of the larva. It is also separated from the genus *Gibbovalva* (gen. nov.) by the smooth antennal scape, and from the genus *Melanocercops* (gen. nov.) by the presence of the vein  $Cu_{1b}$  of the fore wing and by the long anterior invaginations of the male 8th abdominal sternite; further, it is distinct from both the genera in the obtuse or blunt apex of the fore wing and in the absence of the supposed seta XD2 on the larval prothorax. The interparenchymal and swollen mine of the larva also serves to distinguish it from the related genera mentioned above.

The following 2 species are treated in this paper as members of the new genus, though there are some doubts about the inclusion of *Acrocercops triplaca* Meyrick in the genus as discussed later. The type-species is a leaf-miner of *Eurya* spp. (Theaceae), while *B. triplaca* is unknown about its food plant.

#### Key to the Japanese species of *Borboryctis*

1. Fore wing with 3 white transverse fasciae alternated with 3 brownish ones; male valva with 2 tufts of long androconial scales on outer surface, one near base of costa and the other near base of sacculus, and without a group of minute circular scent scales; male aedeagus with many rows of short transverse processes near apex; vinculum with a rather long and acuminate saccus; food plant unknown. . . . . *B. triplaca* (Meyrick), comb. nov.
- Fore wing white in ground colour, with 2 narrow gray-brownish fasciae which are oblique inwardly and more or less widened costally; male valva with a group of small circular scent scales on outer surface at apical 1/3 near costa and with long androconial scales along ventral margin throughout; male aedeagus with surface smooth, without any process near apex; vinculum without any projecting saccus; leaf-miner on *Eurya*.  
. . . . . *B. euryae* Kumata et Kuroko, sp. nov.

28. *Borboryctis euryae* Kumata et Kuroko, sp. nov.

[Figs. 13, 37(A-B), 41(E), 43(C), 48(A) and 53(A-C)]

♂ ♀. Expanse of wings: 6.9-8.1 mm (7.5 mm in holotype, 7.50 mm on an average of 22 specimens). Length of fore wing: 3.2-3.9 mm (3.5 mm in holotype, 3.55 mm on an average of 22 specimens).

Face, head and thorax brilliant white; tegulae fuscous anteriorly. Maxillary palpus very slender, white. Labial palpus smooth-scaled, white, with 2nd segment having a longitudinal fuscous line laterally. Antenna about 1.2 times as long as fore wing, grayish-white, faintly annulated with fuscous above, the annulations becoming more or less distinct towards apex; scape white, with a slender, grayish dorsal line in fresh specimens. Legs white; fore coxa with a median fuscous blotch and a subapical spot laterally; fore and middle femora fuscous at apex, the tibiae with 2 blackish bands in middle and at apex, and the tarsi with 5 blackish rings alternated with white ones at nearly equal intervals; outer apical spur of middle tibia wholly black; hind coxa with a small fuscous apical spot, the tibia with a small premedian ring and an elongate apical one blackish, and the tarsus with 4 rather broad blackish rings. Abdomen pale gray dorsally, whitish ventrally, with 5 oblique, narrow fuscous bands laterally.

Fore wing brilliant white in ground colour, with costa very narrowly blackish throughout; grayish-brown or fuscous marks arranged as follows:— a narrow streak running along costa from base to basal 1/4 of wing, slightly widened basally; a fascia stretched from apex of this streak towards dorsum, but detached from dorsum, slightly oblique inwardly and widened costally; a broad fascia at middle, nearly parallel to the preceding, widened costally and producing a narrow line along costa towards apical 1/4 of wing, sometimes enclosing indistinct, small paler or whitish spots at costa, in disc and at dorsum; a longitudinal, short line lying near costa between median fascia and a large subapical blotch, which is circular or elliptical, occupies almost whole the subapical space of the wing and is suffused by jet-black in its centre; a small spot on costa between median fascia and subapical blotch; a narrow strigula running from tornus to subapical blotch. Cilia around apex of fore wing pure white, with a blackish subapical line curved from costa towards tornus, and those along dorsal margin gray. Hind wing and its cilia gray.

Male genitalia (Fig. 13: A-D): Tegumen very elongate, partly well swollen around apical 1/3 in ventral view, then narrowed apically, with a pair of fine setae at apex and 20-30 pairs of shorter setae situated inside the swollen areas; microspines occurring densely on median 1/3 of lateral margins; tuba analis with a short and narrow subscaphium at base. Valva long, rather slender, nearly parallel-sided, round apically, on inner surface with a small, mushroom- or fan-shaped projection projected from a shallow pouch at middle near costal margin and with dense fine setae on apical half; a group of 35-45 very small, circular scent scales placed on outer surface just beyond mushroom-shaped projection; many liner androconial scales along ventral margin rather sparsely and at base densely. Vinculum with narrow and long lateral arms, without any apically projecting saccus. Aedeagus about as long as valva, tubular, slightly narrowed apically, with a minute hook at apical extremity; vesica without any cornutus; ductus ejaculatorius slen-

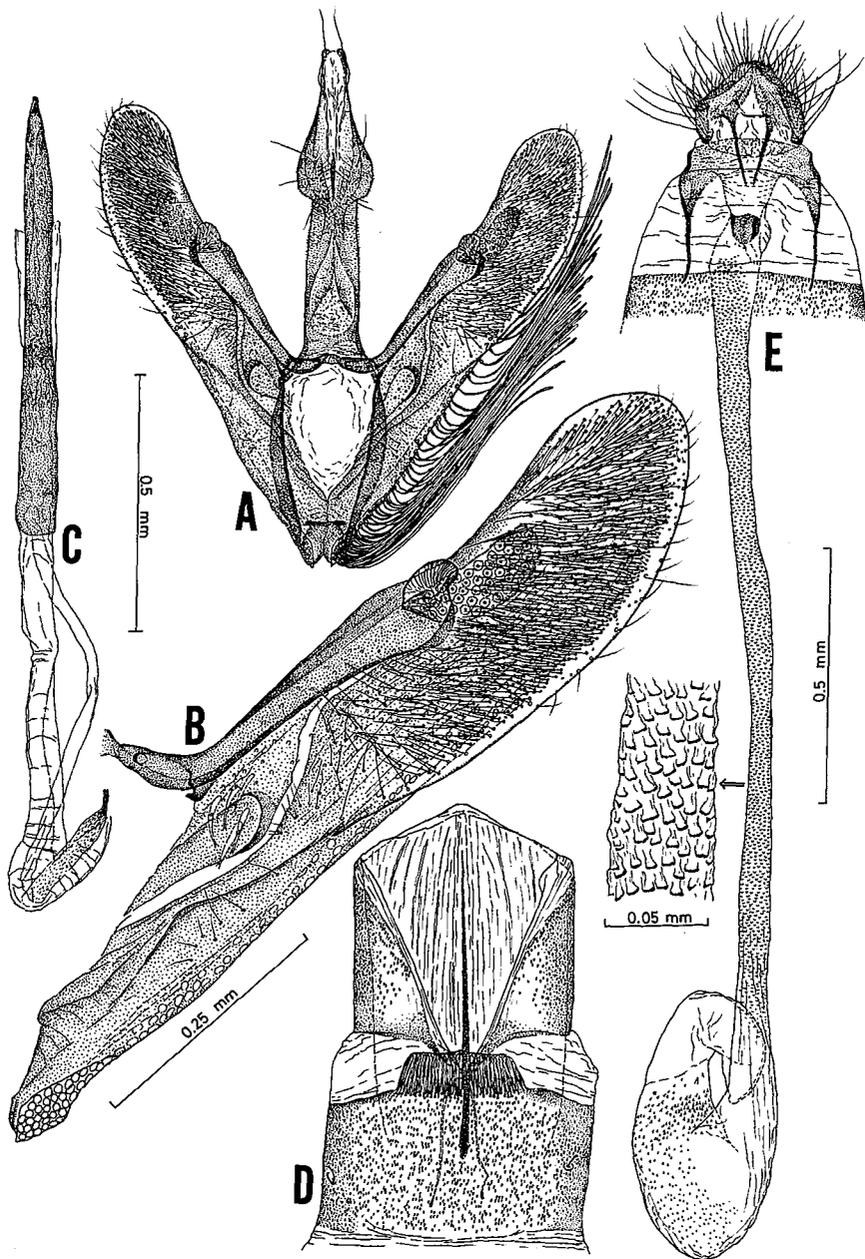


Fig. 13. *Borboryctis euryae* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-1646, holotype] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view [Grc-1648, Kozagawa, Wakayama-ken, em. 15/vi/1970, ex *Eurya japonica* (1038)].

der, long, a little shorter than valva. Eighth abdominal segment a little longer than the 7th, deeply notched ventrally; dorsocephalic apodeme slender, with median sclerotization extending near caudal margin of 8th tergite; a pair of ventral invaginations connate at base, very slender, about 1.8 times as long as dorsal apodeme. Seventh abdominal segment with a trapeziform plate on caudal margin of sternite, the plate composed of many specialized scales.

Female genitalia (Fig. 13: E): Papilla analis short, transversely slender in lateral view, covered with microscopic spines along caudal area and usual slender setae densely; apophysis posterioris slender, short, about 3/4 as long as apophysis anterioris. Ostium bursae moderate in opening size, without any sclerite; antrum short, ring-shaped; ductus bursae slender, long, tubular, about 3 times as long as 7th abdominal segment, lined with scale-like sculpture on almost whole length; corpus bursae rather small, reversedly turned twice, thus apex pointing cephalad, with many minute spine-like signa scattered around median area, the signa at inner median area being a little larger. (Four slides examined.)

Specimens examined: 33♂♂ & 31♀♀. Holotype: ♂, Kozagawa, Wakayama-ken, Honsyū, em. 17/vi/1970, ex *Eurya japonica* (1038), Gen. sl. no. Grc-1646. Paratypes: HONSYŪ — 2♂♂ & 5♀♀, Kozagawa, Wakayama-ken, em. 3-15/vi/1964, ex *E. japonica* (652); 17♂♂ & 14♀♀, ditto, em. 9-17/vi/1970, ex *E. japonica* (1038); 10♂♂ & 7♀♀, ditto, em. 31/x-16/xi/1974, ex *E. japonica* (1290). SIKOKU — 1♂ & 5♀♀, Ino, Kōti-ken, em. 25/vi-3/vii/1957, ex *E. japonica* (328); 3♂♂, ditto, em. 8-17/xii/1980, ex *E. japonica* (2207). KYŪSYŪ — 1♂, Hikosan, Hukuoka-ken, em. 23/v/1979, ex *E. japonica*, I. Kanazawa leg. TUSIMA — 1♂, Izuhara, em. 7/xii/1979, ex *E. emarginata* (2072).

Distribution: Japan (Honsyū; Sikoku; Kyūsyū; Tusima).

Food plants: *Eurya japonica* Thunb. and *E. emarginata* Makino (Theaceae).

Remarks: This new species may be more similar to *Acrocercops barringtoniella* (Deventer, 1904) than to the following *B. triplaca* (Meyrick). *A. barringtoniella* is originally described from Java, Indonesia, as a leaf-miner of *Barringtonia spicata*, and we have examined 3 specimens of it collected from W. Malaysia. The new species is, however, at once distinguished from *A. barringtoniella* by the gray-brownish markings of the fore wing, by the male valve having a mushroom-shaped projection on the inner surface and a group of circular scent scales on the outer surface, and by the straight and membranous female ductus bursae. In *A. barringtoniella*, the fore wing shows a slightly different pattern of bluish markings; the male valva has a spoon-shaped projection on the inner surface and well-branched projections on the outer surface; and the female ductus bursae is partly sclerotized near cephalic area and reversedly turned twice at this sclerotized part. *Barringtoniella* may be a member of the genus *Borboryctis*.

## 29. *Borboryctis triplaca* (Meyrick), comb. nov.

[Figs. 14, 37(C-D) and 43(D)]

*Acrocercops triplaca* Meyrick, 1908, Journ. Bomb. nat. Hist. Soc. 18: 817 [India (Khasi Hills)].

Original description: "♂. 12 mm. Head shining white. Palpi white, upper edge of second joint dark fuscous. Antennae white, suffusedly spotted with grey. Thorax brown. Abdomen grey, beneath white ringed with fuscous. Legs white, banded with dark fuscous. Forewings very narrowly elongate, short-pointed, obtuse; rather dark brown; three shining white fasciae, first towards base, broad, broadest on dorsum, second median, moderate, dilated towards dorsum, third

towards apex, rather narrow, anteriorly rather convex, preceded by blackish suffusion; beyond this is a blackish longitudinal spot, terminated by a white apical dot: cilia brownish with some whitish suffusion on lower extremity of third fascia, and a postmedian dark fuscous shade round apex. Hindwings and cilia grey."

Additional description: ♂ (♀ unknown). Expanse of wings: 11.7-12.3 mm (11.93 mm on an average of 3 specimens). Length of fore wing: 5.5-6.1 mm (5.75 mm on an average of 4 specimens).

Face and head shining white. Palpi white; basal segment of maxillary palpus fuscous; 2nd segment of labial palpus with an apically projecting short scales beneath, and with upper edge dark fuscous as in original description. Antenna about 1.2 times as long as fore wing; scape smooth, wholly white. Thorax shining white, not brown; tegula anteriorly brownish; pleural surfaces with a brownish oblique stripe. Legs white; fore coxa fuscous at apex; fore and middle femora dark fuscous on basal half, the tibiae fuscous on apical 2/3-1/2, and the tarsi with 1st segment ringed with blackish at subbase and subapex, and 2nd and 3rd segments also at middle; hind coxa with a fuscous apical spot, the femur and tibia with a fuscous blotch in median area of outer side, the tarsus with 1st segment ringed with black at base, before middle and at subapex, 2nd segment also at subbase and subapex, and 3rd to 5th segments fuscous except at apical extremity.

The Japanese specimens examined well agree with the original description in the colour pattern of the fore wing except for the following points: — 2nd white fascia more or less as wide as the 1st, thus the interspace between them being narrower than the fasciae and also narrower than that between 2nd and 3rd fasciae; 3rd fascia not preceded by blackish suffusion; white apical dot confluent with 3rd fascia through white terminal line in one specimen; subapical blackish spot discoloured into brown on its costal side; cilia as in original description.

Genitalia (Fig. 14): Tegumen elongate, strongly swollen around basal 1/3, then becoming slenderer on apical half, well sclerotized laterally, especially on swollen parts, covered with microspines on inner surface near base, with 4-8 pairs of fine setae scattered on lateral margins near apex and with 15-20 pairs of setae on swollen part; tuba analis without sclerous subsclaphium. Valva a little shorter than tegumen, moderately slender, round apically; costa well sclerotized in a complicated pattern, the costal margin of inner wall convex near its apex, while that of outer wall nearly straight; many bristly setae occurring on apical half of inner surface very densely, and fine setae along ventral margin rather sparsely; long, linear androconial scales on outer surface clustered into 2 tufts, one near costal base and the other near base of sacculus. Vinculum well developed, rather wide in lateral arms, with a long saccus, which is somewhat acuminate and about 1/4 as long as valva. Aedeagus slender, long, tubular, about 1.4 times as long as valva, covered with many rows of shortly transverse projections on its apical area; vesica with a small group of minute needle-shaped cornuti; ductus ejaculatorius nearly as long as aedeagus, very widened apically. Eighth abdominal segment about as long as the 7th, widely notched ventrally; dorsocephalic apodeme wide, short, about half as long as the 7th abdominal segment, shortly bifurcated apically, without median sclerotization; a pair of ventral invaginations elongate-conical, nearly as long as dorsal apodeme. Seventh abdominal segment normal in shape and structure, without any specialized scales. (Three slides examined.)

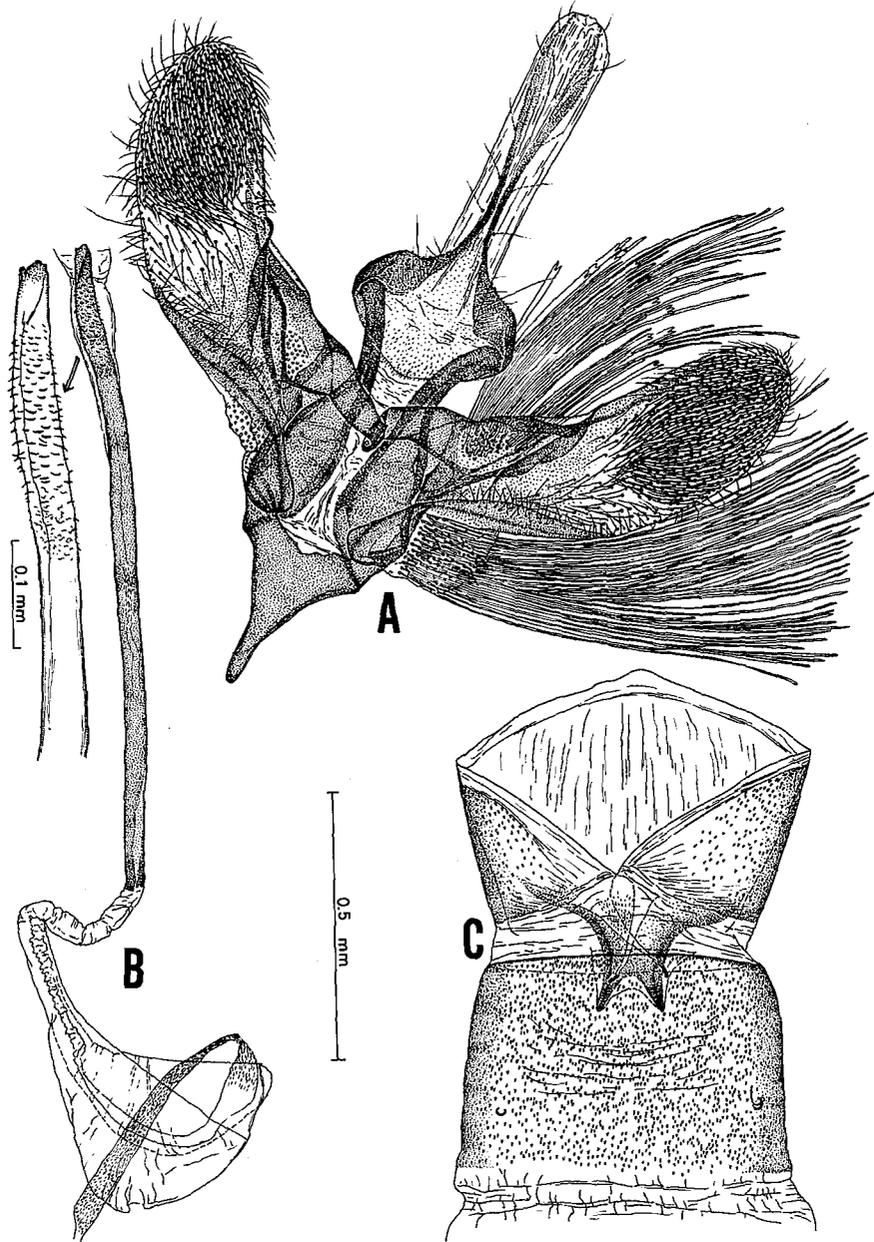


Fig. 14. *Borboryctes triplaca* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-2018, Yotugaya, Tōkyō, 18/vi/1951, H. Kuroko leg.] — B: Aedeagus [ditto] — C: Male 7th and 8th abdominal segments in ventral view [ditto].

Speciment examined : 4♂♂. HONSYŪ — 1♂, Yukigaya, Tôkyô, 16/vii/1950, H. Kuroko leg. ; 1♂, ditto, 10/vi/1951, H. Kuroko leg. ; 1♂, Takayama, Gihu-ken, 24/vii/1954, T. Yasuda leg. ; 1♂ Mt. Sanageyama, Toyota, Aiti-ken, 1/vii/1978, B. Tanaka leg.

Distribution : Japan (Honsyû) ; and India (Khasi Hills).

Food plant : Unknown.

Remarks : This identification of the Japanese specimens has been confirmed by Kumata at British Museum (N.H.) in comparing the genital slide of Japanese specimens with that of the holotype (Gen. sl. no. BM-16928). The colour pattern is, however, slightly different from that of the holotype as mentioned above.

*B. triplaca* is very peculiar in having the wide dorsocephalic apodeme of the 8th abdominal segment and 2 tufts of long androconial scales on the valva, and it can be easily distinguished from any other species of the *Acrocercops*-group. It is also unusual among the members of the genus *Borboryctis* in having the long saccus and in lacking the median sclerotization of the dorsal apodeme of the 8th abdominal segment. It may tentatively be referred to the genus because of the similar wing venation, the obtuse apex of the fore wing and the smooth-scaled antennal scape. Larval characters will clarify its true position.

### XIII. GENUS LEUCOSPILAPTERYX SPULER

*Leucospilapteryx* Spuler, 1910, Schmett. Eur. 2 : 408 ; Ely, 1917, Proc. Ent. Soc. Washington 10 : 40 ; Vári, 1961, Transvaal Mus. Mem. 12 : 173 ; Kumata, 1965, Kontyû 33 : 211.

Type-species : *Argyromiges omissella* Stainton, 1848.

♂ ♀. Face and head smooth-scaled ; ocelli absent ; proboscis moderately developed, naked. Labial palpus moderate in length, drooping, very slightly upturned, roughened with scales below ; apical segment about as long as the 2nd, pointed apically. Maxillary palpus minute, 1/3-1/2 as long as apical segment of labial palpus, porrect, pointed apically. Antenna a little shorter than fore wing, filiform, simple in both sexes ; scape very slightly thickened, simple, without any pecten or tuft. Legs moderately long, smooth-scaled except for following segments : middle femur expanded with scales beyond middle, hind tibia and 1st segment of hind tarsus with a row of bristly scales above ; anterior pair of spurs of hind tibia placed at basal 1/3 ; hind tarsus a little longer than hind tibia.

Fore wing narrowly lanceolate, long-pointed or acuminate apically ; discoidal cell long, occupying about basal 7/10 of wing, slightly dilated distally, with an obliquely truncated distal margin ; upper vein of cell weakened on proximal part far basal to a point where the vein  $R_1$  branches off ; 12-veined, with vein  $Cu_{1b}$  absent ;  $R_1$  moderate in length, running from basal 3/7 of cell to about middle of costa ;  $R_2$  from upper angle of cell ;  $R_5$  present (previously always described as "absent"), very weakened basally and long-stalked with  $R_4$  ;  $M_2$  and  $M_3$  connate or short-stalked, and from lower angle of cell ;  $Cu_{1a}$  apart from  $M_3$  ;  $Cu_2$  obsolescent on apical part and indicated its presence by basal trace ; An connected with dorsal margin at about basal 1/5 of wing. Hind wing nearly linear, about half as wide as and about 4/5 as long as fore wing, with cell opened between  $M_2$  and  $M_3$  ; 7-veined, with venation not strongly different from that of *Acrocercops* ; cilia long, 4-5 times of wing-width.

Male genitalia : Tegumen small, sclerotized only laterally, with a pair of slender subapical falces bearing a few fine setae on basal areas ; tuba analis protruded far

beyond tegumen, with or without subscaphium. Valva well widened basally and slightly narrowed apically, upturned at middle, with 2 sclerotized lobes or wide projections on ventral margin, and with a finger-shaped small projection near centre of inner surface; cucullus well prolonged narrowly and round distally; fine setae occurring on cucullus and near ventral margin; long, linear androconial scales occurring on outer surface near base; transtilla complete, widened basally. Vinculum U-shaped, widened laterally and ventrally, with round lateral lobes and a small ventral saccus. Diaphragma membranous, without any particular sclerite. Aedeagus tubular, obliquely truncated apically; vesica with a weakly sclerotized conical cornutus; ductus ejaculatorius short, obovate. Eighth abdominal segment triangularly incised ventrally; tergum with a narrow anterior apodeme of which a median sclerotization narrowly extends onto the tergite; sternum with a pair of long anterior invaginations usually longer than dorsal apodeme. Seventh abdominal segment normal in structure as in the preceding ones.

Female genitalia: Papillae anales united dorsally, rather long, somewhat triangular in lateral view, with ventral corners a little protruded; fine or thick setae occurring along caudal margin; apophysis posterioris moderately long, widened at base. Eighth abdominal segment shortly sclerotized, slightly protruded on ventrocaudal corners; apophysis anterioris slender, usually a little longer than apophysis posterioris. Ostium bursae opened on cephalic area of weakly sclerotized 8th abdominal sternum (lamella postvaginalis); sclerotized part of antrum united with lamella postvaginalis, cup-shaped, twisted on its cephalic half; ductus bursae very short, almost vestigial, membranous; corpus bursae small, membranous, without signum.

Body chaetotaxy of last instar larva (Fig. 48: C-D): Very similar to that of type-species of the genus *Phodoryctis* in number and basic arrangement of setae and proprioceptors on each body segment, differing from the latter by seta SD2 situated anterior to level of seta SD1 on the prothorax.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments with crochets arranged in a circular row, the anterior half of crochets becoming smaller and sparser like those of the type-species of *Phodoryctis*. Anal proleg with crochets arranged in a transverse or semicircular row as usual to those of the *Acrocercops*-group

Larval habit: The larva of *Leucospilapteryx* is a leaf-miner of composite plants. The mine occurs on the lower side of leaves in the early stage and appears on the upper side in the late stages; it starts in a narrow, long, linear gallery with a brownish central line of frass, then suddenly broadens into an oblong blotch which is placed in a rather lower layer of the parenchymal tissue. The upper surface of the blotchy part is usually swollen, pale yellowish to reddish in colour, then loosened in accordance with the growth of the larva by the feeding of the upper parenchymal tissues. The grains of black frass are usually gathered in the central area within the mine-cavity. When full-grown, the larva changes the body colour into red, then leaves the mine for a spinning site through a semicircular slit occurring on the loosened upper side. The cocoon is boat-shaped as in most species of *Acrocercops*-group, but not covered with bubbles on the surface.

Remarks: This is a rather unique genus among the *Acrocercops*-group in having

a pair of falces on the male tegumen and the very short ductus bursae of the female genitalia. On the other hand, the wing venation, the male pregenital segments and the larval chaetotaxy indicate that it is definitely a member of the group.

As pointed out by Vári (1961), the genus *Leucospilapteryx* is allied to the genus *Leucocercops* Vári in the well-sclerotized and prolonged papillae anales of the female genitalia. In spite of this it should be situated at a position apart from *Leucocercops* on account of some dissimilar characters such as the stalked veins  $R_4$  and  $R_5$  of the fore wing, the peculiar-shaped male valva and the presence of the falces on the male tegumen. It is also very similar to *Phodoryctis* (gen. nov.) in the wing venation and in the larval body chaetotaxy as stated in the above redescription, but it is clearly separated from the latter by the fore wing with the vein  $M_2$  stalked with  $M_3$ , by the presence of the paired falces on the male tegumen, by the absence of the paired projection of the aedeagus, and by the normal structure of the female 7th abdominal sternite. At present the true taxonomic position of *Leucospilapteryx* is uncertain for us, but it seems to be placed at a position near *Corethrovalva* Vari, *Gibbovalva* (gen. nov.), *Melanocercops* (gen. nov.), *Phodoryctis* (gen. nov.) and *Borboryctis* (gen. nov.), all of which are characterized by the stalked veins  $R_4$  and  $R_5$  of the fore wing and by the presence of a projection at or near costa of the male valva.

As far as we are aware, 3 species of the present genus are recorded from the World, and all feed on Compositae in the larval stage. In Japan the following 2 species are known to occur.

#### Key to the Japanese species of *Leucospilapteryx*

1. Falcis of male tegumen at most as long as finger-shaped central process of valva; female papilla analis with very stout, curved setae on caudal area densely; female lamella postvaginalis circular, with a pair of pouches in its centre; leaf-miner on *Artemisia* and *Chrysanthemum*. . . . . *L. omissella* (Stainton)
- Falcis of male tegumen much longer, nearly twice as long as central process of valva; female papilla analis with slender, fine setae on caudal margin sparsely; female lamella postvaginalis trapezoid, without any pouch; leaf-miner on *Anaphalis*.  
 . . . . . *L. anaphalidis* Kumata

#### 30. *Leucospilapteryx omissella* (Stainton)

[Figs. 15, 17(A-B), 36(E-F), 41(F), 43(E), 48(C) and 53(D-F)]

*Argyromiges omissella* Stainton, 1848, Zoologist: 2163, f. 39 [England].

*Gracilaria* (!) *omissella*: Stainton, 1851, Trans. Ent. Soc. Lond. (2) 1: 183 [England; host: *Artemisia vulgaris*]; Ibid., 1864, Nat. Hist. Tin. 8: 150; Wocke, 1877, Schmett. Deutsch. Schweiz 2: 627 [Germany; host: *A. vulgaris*].

*Euspilapteryx omissella*: Herrich-Schäffer, 1855, Schmett. Europa 5: 292.

*Leucospilapteryx omissella*: Spuler, 1910, Schmett. Europas 2: 408; Pierce & Metcalfe, 1935, Genit. Tin. Brit.: 109, pl. 64; Benander, 1944, Opusc. Ent. 8: 119 [Sweden, Norway; host: *A. vulgaris*]; Hering, 1957, Bestimm. Blattm. Europa 1: 124 [England; Central Europe; host: *A. vulgaris*, *A. campestris*]; Kuroko, 1961, Sci. Bull. Fac. Agr. Kyushu Univ. 18: 318, fs. 6 & 7, pl. 36 [Japan (Honsyū, Kyūsyū); host: *A. princeps*]; Kumata, 1963, Ins. matsum. 25: 136 [Japan (Hokkaidō, Honsyū, Sikoku, Kyūsyū)]; host: *A. montana*]; Ibid., 1965, Kontyū 33: 212; Kuroko, 1982, Moths Jap. 1: 186, & 2: pl. 6(6); Emmet, 1985, Moths Butterfl. G. Brit. Irel. 2: 293.

*Acrocercops omissella*: Meyrick, 1912, Lep. Cat. 6: 45; Ibid., 1927, Rev. Handb. Brit. Lep.: 783.

*Dryadula* (!) *ainoniella* Matsumura, 1931, 6000 Ill. Ins. Jap.: 1105, f. 2305 [Japan (Hokkaidō)].

Original description of *Argyromiges omisella*: "Expansion of wings 3 3/4 lines. Head white. Forehead white. Palpi white. Antennae white, annulated with fuscous. Thorax white. Abdomen fuscous, with the extremity fulvous. Legs white. Tarsi white, annulated with fuscous. Anterior wings pale fuscous, deepest towards the apex, with four white transverse fasciae; one, rather obscure and interrupted, near the base; a second near the middle, placed obliquely, and broadest on inner margin; a third beyond the middle, broadest on the costa; and a fourth near the apex, nearly straight, and continued through the cilia: there is a pale mark on the inner margin, between the second and third fasciae: cilia fuscous, palest at the apex of wing, with two darker curved lines going round the apex and to the anal angle; one of these is nearly in the middle of the cilia, the other at their extreme edge. Posterior wings clear gray, with paler cilia."

Original description of *Dryadaula aioniella* [translated from the Japanese text]: "♀. Head, thorax and wings white. Fore wing with four blackish fasciae running obliquely and widened towards dorsal margin, the apicalmost fascia more or less round and detached from costa; cilia with a blackish line. Hind wing dark gray. Antenna annulated with grayish-white and black. Labial palpus white, each segment ringed with black apically. Fore and middle legs black except for silvery-white tarsi; hind leg white, the tibia and tarsus spotted with black. Expanse 7.5 mm."

Additional description: ♂ ♀. Expanse of wings: 5.8-7.8 mm (7.05 mm on an average of 21 specimens). Length of fore wing: 2.8-3.7 mm (3.5 mm in holotype of *D. aioniella*, 3.36 mm on an average of 22 specimens).

Fore and middle legs fuscous except for white tarsi as in original description of *D. aioniella* in Japanese and European specimens examined.

Male genitalia (Figs. 15: A-D, & 17: A-B): Tegumen small, with a pair of falces small, slender, at most as long as ampulla or central process of valva, with a short apical seta and a few fine basal setae; tuba analis membranous, well protruded beyond tegumen, with a very short, slender subscaphium near base. Valva about 1.5 times as long as tegumen, upturned, with many linear androconial scales on basal half of outer surface; costa weakly sclerotized, smooth; cucullus well protruded upwardly, blunt, widened basally, with fine setae on inner surface, the setae along basal margin being more minute; sacculus well sclerotized, widely round, with fine setae near base and rather long setae along round margin; harpe well sclerotized, triangular, with a short, triangular projection bearing some stout setae on inner side; ampulla or central process of valva small, finger-shaped. Vinculum very wide, with large lateral lobes; saccus small, triangular. Aedeagus as long as or a little longer than valva, tubular, obliquely truncated apically; vesica with a weakly sclerotized conical cornutus. Eighth abdominal segment about as long as the 7th, deeply notched ventrally; dorsocephalic apodeme slender, short, with a narrow median sclerotization straight and reaching near caudal margin of 8th tergite; a pair of ventral invaginations slender, 1.2-1.6 times as long as dorsal apodeme. (Eight slides examined.)

Female genitalia (Fig. 15: E-F): Papilla analis large, well sclerotized, elongated, subtriangular in lateral view, with very stout, curved setae on caudal area densely, the ventrocephalic corner being more or less acutely angulated; apophysis posterioris slender, a little shorter than apophysis anterioris. Eighth abdominal segment well sclerotized dorsally, with ventrocaudal extremities slightly produced and round or truncate. Ostium bursae rather large in opening size, with lamella postvaginalis or sterigma very large, somewhat circular, and having a pair of shallow pouches in centre; antrum cup-shaped, a little longer than apophysis, narrowing cephalad, with a twisted sclerite on cephalic half; ductus bursae very short, membranous; corpus bursae small, membranous, without signum. (Seven

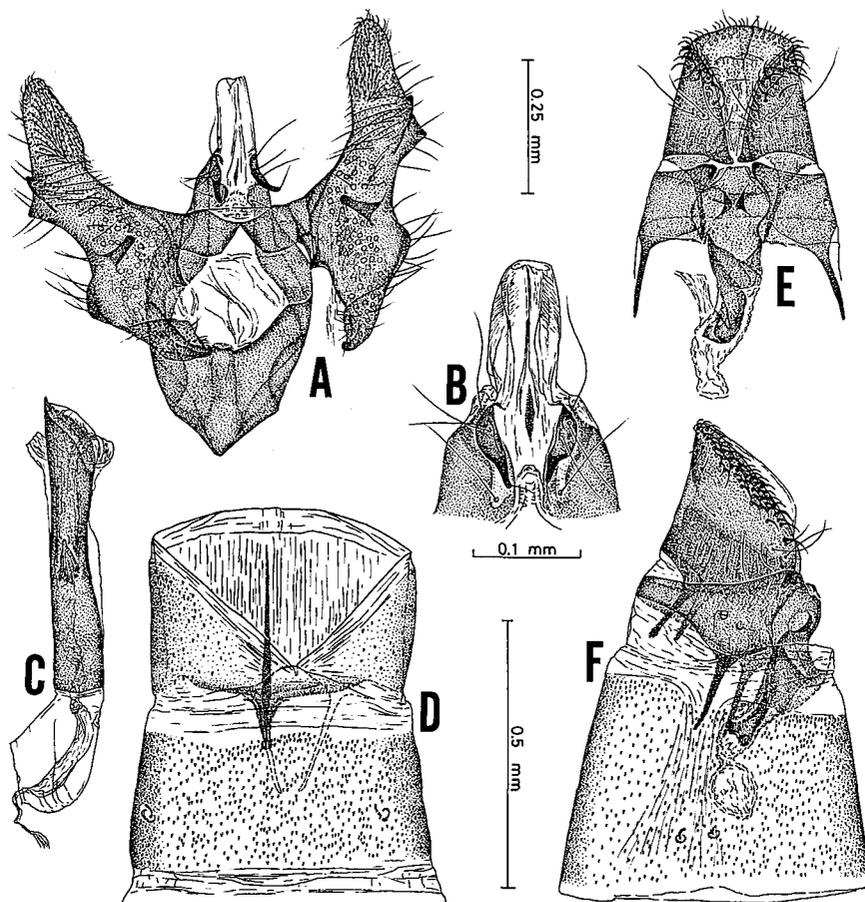


Fig. 15. *Leucospilapteryx omissella* (Stainton). A: Male genitalia in caudal view, aedeagus omitted [Grc-3060, Tosasimizu, Kôti-ken, em. 15/x/1980, ex *Chrysanthemum ornatum* (2262)] — B: Apical part of tegumen [Grc-895, Teine, Hokkaidô, em. 24/iv/1959, ex *Artemisia montana*] — C: Aedeagus [Grc-3060] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view [Grc-3061, Tosasimizu, Kôti-ken, em. 14/xi/1980, ex *C. ornatum* (2262)] — F: Ditto in lateral view [Grc-896, Teine, Hokkaidô, em. 8/iv/1958, ex *A. montana*].

slides examined.)

Specimens examined: 85♂♂ & 108♀♀. Holotype of *Dryadula ainoniella*: ♀, labelled "Sapporo, Matsumura, 29/viii/18", "*Dryadula ainoniella* Matsumura", "♀ Genitalia on slide no. Grc-566", "Holotype, *Dryadula ainoniella* Matsumura", "*Leucospilapteryx omissella* (Stainton), det. T. Kumata, 1963". Further specimens: HOKKAIÐ — 1♀, Rebun-tô, em. 12/viii/1958, ex *Artemisia montana*; 14♂♂ & 13♀♀, Yûbari, Sorati, em. 12-19/v/1978, ex *A. montana* (1725); 3♂♂ & 3♀♀, Apoi-dake, Hidaka, em. 21-30/iv/1975, ex *A. montana* (1391); 1♀, Nopporo, em. 30/viii/1969, ex *A. montana* (909); 3♂♂ & 1♀, Sapporo, em. 19/vii/1956, ex *A. montana* (155); 1♀, ditto, 7/ix/1957; 1♀, ditto, 26/v/1961; 5♂♂ & 1♀, ditto, em. 21-23/viii/1964, ex *A. montana* (706); 2♂♂ & 1♀, ditto, em. 6/ix/1971, ex *A. montana* (1111); 2♂♂ & 5♀♀, Moiwa, Sapporo, em. 1/v/1967, ex *A. montana* (793); 1♀, Teine, em. 8/iv/1958, ex *A. montana* (155); 2♂♂ & 4♀♀, ditto, em. 24/iv/1959, ex *A. montana*. HONSYÛ — 6♂♂ & 3♀♀, Siobara, Totigi-ken, em. 26-30/iv/1976, ex *A. princeps* (1659); 1♂ & 4♀♀, Nippara, Okutama, Tôkyô, em. 27-29/vii/1981, ex *A. montana* (2340);

13♂♂ & 9♀♀, Todai, Ina, Nagano-ken, em. 24/iv-19/v/1976, ex *A. princeps* (1587); 1♀, ditto, 27/ix/1975; 10♂♂ & 19♀♀, Kisohukusima, Nagano-ken, em. 9-13/x/1975 & 14/iv-4/v/1976, ex *A. princeps* (1512); 1♂ & 1♀, Kozagawa, Wakayama-ken, em. 9/x/1974, ex *A. princeps*; 2♀♀, Koza, Wakayama-ken, em. 11-14/x/1974, ex *A. princeps* (1348). SIKOKU — 5♂♂ & 5♀♀, Tosasimizu, Kôti-ken, em. 8-15/xi/1980, ex *Chrysanthemum ornatum* (2262); 2♂♂ & 3♀♀, Asizuri-misaki, Kôti-ken, em. 1-6/vii/1957, ex *Artemisia* sp. (287); 13♂♂ & 14♀♀, ditto, em. 7-14/xi/1980, ex *A. princeps* (2253). KYÛSYÛ — 1♀, Satamisaki, Kagosima-ken, 3/vi/1956, T. Oku leg. TUSIMA — 3♀♀, Mine, em. 25-28/v/1980, ex *A. princeps* (2085); 2♂♂ & 5♀♀, Kamitusima, em. 25-29/v/1980, ex *A. princeps* (2124). NANSEI IS. — 3♀♀, Anbô, Yaku-sima, em. 4-8/xi/1973, ex *A. princeps*. GERMANY — 1♂ & 1♀, Crossen, ex *Artemisia*, M. Hering leg., determined as *Leucospilapteryx omissella* by M. Hering, 1959.

Distribution: Japan (Hokkaidô; Honsyû; Sikoku; Kyûsyû; Tusima; Nansei Is.); North and Central Europe; England.

Food plants: *Artemisia montana* Pampan., *A. princeps* Pampan. and *Chrysanthemum ornatum* Hemsl. (Compositae) in Japan. *Artemisia vulgaris* Linn. and *A. campestris* Linn. (Compositae) in Europe.

### 31. *Leucospilapteryx anaphalidis* Kumata

[Figs. 16, 17(C-D), 36(G-H), 43(F) and 48(D)]

*Leucospilapteryx anaphalidis* Kumata, 1965, Kontyû 33: 214 [Japan (Hokkaidô); host: *Anaphalis margaritacea*]; Ermolaev, 1977, Proc. Zool. Inst. Acad. Sci. U.S.S.R. 70: 111 [U.S.S.R. (Far East)]; Kuroko, 1982, Moths Jap. 1: 186, & 2: pl. 6(7) [Japan (Hokkaidô, Honsyû)].

Original description: "♂ & ♀. Head white, tinged with pale gray posteriorly; face pale ochreous-gray, somewhat darkened anteriorly. Maxillary palpus very minute, whitish, with a blackish median ring; labial palpus a little rough-scaled beneath, whitish, the second segment with a blackish apical ring, and the third with a blackish subapical ring. Antenna gray, each segment somewhat darkened on apical half. Fore leg blackish-brown, the coxa being whitish on median area of lower surface, the tarsus silk-white in whole length; mid leg blackish-brown, the femur with a tuft of blackish, appressed scales on lower side, the tibia with two whitish basal rings, the tarsus silk-white, sometimes the first segment with a dark brown apical ring; hind leg ochreous-white, the femur with a small, blackish median dot, the tibia with a small, blackish basal spot and an oblong apical blotch which sometimes occupies almost the apical half, the tarsus silk-white, each segment with a dark brown apical ring. Thorax ochreous-gray, with dark median stripe; tegula gray, somewhat darkened basally. Fore wing ochreous-gray, heavily speckled with blackish-brown scales, with white markings; four costal strigae, of which the first is situated at the basal 1/4, the second at the middle, the third at the 2/3 and the last at the 5/6, all oblique outwardly, extending just beyond middle across wing except for the last which reaches almost to the dorsal margin of wing; three dorsal dots situated at opposite sides of apices of first three costal strigae, sometimes fused with opposite costal strigae as straight fasciae (in a few specimens the first dot extending towards base along dorsal margin); cilia on apical area of wing white, the rest being pale ochreous-gray, with blackish median line and an apical one throughout. Hind wing dark brownish-gray, with cilia pale ochreous-gray."

"Expanse of fore wings, 6-7 mm."

"The genitalia of this species are much similar to those of the preceding species [*Leucospilapteryx omissella*] in both sexes, but differ from the latter by the following aspects: — In male genitalia, (1) falcis of tegumen much longer, nearly twice as long as tooth-shaped process of sacculus, sinuate, with a long seta at apex; (2) harpe long-produced, somewhat spatulate in shape, with a process dentated apically; and (3) lateral lobe of vinculum larger. In female genitalia, (1) papilla analis with slender, fine setae on caudal margin sparsely, (2) its ventro-cephalic extremity widely produced, somewhat rounded apically; (3) ventro-caudal extremity of eighth abdominal segment strongly produced, somewhat acutely pointed; and (4) sterigma trapezoid in shape, without any pouch."

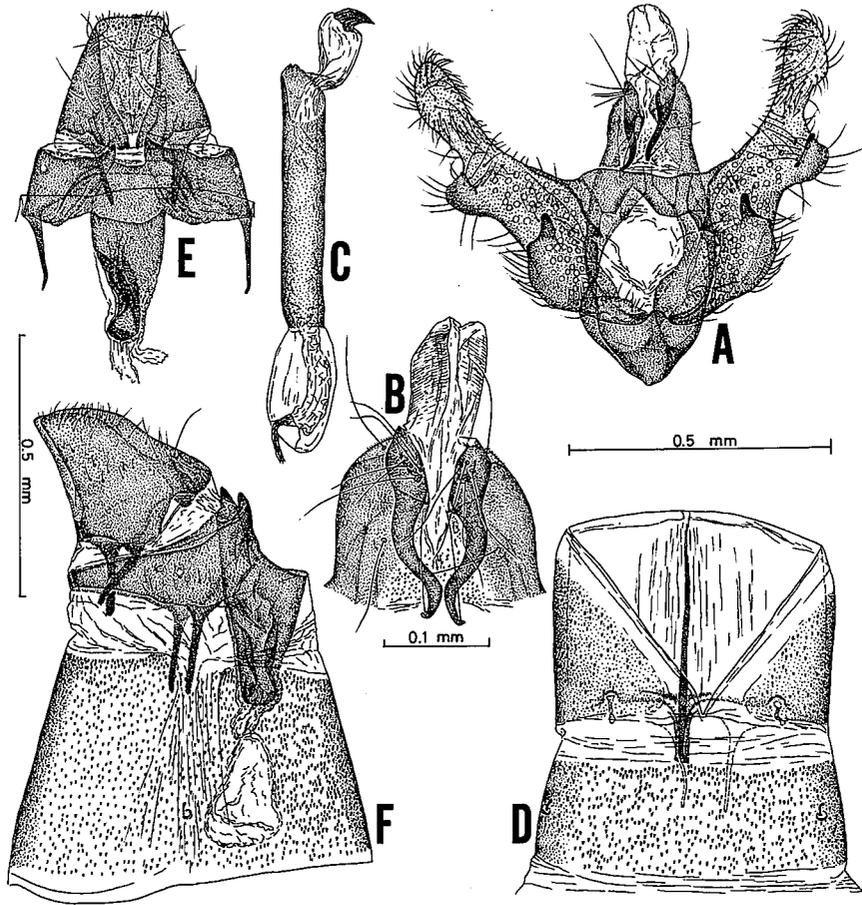


Fig. 16. *Leucospilapteryx anaphalidis* Kumata. A: Male genitalia in caudal view, aedeagus omitted [Grc-3062, Kenebetu, Nemuro, Hokkaidō, em. 17/v/1980, ex *Anaphalis margaritacea* (2014)] — B: Apical part of tegumen [Grc-559, holotype] — C: Aedeagus [Grc-3062] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view [Grc-756, Soranuma-dake, Sapporo, Hokkaidō, em. 21/viii/1962, ex *A. margaritacea*] — F: Ditto in lateral view [Grc-897, ditto].

Additional description: ♂ ♀. Expanse of wings: 6.0–7.1 mm (6.1 mm in holotype, 6.56 mm on an average of 14 specimens). Length of fore wing: 2.8–3.4 mm (2.9 mm in holotype, 3.06 mm on an average of 16 specimens).

Antennal scape smooth, wholly dark fuscous. Thorax with dorsum as in original description, while ventrum dark fuscous with a whitish, oblique median stripe on pleural surface. Anterior 4 white tarsi with each segment faintly ringed with dark brown at apex in holotype and some other specimens. Abdomen dorsally dark gray, ventrally pale gray, without lateral stripes; anal extremity pale ochreous in both male and female.

Specimens examined: 8♂♂ & 9♀♀. Holotype of *L. anaphalidis*: ♂, Apoi, Hidaka, Hokkaidō, em. 4/ix/1957, ex *Anaphalis margaritacea* (327), Gen. sl. no. Grc-559. Paratypes: HOKKAIDŌ

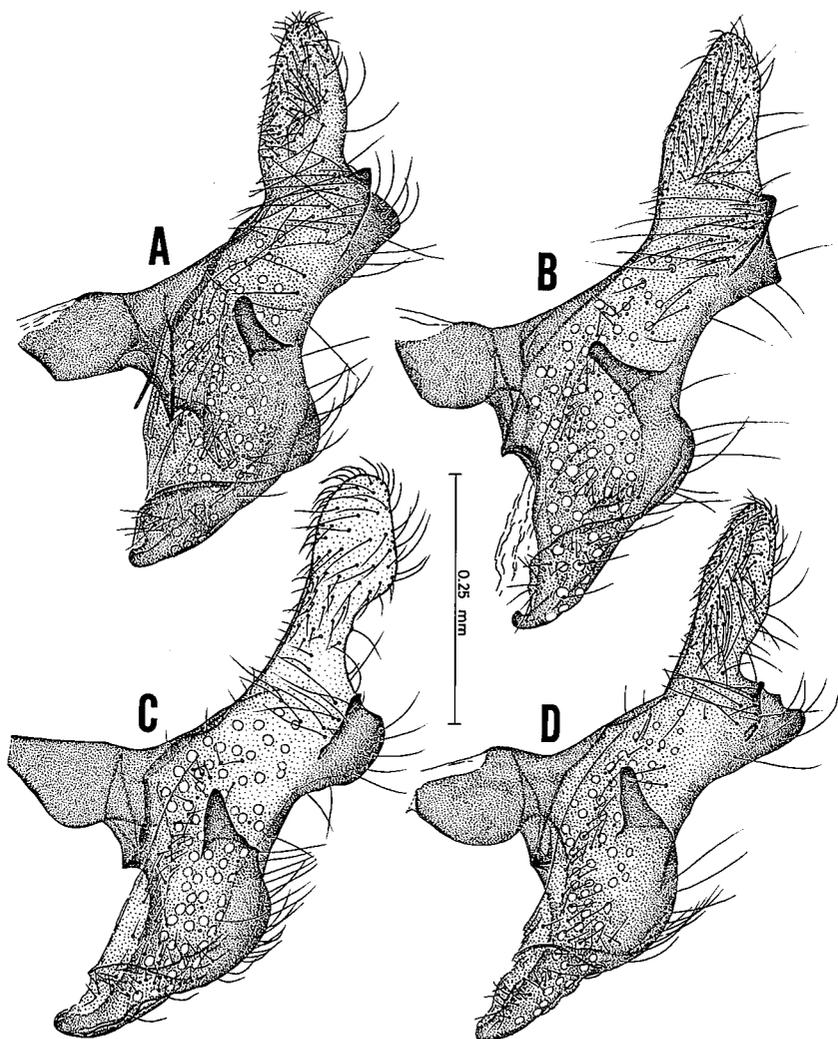


Fig. 17. A-B: *Leucospilapteryx omissella* (Stainton). A: Right valva [Grc-895, Teine, Hokkaidô, ex *Artemisia montana*] — B: Ditto [Grc-3060].  
C-D: *Leucospilapteryx anaphalidis* Kumata. C: Right valva [Grc-3062] — D: Ditto [holotype].

— 2 ♀♀, Apoi, Hidaka, em. 30/viii-1/ix/1957, ex *A. margaritacea* (327); 3 ♂♂ & 6 ♀♀, Soranumadake, nr. Sapporo, em. 21/viii/1962, ex *A. margaritacea*. Further specimens: HOKKAIDÔ — 4 ♂♂ & 1 ♀, Kenebetu, Nemuro, em. 17-19/v/1980, ex *A. margaritacea* (2014).

Distribution: Japan (Hokkaidô; Honsyû); and U.S.S.R. (Far East).

Food plant: *Anaphalis margaritacea* Benth. et Hook. (Compositae) in Japan.

Remarks: This species is very similar to and hardly distinguishable from *L. omissella* in colour-pattern. However, it can be separated from *L. omissella* by some genital characters of the male and female as pointed out in its original description

and in the key to the species.

#### XIV. GENUS CHRYSOCERCOPS KUMATA ET KUROKO NOV.

Type-species: *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov.

Etymology: *Chrysocercops* (G.) = *chrysos* (gold) + *cercos* (tail) + *ops* (eye); feminine.

♂ ♀. Face, head and thorax smooth-scaled; ocelli absent; proboscis moderately developed, naked. Labial palpus drooping or porrect, slightly upcurved, entirely very slender, pointed apically; apical segment about as long as the 2nd. Maxillary palpus short, 1/3-1/2 as long as apical segment of labial palpus, slender, porrect, slightly upturned, pointed apically. Antenna filiform, 1.3-1.5 times as long as fore wing, simple in both sexes; scape flattened, a little wider than the 2nd segment, simple, without any hairy pecten or scaly tuft. Legs long, slender, smooth-scaled except for hind tibia and 1st hind tarsal segment, which bear a row of bristly scales above, but the scales on the tarsus are much shorter than those on the tibia; anterior pair of spurs of hind tibia located at basal 1/4 and about 3/5 as long as tibia; hind tarsus about as long as hind tibia.

Fore wing very narrowly lanceolate, acutely pointed apically; discoidal cell long, occupying about basal 4/5 of wing, nearly parallel-sided, obliquely truncated or angulated distally, with upper vein weakened on proximal part; 11- or 12-veined, the vein  $R_1$  usually absent, but faintly indicate its presence by basal part alone in a few specimens of the type-species, and  $Cu_{1b}$  absent in type-species or present in others;  $R_2$  to  $Cu_{1a}$  well separated at bases, or  $R_4$  and  $R_5$  or  $R_5$  and  $M_1$  connate and from distal angle of cell;  $Cu_2$  distinct near dorsal margin of wing; An weakened, probably connected with dorsal margin at basal 1/6-1/4 of wing. Hind wing linear, about half as wide as and 4/5-5/6 as long as fore wing, long-pointed apically, with cell opened between  $M_2$  and  $M_3$ ; 7-veined, with venation as usual to most genera of the *Acrocercops*-group; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen moderate in length, spatulate or oblong in ventral view, weakly sclerotized laterally, with fine or rather long setae sparsely along lateral margins; tuba analis with or without subscaphium. Valva usually long and slender; costa short, weakly sclerotized; cucullus very narrowly protruded, more or less curved; sacculus long, about twice as long as costa, with distal corner evenly round or strongly protruded, sometimes bearing a pectination along this protruded distal margin; long or fine setae scattered on inner surfaces of cucullus and sacculus; long, linear androconial scales occurring on outer surface of sacculus; transtilla incomplete, narrowed distally. Vinculum V-shaped, with lateral arms slender and long; saccus short and round apically. Diaphragma membranous, without any particular sclerite. Aedeagus slender, tubular; vesica with cornuti various in shape; ductus ejaculatorius short to moderate, widened distally. Eighth abdominal segment deeply notched ventrally, with a pair of long, membranous invaginations originating from depth of this notch; tergum with a long, slender anterior apodeme, of which a median sclerotization narrowly extends onto the tergite. Seventh abdominal segment normal in structure as in preceding ones.

Female genitalia: Papilla analis comparatively small, obliquely transverse in lateral view, obtuse ventrally and dorsally, setose as usual; apophysis posterioris

short to moderate, attenuate apically. Eighth abdominal segment short, weakly sclerotized dorsally, widely membranous ventrally; apophysis anterioris slender, short to moderate. Ostium bursae opened on cephalic area of 8th sternum, without genital plate; antrum shortly sclerotized, ring-shaped; ductus bursae moderate to long, tubular, membranous, partly shagreened or simple; corpus bursae elongate-ellipsoidal or pyriform, recurved in type-species or straight in some others, with a signum of small to moderate patch bearing many cone- or needle-shaped projections. Seventh abdominal segment normal in structure as in preceding ones.

Body chaetotaxy of last instar larva (Fig. 48 : B) : So far as represented by the type-species and another species, the body chaetotaxy of the larva is not essentially different from that of *Gibbovalva*, (gen. nov.). Prothorax with seta XD2 present; mesothorax, metathorax and all abdominal segments with seta L2 absent; 2nd abdominal segment with 2 subventral setae, SV1 and SV2; the 6th segment with 3 subventral setae as in the 3rd to 5th; the 8th and 9th segments with seta V1 and proprioceptor MV3 absent, while proprioceptor MD1 present.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments with crochets uniordinal and arranged in a circular row like larvae of *Gibbovalva* (gen. nov.) and *Acrocercops* Wallengren, and anal proleg with crochets in a transverse or semicircular row.

Larval habit: The larva is a leaf-miner during its feeding stages; at first it makes a linear, long gallery occurring on the lower side of the leaf, then enters the upper layer of parenchymal tissue and forms an irregularly curved, wider gallery; finally it makes a moderately large, upper blotchy mine. The upper epidermis of the mining part is brownish with whitish spots caused by the larval feeding on upper parenchymal tissue, and loosened up in fully developed condition. This type of mine is made by the larva of the type-species. Some other species feeding on dipterocarpaceous plants make a different type of mine, which will be described in separate papers. In any case, the larva changes the body colour to crimson-red at full growth, then leaves the mine for a pupating site. The cocoon is placed outside the mine, boat-shaped, with 2 or 3 whitish bubbles on the surface.

Remarks: In this paper a single species feeding on fagaceous plant in Japan is referred to the genus, which, however, contains 5 other species feeding on dipterocarpaceous plants in Nepal and Malaysia. The generic description given above is partly based on these species.

In lacking the vein  $R_1$  of the fore wing, the new genus is somewhat similar to the following 2 genera, *Telamoptilia* (gen. nov.) and *Spulerina* Vári, but is at once distinguished from them by the abdominal seta D1 of the larva well separated from the seta D2 as well as by the smooth-scaled antennal scape and the entirely slender middle femur of the adult. On the other hand, as mentioned in the generic description, it is very similar to *Gibbovalva* (gen. nov.) in the body chaetotaxy of the larva, but is very different from the latter in the wing venation and male genitalia of the adult stage. On account of the larval characters related to *Gibbovalva* and the adult characters related to *Telamoptilia* and *Spulerina*, the new genus is tentatively placed between *Gibbovalva*-subgroup and *Spulerina*-subgroup.

The new genus is also somewhat similar to *Lamprolectica* Vári and *Psydrocercops* Kumata et Kuroko in the male valva with a narrowly protruded cucullus, but

is immediately distinguished from them by the fore wing venation and male pregenital segments. It may be apart from them taxonomically.

32. *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov.

[Figs. 18, 37(E-F), 44(A), 48(B) and 54(A-B)]

♂ ♀. Expanse of wings : 6.2-8.0 mm (7.4 mm in holotype, 7.21 mm on an average of 21 specimens). Length of fore wing : 3.0-3.9 mm (3.7 mm in holotype, 3.54 mm on an average of 21 specimens).

Face ochre-whitish, slightly tinged with gray posteriorly ; head silvery-grayish, with a metallic lustre strongly. Palpi white internally, ochre-whitish laterally ; labial palpus very slender, upturned, with apical segment becoming gray apically on lower surface. Antenna grayish, very slightly annulated with white ; scape brownish above, whitish below. Thorax brilliantly brownish, with tegulae silvery-gray posteriorly and blackish anteriorly. Legs ochreous-whitish ; fore and middle tibiae and tarsi narrowly lined with gray on upper edges ; hind tibia brownish on lateral surface, with bristly scales whitish ; hind tarsus slightly tinged with gray. Abdomen silvery-gray dorsally, metallic white ventrally, with 4th segment brownish-gray laterally ; anal scales blackish in female, and dark gray with white tip in male.

Fore wing golden-brownish with a metallic lustre strongly in ground colour ; basal area of costal margin narrowly blackish ; a large blackish blotch placed on costa around basal 1/5 of wing, quadrangular, expanding near wing fold, suffused with silvery-gray towards its apex, and narrowly edged with ochre-white on its inner margin ; a small white spot on costa at basal 1/3 of wing, surrounded by black scales narrowly ; a silvery-gray streak along wing-fold around centre of wing, about twice as long as white costal spot, rather broad, and sometimes very slightly detached from dorsal margin of wing ; a narrow silvery-gray streak running in disc from apical 1/3 to apex of wing in parallel with costal margin, widened apically and sometimes occupying apical space of wing, with upper edge faintly margined with black ; cilia around apex of wing and along termen pale brownish, without any dark or pale fringe-line, and those along dorsal margin pale gray. Hind wing dark gray, with cilia pale gray.

Male genitalia (Fig. 18 : A-D) : Tegumen rather short, wide-spatulate in ventral view, with 11-14 (13 in holotype) setae along each lateral margin, the apical and basal ones being long ; tuba analis without a sclerous subscaphium. Valva about twice as long as tegumen, moderate in width, with very narrow cucullus occupying apical 1/3 of valva, curved or twisted, and slightly capitated ; costa weakly sclerotized, with a small and round protuberance near base ; long and slender setae scattered on cucullus and on apical area of sacculus ; long androconial scales scattered on outer surface of sacculus. Vinculum short, with saccus about 1/4 as long as tegumen and round apically. Aedeagus about as long as valva, tubular, straight, with 8-9 rows of spinules near apex ; vesica with a number of fine needle-shaped cornuti, some of which on apical area are longer than those on basal area. Eighth abdominal segment deeply notched ventrally, with a dorsocephalic apodeme narrow and bar-shaped, and ventral invaginations slender and about 1.3 times as long as dorsal apodeme. (Three slides examined.)

Female genitalia (Fig. 18 : E-F) : Papilla analis moderate in length, round

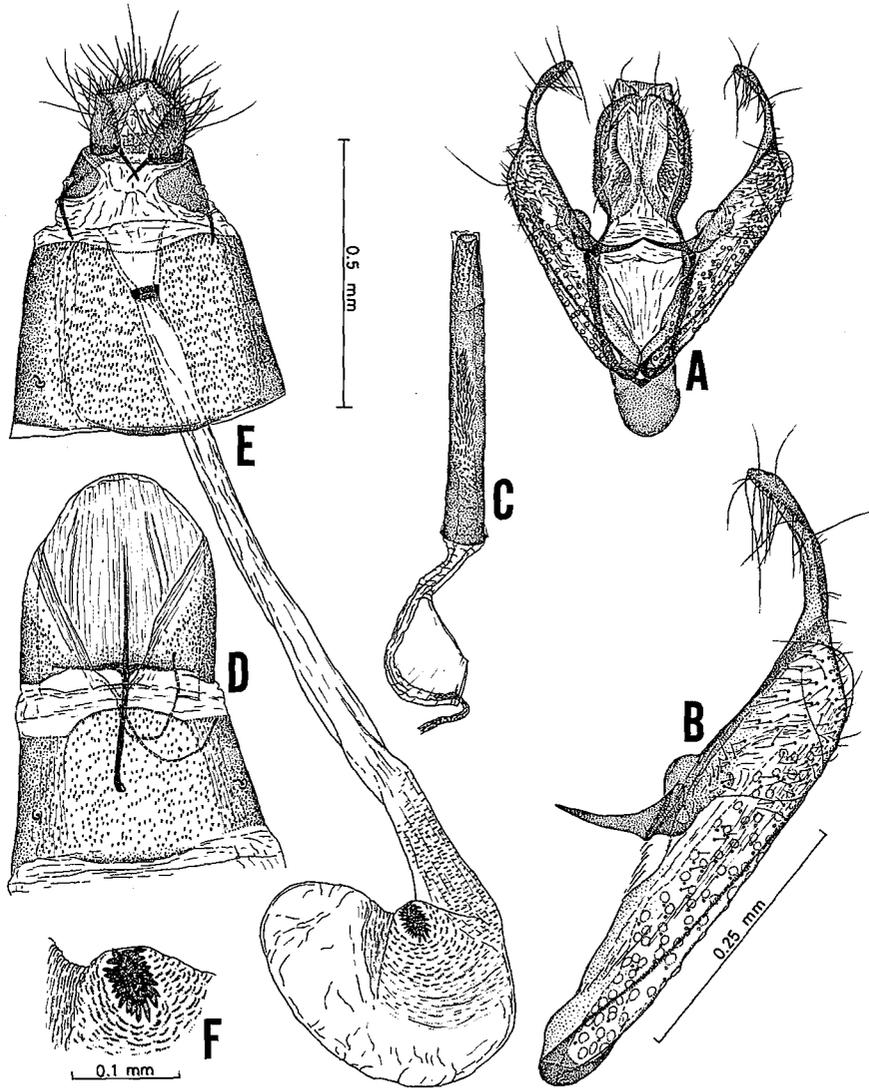


Fig. 18. *Chysocercops castanopsidis* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-1812, holotype] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view [Grc-1814, Kozagawa, Wakayama-ken, em. 4/x/1974, ex *Castanopsis cuspidata* (1284)] — F: Signum enlarged [ditto].

ventrally, obtuse dorsally, covered with usual setae on almost whole surface; apophysis posterioris slender, rather short. Eighth abdominal segment with apophysis anterioris very short, about half as long as apophysis posterioris. Ostium bursae large, about 1/3 as wide as caudal margin of 7th sternite in ventral view; antrum shortly sclerotized; ductus bursae slender, membranous; corpus bursae membranous, upturned near base, with its caudal half and cephalic area of ductus bursae lined with microspines, which are arranged in a reticulate pattern; a small

patch of about 20 thorn-like signa situated on inner curve of corpus bursae. (Three slides examined.)

Specimens examined: 25♂♂ & 22♀♀. Holotype: ♂, Kozagawa, Wakayama-ken, Honsyū, em. 7/x/1974, ex *Castanopsis cuspidata* (1284), Gen. sl. no. Grc-1812. Paratypes: HONSYŪ — 14♂♂ & 17♀♀, with same data as holotype except on dates emerged, 4-21/x/1974. SIKOKU — 10♂♂ & 5♀♀, Ino, Kōti-ken, em. 7-11/xi/1980, ex *Pasania glabra* (2200).

Distribution: Japan (Honsyū; Sikoku).

Food plants: *Castanopsis cuspidata* (Thunb.) Schottky and *Pasania glabra* (Thunb.) Oerst. (Fagaceae).

Remarks: This new species is immediately distinguished from other known members of the *Acrocercops*-group by the unique colour-pattern of the fore wing and by the peculiar shape of the male valva.

## XV. GENUS TELAMOPTILIA KUMATA ET KUROKO NOV.

Type-species: *Acrocercops cathedraea* Meyrick, 1908.

Etymology: Telamoptilia (G.)=telamon (belt)+ptilia (small wing); feminine.

♂♀. Head and thorax smooth-scaled; ocelli absent; proboscis moderately developed, naked. Labial palpus rather long, drooping, sometimes slightly upcurved; 2nd segment slightly rough-scaled below apically; apical segment smooth-scaled, pointed apically, about as long as the 2nd. Maxillary palpus minute, 1/3-1/2 as long as apical segment of labial palpus, porrect, more or less rough-scaled below. Antenna filiform, 1.0-1.1 times as long as fore wing, simple in both sexes; scape slightly widened apically with a very minute ventral flap. Legs rather long, slender; middle femur expanded with scales beyond middle; middle tibia thickened apically; hind tibia and basal half of 1st hind tarsal segment with a row of bristly scales above, the scales on tarsus much smaller than those on tibia; anterior pair of spurs of hind tibia placed at basal 1/4-1/3, about half as long as the tibia; hind tarsus a little longer than the tibia.

Fore wing narrowly lanceolate, acutely pointed or acuminate apically; discoidal cell long, occupying basal 3/4 of wing, slightly dilated distad, with an angulated distal margin, the upper vein being obsolescent proximally; 12-veined; R<sub>1</sub> absent or entirely obsolescent; R<sub>2</sub> from upper angle of cell; R<sub>4</sub> and R<sub>5</sub> stalked; M<sub>1</sub> and M<sub>2</sub> connate or slightly separated basally and arising around distal angle of cell; Cu<sub>1a</sub> far apart from M<sub>3</sub> and basal to level of R<sub>2</sub>; Cu<sub>1b</sub> obsolescent basally, nearly parallel to Cu<sub>1a</sub>; Cu<sub>2</sub> indistinct entirely; An weakened basally, connected with dorsal margin at basal 1/5-1/4 of wing. Hind wing nearly linear, about half as wide as and 4/5 as long as fore wing, long-pointed apically, with cell opened between M<sub>2</sub> and M<sub>3</sub>; 7-veined, with venation not obviously different from that of most members of *Acrocercops*-group; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen moderate in length, spatulate or oblong in ventral view, weakly sclerotized laterally, with fine setae along lateral margins; tuba analis with a slender subscaphium. Valva elongated, wing-shaped, nearly straight costally, curved ventrally, round apically, with costal margin more or less sclerotized, usually having a long sclerite along costa; fine and rather dense setae occurring on inner surface; long, linear androconial scales on basal area of outer surface; transtilla complete, narrowed medianly. Vinculum V-shaped, widened ventrally, with

saccus short. Diaphragma membranous, without particular sclerite. Aedeagus tubular, nearly straight; vesica with cornuti various in shape; ductus ejaculatorius short, round distally. Eighth abdominal segment widely incised ventrally; tergum with a narrow anterior apodeme, of which the median sclerotization extends narrowly onto the tergite; sternum with a pair of membranous, stringy anterior invaginations which are more or less capitated. Seventh abdominal segment normal in shape and structure as in preceding ones.

Female genitalia: Papilla analis comparatively small, obliquely transverse in lateral view, blunt dorsally and ventrally, setose as usual; apophysis posterioris slender, widened at base. Eighth abdominal segment very shortly sclerotized dorsally and widely membranous ventrally, the sclerotized part extending caudad at dorsomesal and lateral areas; apophysis anterioris slender, nearly as long as apophysis posterioris. Ostium bursae opened on cephalic area of 8th sternum, without genital plate; antrum shortly sclerotized, usually ring-shaped; ductus bursae gradually widened towards corpus bursae without gap between them, both being membranous, finely shagreened around a single signum, which is elongate-navicular with an apically bifurcated median projection.

Body chaetotaxy of last instar larva (Fig. 49: A-C): So far as represented by 3 species, body chaetotaxy of larva is fundamentally very similar to that of *Gibbovalva* (gen. nov.), but is different from it by following points: — Seta XD1 on prothorax tending to move posteriorly and situated between D1 and D2; D2 and SD2 on mesothorax and metathorax set close to each other and apart from D1 and SD1, respectively; D1 and D2 on 1st to 8th abdominal segments also set close to each other; SV3 on 6th abdominal segment absent in type-species or present in *T. prosacta*; V1 on 7th abdominal segment absent as in the 8th and 9th. Sixth abdominal segment with a pair of large ventral protuberances which seem to be vestigial prolegs with an apical membranous area (planta) though without crochets.

Arrangement of crochets: Ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in a transverse row as in *Artifodina* Kumata, *Deoptilia* Kumata et Kuroko and *Melanocercops* (gen. nov.); vestigial ventral proleg on 6th abdominal segment and anal proleg with crochets absent.

Larval habit: The larva of this genus is a leaf-miner during the feeding period as in most members of the *Acrocercops*-group. The mine is at first a linear gallery occurring on upper or lower side of the leaf, soon after it changes into a blotch lying in an interparenchymal layer, but usually nearer to the lower surface of leaf; in most cases the blotch mine is oblong or quadrangular and surrounded by leaf-veins. According to the growth of larva, the yellowish or brownish upper side of the mine is spotted with yellowish-white, mostly along the margin, these spots being caused by the larval feeding on the upper layer of the parenchyma; finally it is completely changed into yellowish-white in colour. The mine is not swollen in any stage; by this point it is easily discriminated from that of *Borboryctis* (gen. nov.) and *Leucospilapteryx* Spuler. When fully grown, the larva changes the body colour into crimson-red, then leaves the mine for a pupating site through a semicircular slit. The cocoon is boat-shaped with an elliptical outline, and covered with 1 or 2 whitish minute bubbles on the surface.

Remarks: This new genus is undoubtedly related to the following genus *Spuler-*

*ina* Vári in the fore wing venation (vein  $R_1$  absent and  $R_4$  and  $R_5$  stalked), in the legs (middle femur expanded with scales beyond middle), in the male pregenital segments (8th tergum with a slender anterior apodeme and its median sclerotization extending caudad onto the tergite; 8th sternum with a pair of stringy anterior invaginations), and in the larval chaetotaxy (setae D2 and SD2 on mesothorax and metathorax, and setae D1 and D2 on 1st to 8th abdominal segments set close to each other). It is, however, distinguished from *Spulerina* by the minute flap of the antennal scape, by the absence of the fan-shaped comb of the male valva and by the different shape of the female signum.

Among the Japanese members of the *Acrocercops*-group, the following 4 species are members of the new genus, though there is some doubt about the inclusion of *T. tiliae* sp. nov. in the genus as discussed under the species. Besides these species, the South African *Acrocercops geyeri* Vári, 1961 should be transferred to the new genus. The food plants of these species are scattered in several families, namely, Malvaceae, Amaranthaceae, Convolvulaceae and Tiliaceae.

#### Key to the Japanese species of *Telamoptilia*

1. Brownish basal blotch or fascia of fore wing with its outer margin strongly oblique inward from costa; male valva with 5-6 large cup-shaped basal sockets of small scales arranged in a longitudinal row on outer surface in disc; female corpus bursae without signum; ductus bursae with caudal swollen part lined with scale-like granules; leaf-miner on *Tilia*.  
 ..... *T. tiliae* Kumata et Ermolaev, sp. nov.
- Brownish or fuscous basal blotch or fascia of fore wing with its outer margin vertical or slightly oblique outward; male valva rather simple, with costal margin more or less sclerotized throughout, and without such sockets of scales on outer surface; female signum navicular, with an apically bifurcated median projection. .... 2
2. Fore wing with a preapical white mark quadrangular and reaching dorsum; costal sclerotization of male valva rather wide, occupying about 1/3 width of valva at its widest part, and narrowed abruptly apically and gradually basally; navicular signum jointed with a short piece of sclerotization at its caudal end; leaf-miner on *Urena*.  
 ..... *T. cathedraea* (Meyrick), comb. nov.
- Fore wing with a preapical white mark triangular, and hardly reaching dorsum; costal sclerotization of male valva rather slender, less than 1/4 width of valva at its widest part; signum not jointed with a short piece of sclerotization at its caudal end. .... 3
3. Costal sclerotization of valva occupying 1/4-1/5 width of valva, gradually narrowed apically and basally; ventral part of female antrum shortly prolonged cephalad; signum comparatively long, about 5 times as long as its median projection; leaf-miner on *Achyranthes*.  
 ..... *T. hemistacta* (Meyrick), comb. nov.
- Costal sclerotization of valva very narrow throughout, occupying less than 1/6 width of valva; female antrum short, distinctly truncated on cephalic margin; signum comparatively short, about 4 times as long as its median projection; leaf-miner on *Ipomoea*.  
 ..... *T. prosacta* (Meyrick), comb. nov.

#### 33. *Telamoptilia cathedraea* (Meyrick), comb. nov.

[Figs. 19, 37(G-H), 41(G), 44(B), 49(A) and 54(C)]

*Acrocercops cathedraea* Meyrick, 1908, Journ. Bomb. nat. Hist. Soc. 18: 817 [India (Khasi Hills)]; *Ibid.*, 1924, Exot. Microlep. 3: 85 [India (Bengal); host: *Urena lobata*]; Fletcher, 1933, Imp. Counc. Agr. Res., Sci. Monogr. 4: 48 [India (Bengal); host: *Urena lobata*, *Triumfetta rhomboidea*]; Viette, 1951, Mém. Inst. Sci. Madagascar A, 5: 132 [Madagascar; host: *Urena lobata*, *Jasminum sambac*]; *Ibid.*, 1955, ditto E, 6: 150; Kuroko, 1961, Sci. Bull. Fac. Agr. Kyushu Univ.

18: 313 [Japan (Nansei Is.) ; host : *Urena lobata* var. *tomentosa*] ; Ibid., 1982, Moths Jap. 1 : 188, & 2 : pl. 6(17) [Japan (Nansei Is., Ryūkyū Is.), Taiwan, India ; host : *Urena lobata*].

Original description : "♂. 8 mm. Head and thorax white. Palpi white, second joint with dark fuscous apical band. Antennae grey, towards base white. Abdomen grey, beneath white with dark fuscous rings. Legs white, banded with dark fuscous. Forewings very narrow, elongate-lanceolate ; light ochreous-brown ; five white fasciae fine edged with black, first moderate, basal, enclosing a small spot of ground colour on costa, second rather broad, narrower on costa, outer edge angulated near dorsum, third beyond middle, moderate, oblique, abruptly dilated below middle so that posterior edge forms a quadrate dorsal expansion, fourth slender, oblique, more or less narrowly interrupted in middle, fifth anteapical, moderately broad, oblique, rather irregular : cilia pale greyish white on basal half at apex and on lower extremity of fifth fascia, with two incomplete black lines. Hindwings rather dark grey ; cilia light grey."

Additional description : ♂ ♀. Expanse of wings : 6.5-8.0 mm (7.23 mm on an average of 16 specimens). Length of fore wing : 3.2-3.9 mm (3.55 mm on an average of 17 specimens).

Face white, narrowly grayish laterally. Maxillary palpus more or less roughened with scales, with a dark fuscous median ring ; 2nd segment of labial palpus roughened below with raised scales apically, with a dark fuscous apical band as described originally, the apical segment with traces of a fuscous median ring in some specimens. Antennal scape slightly expanded with scales below, white, with lower flap dark fuscous apically. Thorax anteriorly ochreous-brown narrowly ; tegulae white, basally ochreous-brown. Legs white ; fore coxa with a fuscous mediolateral blotch and an apical one ; anterior 4 femora and tibiae blackish, with middle femur and tibia medianly ringed with white narrowly ; hind femur with a dark fuscous blotch, the tibia dark fuscous laterally, with a white median band ; all tarsi with 4 or 5 blackish rings.

Colour-pattern of fore wing as described originally ; cilia at apex of wing white on basal half and light grayish on apical half, the boundary between them irrorated with black, those along termen grayish-white, with a distinct, blackish subapical fringe line and an obscure, dark median one parallel to each other, the median fringe line being often interrupted by brownish and whitish dashes.

Male genitalia (Fig. 19 : A-F) : Tegumen moderate in length, spatulate in ventral view, with 9-12 setae arranged in an irregular row along each lateral margin from apex to middle ; tuba analis with a very weakly sclerotized, narrow subsca-phium. Valva about 1.5 times as long as tegumen, very slightly upcurved, basal half nearly parallel-sided, then gradually tapering towards round apex, with a large sclerite along costal margin throughout, the sclerite abruptly widened on its basal 1/2 to 2/3 and occupying about costal 1/3 of valva ; fine setae scattered on inner surface of valva except on costal area, and long androconial scales also on outer surface near base. Vinculum rather short, V-shaped, with an acute apex. Aedeagus about as long as valva, tubular, truncated apically, with 1 or 2 short apical prongs curved inwardly ; vesica with an aggregation of a number of needle-shaped spines on median area of aedeagus and 15-20 thorn-like spines at apical area ; ductus ejaculatorius about 1/3 as long as aedeagus, rounded terminally. Eighth abdominal segment about as long as the 7th, deeply notched ventrally ; dorsal apodeme moderate in length, slightly widened apically, with a slender median sclerotization extending on almost whole length of 8th tergite ; a pair of ventral invaginations

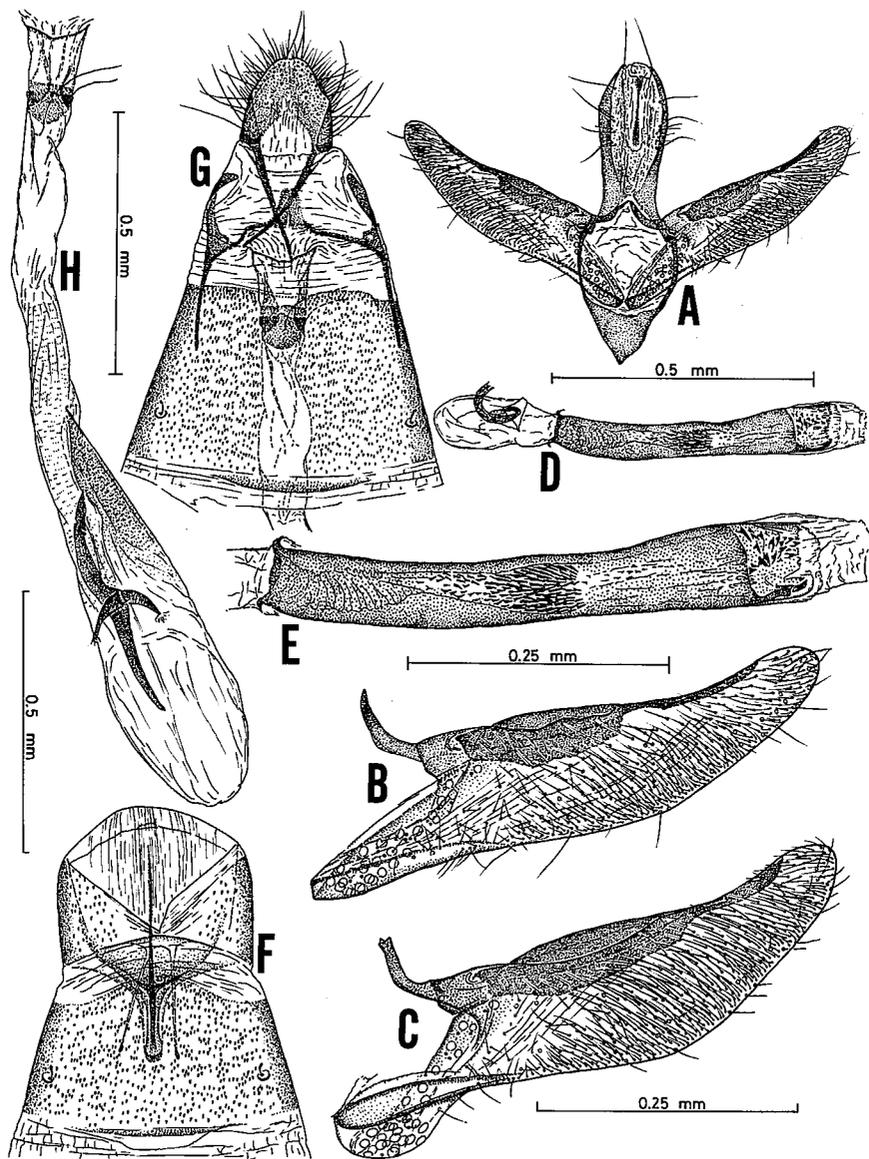


Fig. 19. *Telamoptilia cathedraea* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-3055, Mugiô, Yakusima, Nansei Is., em. 6/xi/1973, ex *Urena lobata* (1177)] — B: Right valva enlarged [ditto] — C: Ditto [Grc-1780, ditto, em. 3/xi/1973] — D: Aedeagus [Grc-3055]. — E: Aedeagus enlarged [ditto] — F: Male 7th and 8th abdominal segments in ventral view [ditto] — G: Female genitalia in ventral view, apical part of bursa copulatrix omitted [Grc-1781, ditto] — H: Bursa copulatrix [ditto].

stringy, more or less capitated apically, a little longer than dorsal apodeme. (Six slides examined.)

Female genitalia (Fig. 19 : G-H) : Papilla analis rather short, obliquely oblong in lateral view, covered with usual setae ; apophysis posterioris a little longer than apophysis anterioris, straight, slightly widened basally. Ostium bursae moderate in opening size ; antrum shortly sclerotized, ring-shaped, about as long as wide ; ductus bursae gradually widened towards corpus bursae without gap between them, with a number of minute, comb-shaped spinules finely lining on median area from caudal 1/3 to 3/4 of bursa copulatrix ; signum large, somewhat navicular, with an apically bifurcated, short projection protruded from the middle ; a short piece of sclerite jointed with signum at caudal end of the latter. (Six slides examined.)

Specimens examined : 10♂♂ & 11♀♀. NANSEI IS. — 9♂♂ & 9♀♀, Mugiô, Yaku-sima, em. 31/x-7/xi/1973, ex *Urena lobata* var. *tomentosa* (1177) ; 1♂ & 1♀, Onoaida, Yaku-sima, em. 12-14/xi/1973, ex *U. lobata* var. *tomentosa* (1261). INDIA — 1♀, Calcutta, West Bengal, xi/1973, ex *U. lobata*, L.K. Das leg., determined as *Acrocercops cathedraea* by T. Kumata, 1974.

Distribution : Japan (Nansei Is. ; Ryûkyû Is.) ; Taiwan ; India ; and Madagascar.

Food plants : *Urena lobata* Linn. var. *tomentosa* Walp. (Malvaceae) in Japan. *Urena lobata* (Malvaceae), ? *Triumfetta rhomboidea* (Tiliaceae) and ? *Jasminum sambac* (Oleaceae) in other countries.

Remarks : This species is characterized by the fore wing marked with 5 whitish transverse fasciae alternated with brownish ones nearly equidistantly, by the male valva with a wide costal sclerite, and by the female signum jointed with a short sclerite at its caudal end.

### 34. *Telamoptilia hemistacta* (Meyrick), comb. nov.

[Figs. 20, 38(A-B) and 44(C)]

*Acrocercops hemistacta* Meyrick, 1924, Exot. Microlep. 3 : 85 [India (Bengal) ; host : *Achyranthes aspera*] ; Fletcher, 1933, Imp. Counc. Agr. Res., Sci. Monogr. 4 : 50 [India (Bengal, Kanara) ; host : *Achyranthes aspera*] ; Viette, 1951, Mém. Inst. Sci. Madagascar, A, 5 : 132 [Madagascar ; host : *Achyranthes aspera*] ; Ibid., 1955, ditto E, 6 : 150 ; Kuroko, 1982, Moths Jap. 1 : 188, & 2 : pl. 6(18) [Japan (Ryûkyû Is.), Taiwan, India ; host : *Achyranthes japonica*].

*Acrocercops cathedraea* [nec Meyrick, 1908] : Fletcher, 1920, Mem. Dept. Agr. India, Ent. 6 : 148 (part) [India (Rajshahi, Coimbatore, Bengal) ; host : *Achyranthes aspera*].

*Acrocercops phalarotis* [nomen nudum] Lefroy, 1909, Ind. Ins. Life : 538 [no description ; India ; host : *Achyranthes aspera*].

Original description : "Differs from *cathedraea* apparently only in forewings being rather darker brown, second fascia less dilated towards dorsum, fourth reduced to a costal dot or mark and seldom a small dorsal dot."

Additional description : ♂♀. Expanse of wings : 6.8 mm in Japanese material ; 6.0-7.2 mm (6.61 mm on an average of 6 specimens) in Indian material. Length of fore wing : 3.3 mm in Japanese material ; 3.0-3.5 mm (3.27 mm on an average of 7 specimens) in Indian material.

As pointed out originally, this species is distinguished from the preceding *T. cathedraea* by a few external characters. Here we will add the following characters by which it is also separated from *T. cathedraea* : —

Face mixed with fuscous scales rather densely ; head with patagia dark brown-

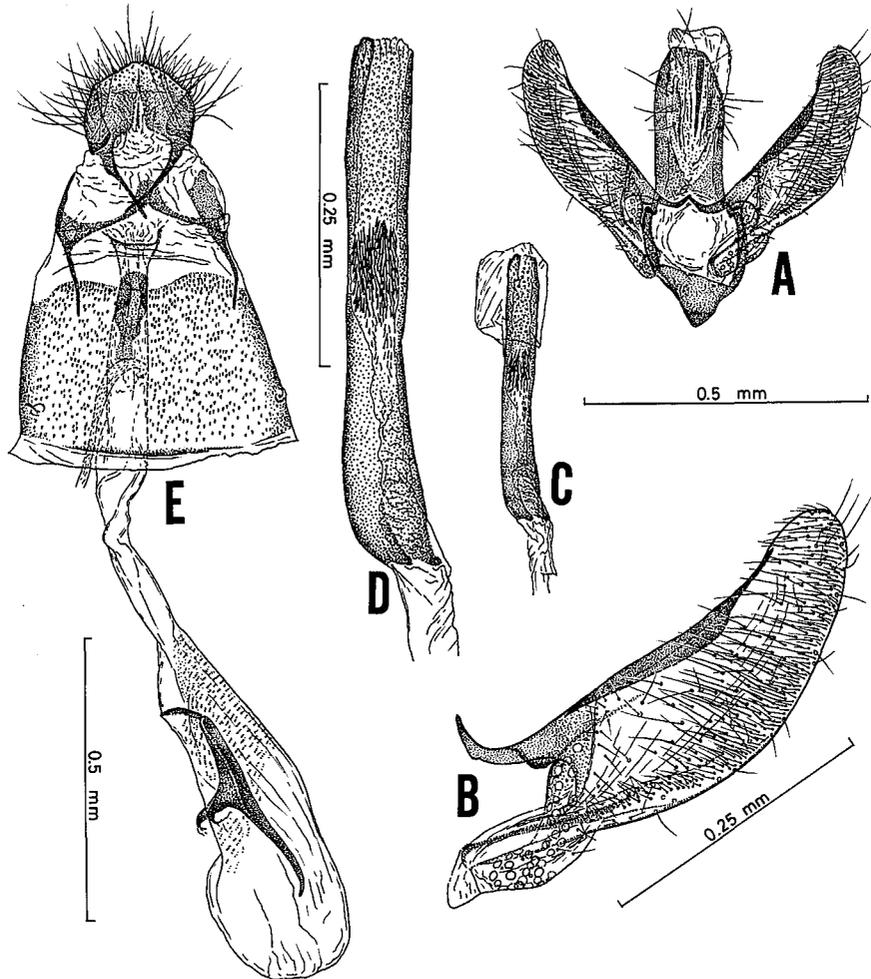


Fig. 20. *Telamoptilia hemistacta* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Kuroko-114, Tina, Okinoerabe, Pyūkyū Is., em. 20/xi/1965, ex *Achyranthes japonica* var. *hachijoensis*, H. Kuroko leg.] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Aedeagus enlarged [ditto] — E: Female genitalia in ventral view [Grc-2020, ditto, em. 9/xi/1965].

ish at least laterally. Middle segment of labial palpus slightly thickened below apically, but roughened less than that of *T. cathedraea*. Antennal scape usually dark fuscous, narrowly whitish above in some specimens especially from India. Fore wing with 1st white fascia at base reduced into a dorsobasal mark and discoloured into ochreous-brown in some specimens; 5th fascia triangular and detached from dorsum in most specimens; interspaces between white fasciae usually wider than the widest 2nd white fascia in most specimens.

Male genitalia (Fig. 20: A-D): Valva with costal sclerite rather narrow, less than 1/4 width of valva, gradually narrowed apically and basally. Aedeagus with a short apical prong straight and bearing 5-10 thorns; vesica with only an aggregation

of a number of needle-shaped spines in centre. (Four slides examined.)

Female genitalia (Fig. 20 : E) : Ventral part of sclerotized antrum shortly extending cephalad. A navicular signum with a faint constriction near caudal end, not jointed with a separated piece of sclerite as seen in *D. cathedraea*. (Four slide examined.)

Specimens examined : 4♂♂ & 6♀♀. RYŪKYŪ Is. — 1♂ & 2♀♀, Tina, Okinoerabu, em. 9-20/xi/1965, ex *Achyranthes japonica* var. *hachijoensis*, H. Kuroko leg., determined as *Acrocercops hemistacta* by H. Kuroko, 1974. INDIA — 1♂ & 1♀, New Delhi, em. 17/xi/1978, ex *A. aspera* (Ind-98 & Ind-112); 2♂♂ & 3♀♀, Bangalore, Karnataka, em. 8-14/ii/1978, ex *A. aspera* (Ind-15).

Distribution : Japan (Ryūkyū Is.); Taiwan; India; and Madagascar.

Food plants : *Achyranthes japonica* Nakai var. *hachijoensis* Honda (Amaranthaceae) in Japan. *Achyranthes aspera* Linn. in other countries.

### 35. *Telamoptilia prosacta* (Meyrick), comb. nov.

[Figs. 21, 38(C-D), 44(D), 49(B) and 54(D-E)]

*Acrocercops prosacta* Meyrick, 1918, Exot. Microlep. 2: 175 [India (Bengal); host : *Ipomoea batatas*]; Fletcher, 1920, Mem. Dept. Agr. India, Ent. 6: 147 [India (Bengal); host : *Ipomoea batatas*]; Kuroko, 1982, Moths Jap. 1: 188, & 2: pl. 6(19) [Japan (Nansei Is.), Taiwan, India; host : *Ipomoea batatas*].

Original description : "♂. 7 mm. Head, thorax white. Palpi white, apical ring of second joint and median ring of terminal fuscous. Forewings narrowly elongate-lanceolate; brownish-fuscous; markings shining white, edged black scales; a dot on costa near base, and an elongate mark on base of dorsum; moderate fasciae at 1/3 and beyond middle, rather dilated towards dorsum, anterior edge of each straight, posterior sinuate; a white dot on costa at 3/4, whence a sinuate row of black scales crossing wing; a triangular spot on costa towards apex, almost touching termen; an apical dot: cilia grey, round apex light brownish. Hindwings and cilia grey."

Additional description : ♂♀. Expanse of wings: 6.5-8.0 mm (7.35 mm on an average of 20 specimens). Length of fore wing: 3.2-4.0 mm (3.6 mm on an average of 20 specimens).

Face white, posteriorly mixed with dark gray scales rather densely; head white in most specimens or grayish in a few specimens. Maxillary palpus white, with a subapical blackish ring; second segment of labial palpus slightly thickened with scales apically, with an apical blackish ring as described originally. Antenna dark fuscous except for white scape and pedicel, the scape being fuscous below, with a narrow blackish apical ring. Thorax and tegulae white, narrowly dark brownish anteriorly. Legs as in *T. cathedraea* and *T. hemistacta*.

Fore wing with ground colour intermediate between those of *T. cathedraea* (lighter) and *T. hemistacta* (darker); markings as described originally and as in *T. hemistacta*, not obviously different from the latter species.

Male genitalia (Fig. 21 : A-E) : Tegumen, vinculum and 8th abdominal segment as in *T. cathedraea* and *T. hemistacta*. Valva about 1.7 times as long as tegumen, wing-shaped, with costal margin straight, ventral margin roundly convex around middle, and apex round; costal sclerotization along extreme margin very slender throughout or not visible in some specimens mainly owing to bad condition of slides; inner surface covered with many slender setae especially densely near ventral margin; outer surface also covered with long androconial scales near base.

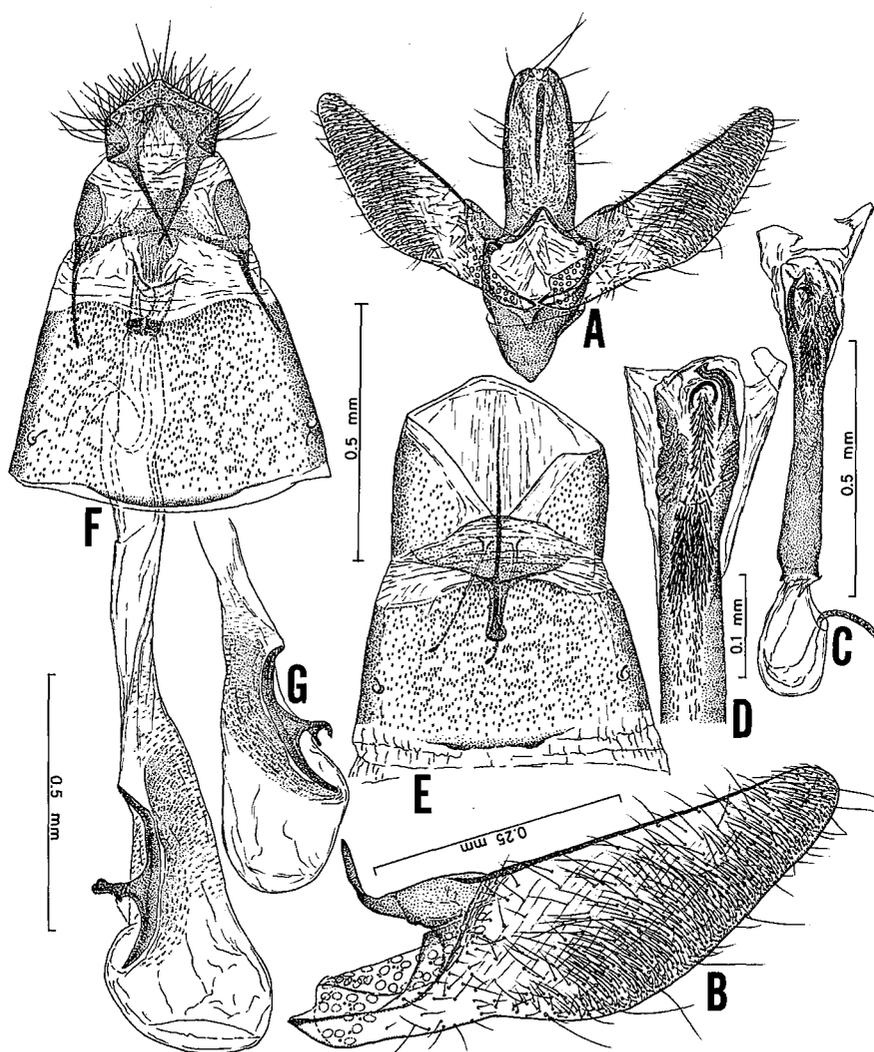


Fig. 21. *Telamoptilia prosacta* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-3053, Miyanoura, Yaku-sima, Nansei Is., em. 6/xi/1971, ex *Ipomoea batatas* (1141), K. Kusigemati leg.] — B: Right valva enlarged [ditto] — C: Aedeagus [ditto] — D: Apical part of aedeagus enlarged [Grc-1914, ditto] — E: Male 7th and 8th abdominal segments in ventral view [Grc-3053] — F: Female genitalia in ventral view [Grc-1917, Miyanoura, Yaku-sima, em. 12/xi/1973, *I. batatas* (1243)] — G: Corpus bursae [Grc-1916, Miyanoura, Yaku-sima, em. 6/xi/1971, ex *I. batatas* (1141), K. Kusigemati leg.].

Aedeagus about as long as valva, straght, tubular, slightly swollen near apex ; inner part of the swollen area finely carinated, and the outer part with an incurved, short prong ; vesica with a number of needle-shaped spines, most of them are aggregated in a mass near the apex of aedeagus and the remining ones are arranged in an irregular row beyond the mass ; a small, lunar sclerite present at apex of aedeagus ; ductus ejaculatorius short, about 1/3 as long as aedeagus, terminally swollen. (Six

slides examined.)

Female genitalia (Fig. 21 : F-G) : Sterigma with lamella postvaginalis weakly sclerotized and finely carinated longitudinally ; antrum very shortly sclerotized, ring-shaped, about half as long as wide, truncated anteriorly and posteriorly ; a navicular signum comparatively short, about 4 times as long as its median projection, without any constriction near its caudal end. The other structures are as in *T. cathedraea* and *T. hemistacta*. (Five slides examined.)

Specimens examined ; 19♂♂ & 18♀♀. NANSEI IS. — 13♂♂ & 15♀♀, Miyanoura, Yakushima, em. 4-13/xi/1971, ex *Ipomoea batatas* (1141), K. Kusigemati leg. ; 1♀, ditto, em. 12/xi/1973, ex *I. batatas* (1243). RYŪKYŪ IS. — 3♂♂ & 1♀, Sueyosi, Okinawa, em. 30/iv-2/v/1985, ex *Ipomoea* sp. (2549), M. Takeda leg. INDIA — 3♂♂ & 1♀, Botanic Garden, Calcutta, West Bengal, em. 7-9/xi/1978, ex *Ipomoea* sp. (Ind-95).

Distribution : Japan (Nansei Is. ; Ryūkyū Is.) ; Taiwan ; and India.

Food plants : *Ipomoea* spp. including *batatas* Lam. (Convolvulaceae) in all countries.

Remarks : This species is very closely similar to the preceding *T. cathedraea* and *T. hemistacta* in many respects, especially in colour-pattern by which it is hardly distinguished from them. The genital characters of both sexes may serve to discriminate these species from one another as pointed out in the key to the species. Nevertheless, the 3 species are quite different in food preference, namely, *T. cathedraea* has been reared from *Urena* (Malvaceae, Malvales) though other doubtful food plants were recorded, *T. hemistacta* exclusively from *Achyranthes* (Amaranthaceae, Caryophyllales), and *T. prosacta* from *Ipomoea* (Convolvulaceae, Polemoniales).

*T. prosacta* is a leaf-miner on cultivated sweet potato (*Ipomoea batatas*), but it is not recorded as a severe pest of this plant from any country where it is distributed. In our observation, however, it heavily infested the leaf of sweet potato in Yakushima, the larval leaf-mines having been found on almost all the leaves of the plant in some cultivated fields in autumn.

36. *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov.

[Figs. 22, 38(E-F), 44(E), 49(C) and 55(A-B)]

♂♀. Expanse of wings : 6.8 (in holotype)-8.0 mm (7.22 mm on an average of 8 specimens). Length of fore wing : 3.3 (in holotype)-4.0 mm (3.50 mm on an average of 9 specimens).

Face white, slightly tinged with ochre anteriorly ; head white. Palpi entirely smooth-scaled, white ; maxillary palpus with a subapical dark ring ; middle segment of labial palpus striped with dark fuscous below. Antenna lightly ochreous, becoming whitish towards base, with slightly dark annulations above ; scape white, with a narrow, fuscous apical ring. Thorax white, with a brownish median band on pleural surfaces ; tegulae white, narrowly brownish anteriorly. Legs white ; fore and middle femora entirely, apical half of the tibiae and 3 rings of the tarsi dark fuscous ; hind femur and tibia dark fuscous on each postmedian area from middle to subapex ; hind tarsus with 6 narrow, blackish rings at about equal intervals.

Fore wing white in ground colour, with 5 transverse, ochreous-brown fasciae finely edged with fuscous irrorations both externally and internally ; 1st fascia occupying basal 1/6 of wing, widened costally, distinctly detached from dorsal

margin, with a dorsal indentation of ground colour sometimes reaching near costa ; 2nd fascia premedian, moderate in width, slightly oblique outward from costa, nearly parallel-sided or slightly narrowed dorsally ; 3rd fascia postmedian, narrower than the 2nd, strongly oblique outward, with inner margin straight or slightly sinuate and outer margin strongly angulated outward in disc ; 4th fascia preapical, nearly parallel to the 3rd, narrow, with external margin very widely blackish ; 5th fascia at

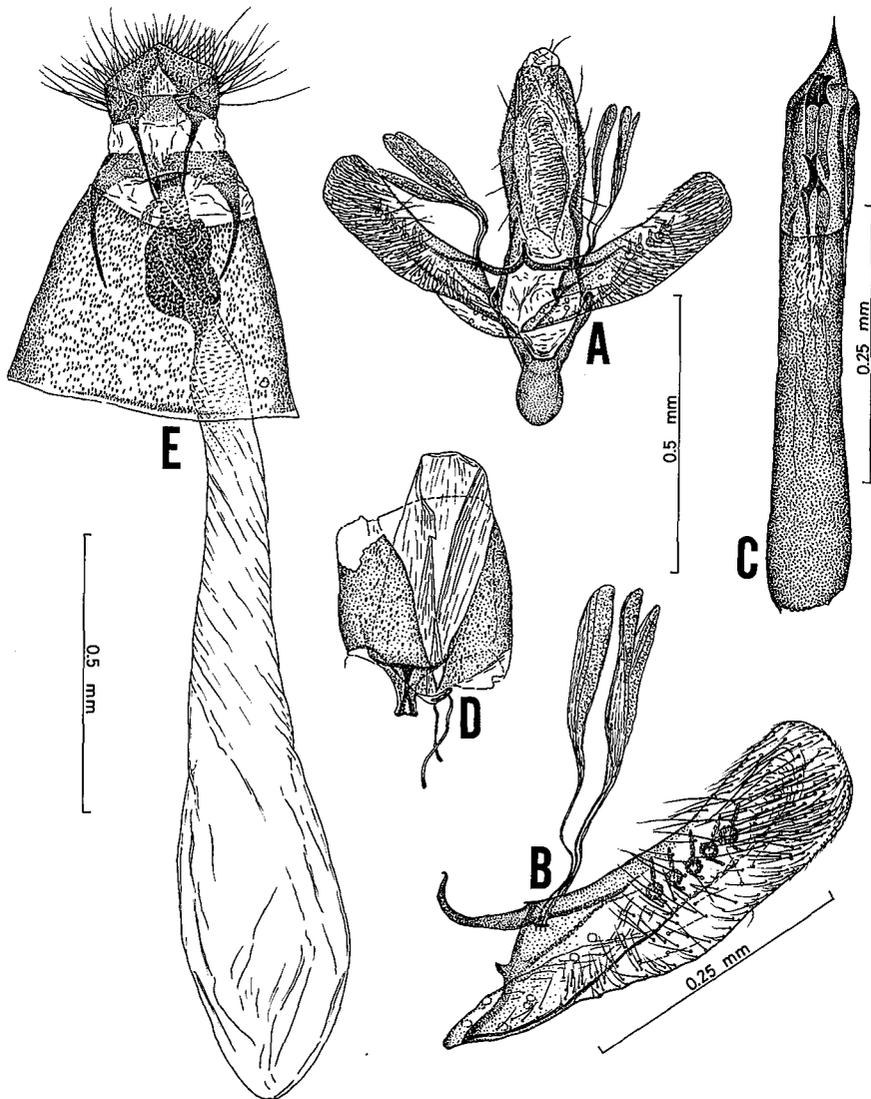


Fig. 22. *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov. A : Male genitalia in caudal view, aedeagus omitted [Grc-1528, holotype] — B : Right valva enlarged [ditto] — C : Aedeagus [ditto] — D : Male 8th abdominal segment in ventral view [ditto] — E : Female genitalia in ventral view [Grc-1529, Moiwa, Sapporo, Hokkaido, em. 8/vi/1079, ex *Tilia maximowicziana* (919)].

apex of wing, the narrowest of fasciae, suffusedly irrorated with black; white interspace between 3rd and 4th fasciae and that between the 4th and 5th are very narrow, about half as wide as interspace between the 2nd and 3rd; cilia at apex of wing white, with a blackish median fringe line and a similar subapical one, those along termen whitish, with a blackish subapical fringe line confluent with median one of wing-apex, and with 1 or 2 fuscous dashes stretched from brownish fasciae, and those along dorsal margin light gray. Hind wing gray, with cilia light gray.

Male genitalia (Fig. 22: A-D): Tegumen moderate in length, subspatulate in ventral view, weakly sclerotized laterally, covered with carinae and spinules along lateral area and on dorsal surface near apex, with a seta at apex and 5 or 6 fine setae scattered along each lateral margin; tuba analis entirely membraneous, without subscaphium. Valva a little longer than tegumen, elongate-quadrangular, slightly upturned at middle; inner surface covered with fine slender setae around margins and thicker and longer setae in disc near apex rather sparsely; outer surface with a few long filiform scales scattered near base, 3 to 5 long, clavate scales clustered in a group near base of costa, and 5 to 7 small, oblong scales arranged in a longitudinal row in disc, the oblong scales each being surrounded by a large cup-shaped basal socket. Vinculum short, with saccus large and round. Aedeagus a little longer than valva, tubular, with an acutely pointed apex; vesica with 2 pairs of rather large, hook-shaped cornuti, and with some minute, needle-shaped ones scattered before large cornuti; ductus ejaculatorius about twice as long as aedeagus, slender, slightly dilated terminally. Eighth abdominal segment 1.3 times as long as 7th, deeply notched ventrally; dorsocephalic apodeme rather short, shortly bifurcated apically, with median sclerotization not extended onto tergite; a pair of ventral invaginations slender, capitate, about 2.5 times as long as dorsal apodeme. (Three slides examined.)

Female genitalia (Fig. 22: E): Papilla analis rather short, obliquely oblong in lateral view, covered with usual fine setae; apophysis posterioris slender, straight, acutely pointed apically, about as long as apophysis anterioris. Eighth abdominal segment with sclerous tergite nearly straight on caudal margin. Ostium bursae moderate in opening size; antrum shortly sclerotized, ring-shaped, about half as long as wide; ductus bursae well swollen and densely lined with scale-like granules near caudal area, then remaining cephalic part membraneous and gradually dilated towards corpus bursae which is entirely membraneous, without any signum. (Three slides examined.)

Specimens examined: 4♂♂ & 5♀♀. Holotype: ♂, Moiwa, Sapporo, Hokkaidō, em. 6/vi/1970, ex *Tilia maximowicziana* (919), Gen. sl. no. Grc-1528. Paratypes: HOKKAIDŌ — 1♀, Apoi-dake, Hidaka, em. 17/v/1975, ex *T. maximowicziana*; 1♂ & 2♀♀, with same data as holotype except on dates emerged, 4-8/vi/1970; 2♀♀, Moiwa, Sapporo, em. 15-20/vi/1978, ex *T. maximowicziana* (1772). U.S.S.R. — 2♂♂, Gornotaeghnoe, Primorye Territory, 30/vi/1982 & 8/vii/1982, V.P. Ermolaev leg.

Distribution: Japan (Hokkaidō); and U.S.S.R. (Far East).

Food plant: *Tilia maximowicziana* Shirasawa (Tiliaceae).

Remarks: This is a rather peculiar species for the genus *Telamoptilia* in having the following characters: — In male genitalia, 1) valva with 3-5 long and clavate scales on outer surface near base of costa as in some species of *Melanocercops* (gen. nov.) and *Dialectica* Walsingham, and 2) 8th abdominal segment with dorsocephalic

apodeme shortly bifurcated apically and its median sclerotization not extending onto tergite; in female genitalia, 3) corpus bursae without signum, and 4) sclerotized 8th tergite nearly straight on its caudal margin without caudal elongations at dorsomesal and lateral areas; and in last instar larva, 5) prothorax without seta XD2 (Fig. 49: C), and 6) all ventral prolegs without crochets. In this paper, however, it is temporarily included in *Telamoptilia*, because it has the following characters in common with other members of the genus: — In fore wing, 1) vein R<sub>1</sub> absent, and 2) veins R<sub>4</sub> and R<sub>5</sub> stalked; in male genitalia, 3) valva simple without any comb on inner surface; and in last instar larva, 4) setae D2 and SD2 set close on mesothorax and metathorax, and 5) setae D1 and D2 also set close on 1st to 8th abdominal segments. The combination of these characters is specific to the genus *Telamoptilia* and may serve to separate this from the other genera of the *Acrocercops*-group.

## XVI. GENUS SPULERINA VÁRI

*Spulerina* Vári, 1961, Transvaal Mus. Mem. 12: 181; Kuznetsov, 1979, Rev. Ent. U.R.S.S. (Ent. Oboz.) 58: 852.

Type-species: *Gracilaria* (!) *simploniella* F.R., 1844.

♂ ♀. Face and head smooth-scaled; ocelli absent; proboscis moderately developed, naked. Labial palpus moderate in length, porrect or drooping, slightly upturned; 2nd segment slightly roughened with scales below or entirely smooth; apical segment a little shorter than the 2nd, smooth, pointed apically. Maxillary palpus minute, about half as long as apical segment of labial palpus, smooth- or rough-scaled, pointed apically. Antenna filiform, 0.9-1.1 times as long as fore wing, simple in both sexes; scape more or less flattened, with a large flap of scales below, the flap being about as wide as scape, a little protruded beyond apex of scape and pointed distally. Legs moderately long, smooth-scaled; middle femur expanded with scales beyond middle; middle tibia slightly thickened apically; hind tibia and 1st hind tarsal segment with a row of bristly scales above, the bristly scales on tarsal segment being a little shorter than those on tibia; anterior pair of hind tibial spurs placed at basal 1/3; hind tarsus a little longer than the tibia.

Fore wing narrowly lanceolate, pointed apically; discoidal cell occupying about basal 3/4 of wing, slightly dilated apically, with distal margin obliquely truncated or angulated outward, and upper vein weakened proximally; 11- or 12-veined; vein R<sub>1</sub> always absent or completely obsolescent, and Cu<sub>1b</sub> also absent in a few species; R<sub>2</sub> from upper angle of cell; R<sub>3</sub> nearly parallel to R<sub>2</sub>; R<sub>5</sub> very weakend or nearly obsolescent in most species, but always stalked with R<sub>4</sub>; M<sub>2</sub> and M<sub>3</sub> connate with or slightly separated from each other and originated around distal or lower angle of cell; Cu<sub>1a</sub> apart from M<sub>3</sub>; Cu<sub>1b</sub>, if present, weakened basally and parallel to Cu<sub>1a</sub>; Cu<sub>2</sub> distinct only near dorsal margin of wing; An very weakened and connected with dorsal margin at basal 1/5-1/4 of wing. Hind wing very slender, 3/5-1/2 as wide as and about 4/5 as long as fore wing, long-pointed apically, with cell opened between M<sub>2</sub> and M<sub>3</sub>; 7-veined, with venation very similar to that of most species of *Acrocercops*-group; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen moderate in length, elongate-oblong or spatulate in

ventral view, weakly sclerotized laterally, with a few setae along lateral margins; tuba analis with a slender subscaphium. Valva somewhat wing-shaped, slightly upturned, more or less strongly tapering apically beyond middle, with a fan-shaped comb around centre of inner surface, the teeth of comb being truncated apically in most species or acute in a few species; fine setae densely occurring on inner surface; long linear androconial scales on outer surface near base; transtilla complete, evenly slender. Vinculum U-shaped, well widened ventrally, with a short, round saccus. Diaphragma membraneous, without particular sclerite. Aedeagus tubular, straight, spiniferous near apex in most species, with a pair of sclerous longitudinal ridges on basal 1/2-2/3; vesica with or without cornuti; ductus ejaculatorius moderately long, widened and round distally. Eighth abdominal segment deeply and widely incised ventrally; tergum with a slender anterior apodeme, of which the median sclerotization narrowly extends onto the tergite; sternum with a pair of stringy anterior invaginations. Seventh abdominal segment normal in shape as in the preceding ones.

Female genitalia: Papilla analis small, obliquely transverse in lateral view, narrowed ventrally and dorsally, setose as usual; apophysis posterioris rather short, tapering distally. Eighth abdominal segment very shortly sclerotized dorsally and widely membraneous ventrally, the sclerotized tergite being narrowly prolonged caudally at dorsomesal and lateral areas; apophysis anterioris usually as long as apophysis posterioris. Ostium bursae opened on cephalic area of 8th sternum, moderate in opening size, without genital plate; antrum shortly sclerotized, usually ring-shaped; ductus bursae tubular, partly dilated beyond antrum, the dilated part being longitudinally striated or lined with spines, and the tubular distal part also lined with minute spines rather densely in most species; corpus bursae elongate-elliptical, membraneous, lined with minute spines around signum, which is narrow, curved, somewhat blade-like, with a short to long median interior projection.

Body chaetotaxy of last instar larva (Figs. 49: D, & 50: A-B): So far as represented by 1 stem-miner (*S. corticicola*) and 2 leaf-miners (*S. dissotoma* and *S. parthenocissi* sp. nov.), the body chaetotaxy of the larva is very similar to that of the preceding genus *Telamoptilia*, though the number of the SV-group and the appearance of the seta V1 on the abdominal segments are inconstant in *Spulerina*. Seta XD1 on prothorax normal in position in the leaf-miners, while it is moved caudad in the stem-miner as in *Telamoptilia*; L2 absent on mesothorax, metathorax and all abdominal segments; D2 and SD2 on mesothorax and metathorax set close to each other in the leaf-miners as in *Telamoptilia*, while they are apart from each other in the stem-miner; D1 and D2 on 1st to 8th abdominal segments also set close in all the species examined; SV3 absent on ventral prolegs of 3rd to 6th abdominal segments in the stem-miner, while it is present on corresponding segments in the leaf-miners; V1 present on all abdominal segments in *S. dissotoma*, while it is absent on the 9th alone in *S. corticicola* and on 7th to 9th in *S. parthenocissi*. Sixth abdominal segment with a pair of large ventral protuberances as in *Telamoptilia*, the protuberances lacking an apical planta in the leaf-mining *S. dissotoma* and *S. parthenocissi*, while they well agree with the ventral prolegs on the 3rd to 5th in structure in the stem-mining *S. corticicola*.

Arrangement of crochets: In the leaf-mining *S. dissotoma* and *S. parthenocissi*, ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in

a transverse row and anal proleg without crochets. In the stem-mining *S. corticicola*, on the other hand, all ventral prolegs on the 3rd to 6th segments and anal proleg with crochets completely absent.

Larval habit : Most species of this genus are stem-miners and some others are leaf-miners during the feeding period.

In the stem-miners the mine occurs beneath the epidermis of young trunks or twigs ; it is usually an irregularly curved linear gallery and becomes wider towards distal end with the growth of the larva, or it starts in a narrow gallery, then suddenly widens into a large blotch. The epidermis of mining part is whitish or brownish in colour, and loosely separated from the trunk or twig in matured stage. When fully grown, the larva changes the body colour from creamy-white to crimson-red as in most larvae of the *Acrocercops*-group, then pupates inside the mine ; the cocoon is usually located under loosened epidermis, boat-shaped as usual, without bubbles on the surface.

In the leaf-miners, the mine occurs on the upper or rarely lower side of the leaf. At first it is linear, and entirely epidermal ; soon after it is broadened into a large blister-like blotch with a whitish or brownish surface. Finally the larva feeds on whole parenchymal tissue within the mine, thus making a full-depth mine. When fully grown, it changes the body colour like stem-miners, then leaves the mine for a pupating site through a semicircular slit. The cocoon is usually placed outside the mine, boat-shaped as usual, with 2 or 3 minute, whitish bubbles on the surface as in most species of the *Acrocercops*-group.

Remarks : The genus *Spulerina* contains 2 groups differing in larval habit, namely, stem-miners and leaf-miners. The 2 groups, however, could not clearly be discriminated from each other in the adult and larval structures except for the larval crochets, which are completely absent on ventral prolegs in the stem-miner, while present in the leaf-miners, so far as the larvae available for the present study are concerned. This difference in crochets seems to be caused by the different spinning sites ; that is, the stem-miners make the cocoon inside the mine, while the leaf-miners spin it outside the mine.

*Spulerina* is related to the preceding *Telamoptilia* in many respects as discussed under the latter genus. It is also somewhat similar to the genus *Acrocercops* in having a comb on the male valva in common, but is quite different from the latter in many important characters, and by these characters it should be placed in a position apart from the latter. In *Acrocercops* the vein  $R_1$  of the fore wing is present ; the Vein  $R_5$  of the fore wing is connate with or separated from the vein  $R_4$  ; the antennal scape is entirely slender without a ventral flap of scales ; the dorsal apodeme of the male 8th tergite has a short sclerotization which is not prolonged onto the tergite ; the prothorax of the larva lacks the seta XD2 ; and all the abdominal segments of the larva bear the well-separated setae D1 and D2.

Among the Japanese members of the *Acrocercops*-group, the following 6 species, including 3 new ones, are referable to the present genus ; 4 of them are stem-miners on Pinaceae, Fagaceae and Rosaceae, and 2 are leaf-miners on Leguminosae and Vitaceae. The records suggest that *Spulerina* is not associated with a particular plant group ; indeed, the type-species occurring in Europe is a stem-miner of Fagaceae, and one species in South Africa, *S. hexalocha* (Meyrick), is known to feed

on Anacardiaceae.

Key to the Japanese species of *Spulerina*

1. White fasciae of fore wing much narrower than brownish or fuscous interspaces between them. . . . . 2
- White fasciae of fore wing as broad as or slightly broader than ochreous-brown to brown interspaces between them. . . . . 3
2. Second white fascia of fore wing about half as wide as interspace between this and 1st fascia ; a fan-shaped comb on male valva with teeth apically dilate ; male aedeagus spinose on apical area ; female signum with median projection large and well-widened basally ; stem-miner on *Quercus acutissima* (Fagaceae). . . . . *S. virgulata* Kumata et Kuroko, sp. nov.
- Second white fascia less than 1/3 as wide as interspace between this and 1st fascia ; a fan-shaped comb on male valva with teeth apically acuminate ; male aedeagus smooth without spinose area ; female signum with median projection very minute ; leaf-miner on various leguminous plants. . . . . *S. dissotoma* (Meyrick)
3. Fore wing with 3rd and 4th white costal marks from base extending 1/3 to 1/2 breadth of wing, and with an elongate white streak on dorsal margin opposite these marks ; female signum with posterior arm broadly blade-shaped ; stem-miner on various species of Pinaceae. . . . . *S. corticicola* Kumata
- Fore wing with 3rd white mark from base forming a complete fascia ; female signum with posterior arm entirely slender. . . . . 4
4. A large species, with wing expanse at least 9 mm (10 mm on an average) ; fore wing with preapical area before white apical spot brownish ; female ductus bursae with its caudal end lined with thorn-like spines, then shortly carinated without lining spinules, and the remaining major area again lined with spinules ; female signum with its median projection long and round apically ; stem-miner on rosaceous trees. . . . . *S. astauvota* (Meyrick)
- A smaller species, with wing expanse at most 9 mm (8-7 mm on an average) ; fore wing with preapical area before white apical spot broadly blackish ; female ductus bursae with its caudal area widely striated and lined with thorn-like spinules, then the remaining major area lined with comb-like spinules ; female signum with its median projection minute or moderately long, and always pointed apically. . . . . 5
5. A fan-shaped comb on male valva large, with length of teeth about 2/3 of valval width ; female signum with its median projection moderately long and somewhat ensiform ; stem-miner on *Castanea crenata* (Fagaceae). . . . . *S. castanaeae* Kumata et Kuroko, sp. nov.
- A fan-shaped comb on male valva small, with length of teeth about 1/3 of valval width ; female signum with its median projection very minute and merely forming an angulated point ; leaf-miner on *Parthenocissus tricuspidata* (Vitaceae).  
. . . . . *S. parthenocissi* Kumata et Kuroko, sp. nov.

37. *Spulerina corticicola* Kumata

[Figs. 23(A-B), 24(C-E), 26(A), 27(B-C), 38(G-H), 45(B) and 49(D)]

*Spulerina corticicola* Kumata, 1964, Ins. matsum. 27 : 31 [Japan (Hokkaidō) ; host : *Abies sachalinensis*, *Larix leptolepis*, *Pinus strobus*, *P. parviflora* var. *pentaphylla*] ; Kuroko, 1982, Moths Jap. 1 : 188, & 2 : pl. 6 (20) ; Suzuki et Komai, 1984, Bull. Hokkaidō Forest Exp. Sta. 22 : 113.

*Acrocercops* sp. : Issiki et Mutuura, 1962, Ent. Lab. College Agr. Univ. Osaka Pref., Pub. 7 : 7 [Japan (Hokkaidō) ; host : *Abies sachalinensis*, *Pinus strobus*].

Original description : “♂ & ♀. Head, face and palpi smooth, silk-white ; second segment of maxillary palpus with a narrow, blackish apical ring ; second segment of labial palpus about as long as the third, with a blackish blotch on outer side. Antenna pale grey, somewhat darkened towards apex ; scape white, with a blackish apical ring and a tuft of fuscous scales. Legs whitish ; fore femur suffused with blackish brown except for median area ; fore tibia dark brown except for basal half of inner side ; mid femur blackish, with two white spots on apical half of inner side ; mid

tibia blackish basally and apically ; fore and mid tarsi with blackish rings at basal 1/4, middle and apical 1/4 ; hind femur with a blackish subapical blotch on outer side ; hind tibia bristled on upper side, silk-white, with blackish subbasal spot and a postmedian one on outer side ; tarsus silk-white, the first segment being rather finely bristled on upper side, with a brownish subbasal spot and a postmedian one on outer side, the second with a brownish median ring, and the third with a brownish apical ring. Thorax white, with a small, dark brownish dot at posterior angle ; tegula white, somewhat brownish basally. Fore wing lanceolate, pointed, with vein  $Cu_2$  absent, the ground colour being white, with ochreous-brown marks which are wholly margined with blackish scales ; a small spot at base of costa irrorated with dark brown scales ; three fasciae rather straight, broad, the first being situated at basal 1/5, direct or slightly oblique inwardly, the second just before middle, oblique outwardly (in some specimens a little arched outwardly), and the third at basal 3/4, almost parallel to the second ; a costal blotch situated at middle between second and third fasciae, reaching nearly half across wing, with two arms stretched from the apex, the anterior arm being directly connected to second fascia in disc, and the posterior one connected also to third fascia in disc (in about one-third of examined specimens this costal blotch disappearing on costal margin of wing or its anterior arm disappearing) ; a V-shaped patch situated near apex just beyond third fascia, the anterior arm being parallel to third fascia, rather narrow, less than half as wide as posterior one ; cilia pale ochreous, with a blackish basal line situated at apical area of wing beyond white apical dot, and a white area along termen between two blackish-irrorated bars. Hind wing pale brownish-gray, with cilia pale ochreous."

"Expense of fore wings, 9.0-11.5 mm."

"Male genitalia : Valva slightly arched downwards, tapering beyond apical 1/3, bluntly pointed, with many slender setae on inner surface and a comb in centre of disc, the comb being composed of seven to eleven spreading teeth. Transtilla narrow. Tegumen rather long, with four to five pairs of setae on inner surface ; tuba analis with a weakly sclerotized, narrow subsclerophium. Saccus moderate in size, broadly produced medially, rounded apically. Aedoeagus bar-shaped, about as long as valva, straight, with a pair of rod-like sclerotizations from base to apical 1/3, and a pair of scobinate areas near apex. Eighth tergite with a narrow median prong, of which the cephalic extremity is widened and bilobed."

"Female genitalia : Papilla analis narrow, with dense, narrow setae on caudal area ; postapophysis slender, rather short, almost straight. Sclerotized sternite of eighth segment broadly separated on ventrum, the tergite being trapezoid in shape ; antapophysis slightly shorter than postapophysis, slender, straight. Sterigma simple, membranous ; antrum provided with a well-sclerotized, narrow ring ; ductus bursae broad and long, with a scobinate area which occupies almost whole basal area beyond antrum ; corpus bursae nearly as long as ductus bursae, rather narrow, with a well-sclerotized, long, narrow signum."

Additional description: ♂ ♀. Expanse of wings: 8.5-11.3 mm (11.0 mm in holotype, 10.12 mm on an average of 20 specimens). Length of fore wing: 4.2-5.5 mm (5.4 mm in holotype, 5.0 mm on an average of 20 specimens).

Thorax silk-white ventrally, with a fuscous band on pleural surface. Abdomen dorsally gray-brownish, ventrally silk-whitish with fuscous bands running along caudal margins of segments. Fore wing with vein  $Cu_{1b}$  absent, and  $Cu_2$  present and distinct only on its short distal part ; cilia along dorsal margin pale grayish, and those along termen dashed with white and ochreous hairs.

Male genitalia (Figs. 23 : A-B, & 24 : C-E) : Valva rather abruptly narrowed apically beyond basal 2/3, with apex upturned and blunt ; teeth of fan-shaped comb arranged in a transverse row in their basal sockets ; long, linear androconial scales scattered on outer surface near base. Eighth abdominal segment deeply notched ventrally, with dorsocephalic apodeme rather broad, very slightly bilobed apically ; a pair of ventral invaginations stringy, slightly capitated apically, a little longer than dorsal apodeme. (Eight slides examined.)

Female genitalia (Figs. 26 : A, & 27 : B-C) : Ductus bursae partly a little swol-

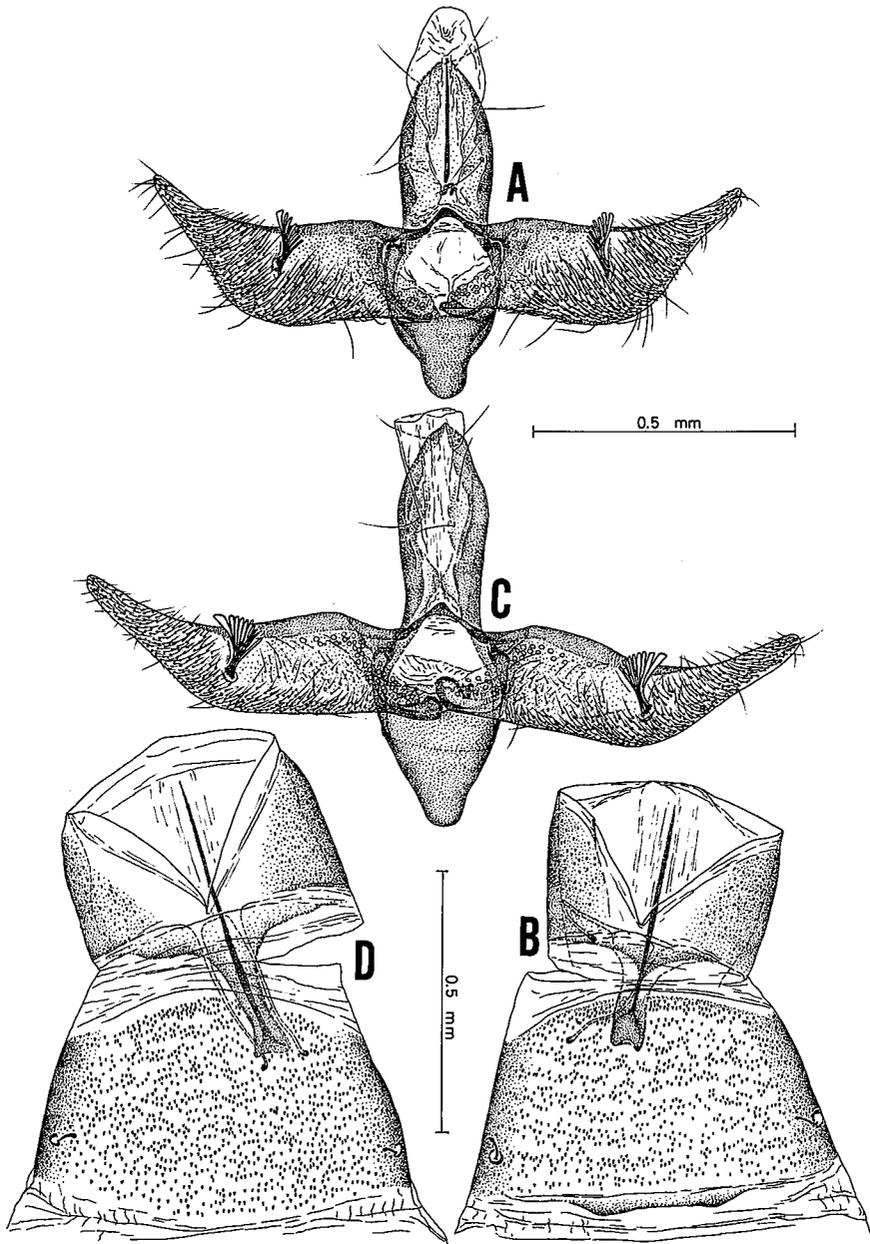


Fig. 23. A-B: *Spulerina corticicola* Kumata. A: Male genitalia in caudal view, aedeagus omitted [Grc-3071, Apoi, Hidaka, Hokkaidō, em. 19/vii/1973, ex *Pinus strobus* (1155)] — B: Male 7th and 8th abdominal segments in ventral view [Grc-1540, Apoi, em. 9/vii/1967, ex *P. strobus*]. C-D: *Spulerina astaurota* (Meyrick). C: Male genitalia in caudal view, aedeagus omitted [Grc-1536, Izaka, Iwate-ken, em. 14/vii/1966, ex *Malus pumila*] — D: Male 7th and 8th abdominal segments in ventral view [ditto].

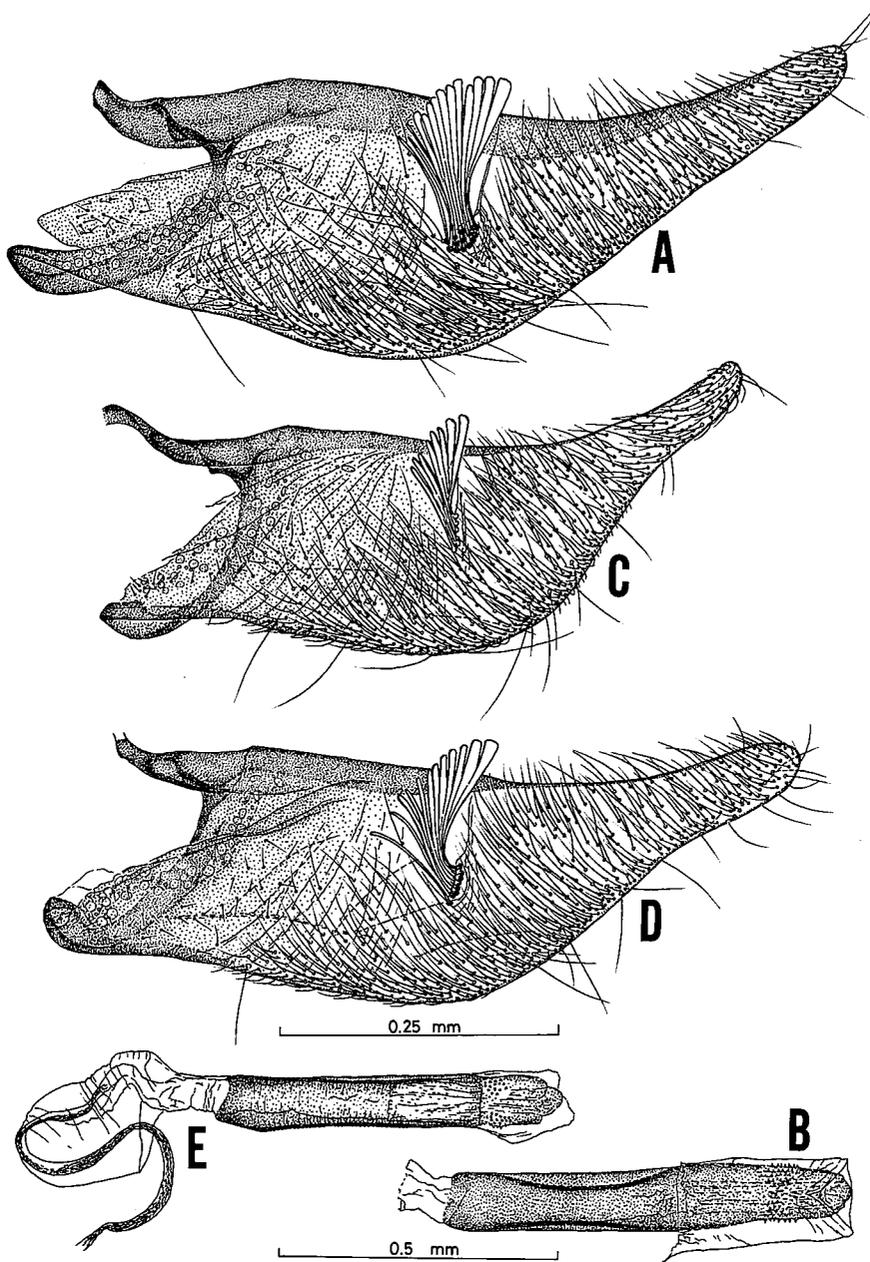


Fig. 24. A-B: *Spulerina simploniella* (F.R.). A: Right valva [Grc-532, Berlin, Lundwin-  
st, 5/vii/'58, ex *Quercus robur*, Schönherr leg.] — B: Aedeagus [ditto].  
C-E: *Spulerina corticicola* Kumata. C: Right valva [Grc-3071] — D: Ditto [Grc-587,  
holotype] — E: Aedeagus [Grc-3071].

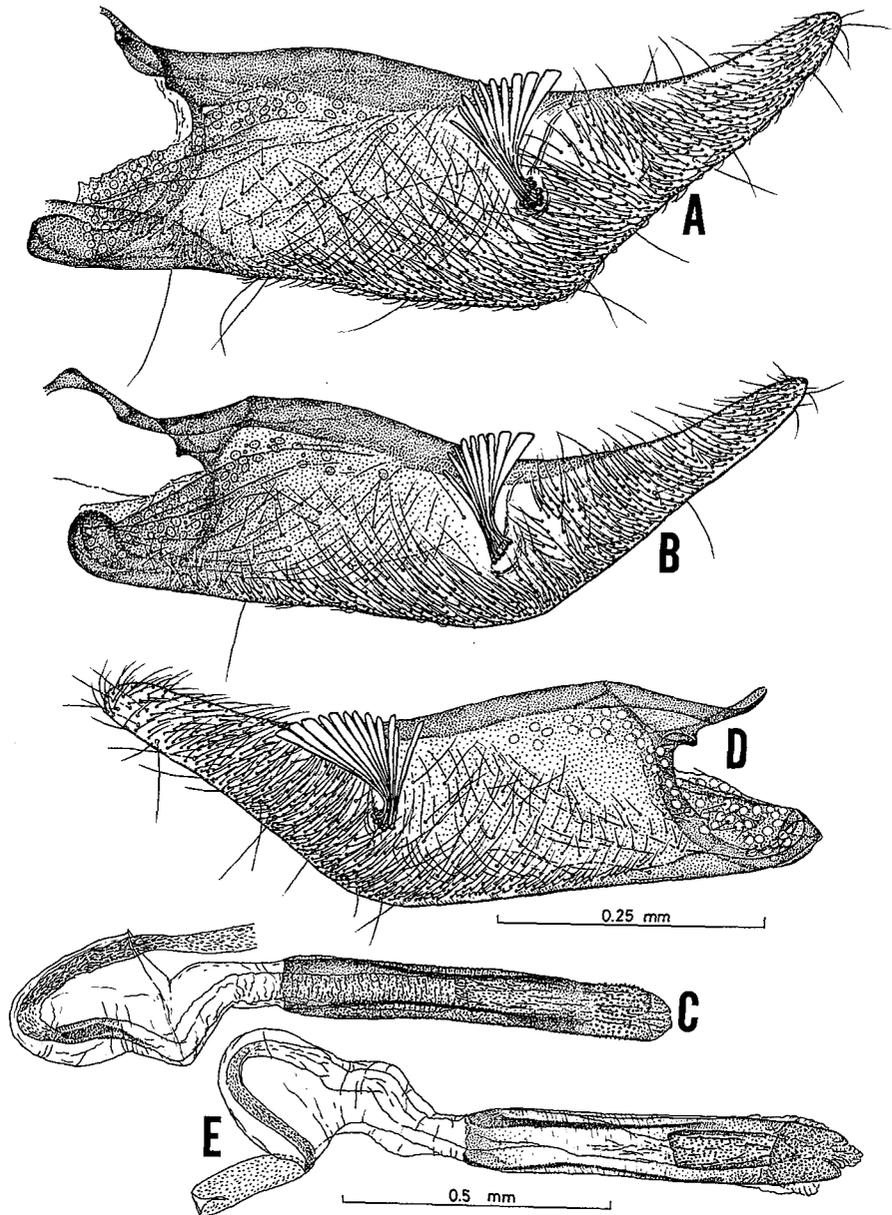


Fig. 25. A-C: *Spulerina astaurota* (Meyrick). A: Right valva [Grc-3073, Izaka, Iwateken, em. 21/vii/1966, ex *Pyrus communis*] — B: Ditto [Grc-1536, Izaka, em. 14/vii/1966, ex *Malus pumila*] — C: Aedeagus [ditto]. D-E: *Spulerina malicola* (Meyrick). D: Left valva (BM-23991, syntype of *Acrocercops malicola* Meyrick, Shillong, Khasis, 30/vi/1918, ex *Malus pumila*, Fletcher leg.) — E: Aedeagus [ditto].

len near base, densely lined with thorn-like spinules on this swollen part, and also lined with more minute comb-like spinules on remaining distal part; signum with median projection moderately long and ensiform, posterior arm widely blade-shaped, and anterior arm widely capitated. (Eight slides examined.)

Specimens examined: 28♂♂ & 29♀♀. Holotype: ♂, Zyōzankei, Hokkaidō, em. 24/vii/1963, ex *Abies sachalinensis*, Gen. sl. no. Grc-587. Paratypes: HOKKAIDŌ—6♂♂ & 5♀♀, Yamabe, em. 13/vii/1960, ex *Pinus strobus*; 3♂♂ & 4♀♀, ditto, em. 8-18/vii/1963, ex *P. strobus*, K. Kamijo leg.; 1♂ & 1♀, Apoi, Hidaka, em. 15/vii/1963, ex *P. strobus*; 2♂♂, ditto, em. 15/vii/1963, ex *P. parviflora* var. *pentaphylla*; 2♂♂ & 1♀, Tomakomai, em. 15-22/vii/1963, ex *P. strobus*; 1♂, Naganuma, Sorati, em. 22/vii/1963, ex *A. sachalinensis*; 2♂♂ & 3♀♀, Tine, em. 24-30/vii/1963, ex *Larix leptolepis*; 3♂♂ & 9♀♀, with same data as holotype except on dates emerged, 22-30/vii/1963. Further specimens: HOKKAIDŌ—2♂♂ & 1♀, Yamabe, em. 8-18/vii/1963, ex *P. strobus*, K. Kamijo leg.; 3♂♂ & 2♀♀, Apoi, Hidaka, em. 9-15/vii/1967, ex *P. strobus*; 1♂ & 3♀♀, ditto, em. 12-23/vii/1973, ex *P. strobus* (1155). HONSYŪ—1♂, Ina, Nagano-ken, 14/vii/1965, Y. Arita leg.

Distribution: Japan (Hokkaidō; Honsyū).

Food plants: *Abies sachalinensis* Masters, *Larix leptolepis* Gordon, *Pinus parviflora* Sieb. et Zucc. var. *pentaphylla* Henry and *P. strobus* Linn. (Pinaceae).

Remarks: This species is a stem-miner of coniferous trees. In colour-pattern it is very similar to the European *S. simploniella* (Röslerstamm) which is a stem-miner of oaks, but it is distinguished from the latter not only by the difference of the food plant but also by the genital structure as follows: — In *S. corticicola*, the male saccus is widely round apically, the fan-shaped comb of the male valva is strongly upcurved near base with the basal sockets of the teeth being arranged in a vertical line, and the female ductus bursae is lined with thorn-like spinules near the caudal end, then also lined with more minute comb-like spinules on the remaining cephalic area. In *S. simploniella*, on the other hand, the male saccus is pentagonal with an angulated apex, the fan-shaped comb of the valva is almost straight or slightly upcurved, with the basal sockets of the teeth being gathered in a group (Fig. 24: A), and the female ductus bursae is lined with comb-like spinules alone on almost entire length (Fig. 27: A).

### 38. *Spulerina astaurota* (Meyrick)

[Figs. 23(C-D), 25(A-C), 26(B), 27(D-E), 39(A-B), 41(H) and 45(C)]

*Acrocercops astaurota* Meyrick, 1922, Exot. Microlep. 2: 562 [India (Shillong)]; Ibid., 1930, ditto, 3: 580 [Japan (Honsyū); host: *Pyrus communis*]; Harukawa et Kumashiro, 1930, Ber. Ohara Inst. 4: 475-492 [Bionomics; Japan (Honsyū, Sikoku, Kyūsyū); host: *Pyrus pyrifolia*, *P. communis*, *Malus sylvestris*, *M. zumi*; *Prunus domestica*, *Chaenomeles* sp.]; Idid., 1932, ditto 5: 301-310 [Biology]; Issiki, 1950, Iconogr. Ins. Jap. ed. sec.: 453, fig. 1222; Inoue, 1954, Check List Lep. Jap. 1: 27; Issiki, 1957, Icones Heterocer. Jap. Col. Nat. 1: 28, pl. 4 (106).

*Spulerina astaurota*: Kuroko, 1982, Moths Jap. 1: 189, & 2: pl. 6 (21) [Japan (Honsyū, Sikoku, Kyūsyū), India; host: *Pyrus communis*]; Park, 1983, Ill. Flora & Fauna Korea 27: 589, pl. 38 (669) [Korea].

Original description: "♂. 10 mm. Head white. Palpi white, a lateral streak of second joint and fine median ring of terminal joint dark fuscous. Thorax white, a fine V-shaped transverse series of grey scales. Forewings narrow, rather short-pointed; rather light chestnut-brown, somewhat mixed ochreous-whitish on margins of fasciae; markings white, irregularly and interruptedly edged black; a basal patch occupying 1/5 of wing, marked black on costa; two moderately broad rather oblique fasciae at 1/3 and beyond middle; a somewhat irregular transverse line at 3/4

interrupted in disc; two narrow irregular approximated transverse streaks near apex; a small white apical spot: cilia ochreous-greyish, mostly white towards base beneath apex, on costa dark fuscous, white on costal and apical margins. Hindwings dark grey; cilia grey."

Additional description: ♂ ♀. Expanse of wings: 9.2-11.2 mm (10.41 mm on an average of 20 specimens). Length of fore wing: 4.5-5.5 mm (5.11 mm on an average of 20 specimens).

Face white; maxillary palpus laterally fuscous on its basal half; labial palpus as described originally. Antenna light ochre-grey, becoming whitish towards base; scape white, ringed with black at apex, with a rather large ventral flap brownish basally and whitish apically. Thorax white; tegulae whitish, somewhat brownish basally. Legs white; fore coxa with a subbasal spot and an apical one fuscous and small; anterior 4 femora and tibiae dark fuscous or blackish, each with 1 or 2 white rings or bands, the tarsi with 3 fine fuscous rings at same intervals; hind coxa apically, the femur subapically and the tibia subbasally and postmedially blackish on their outer sides, the tarsi with 4 rather broad blackish rings.

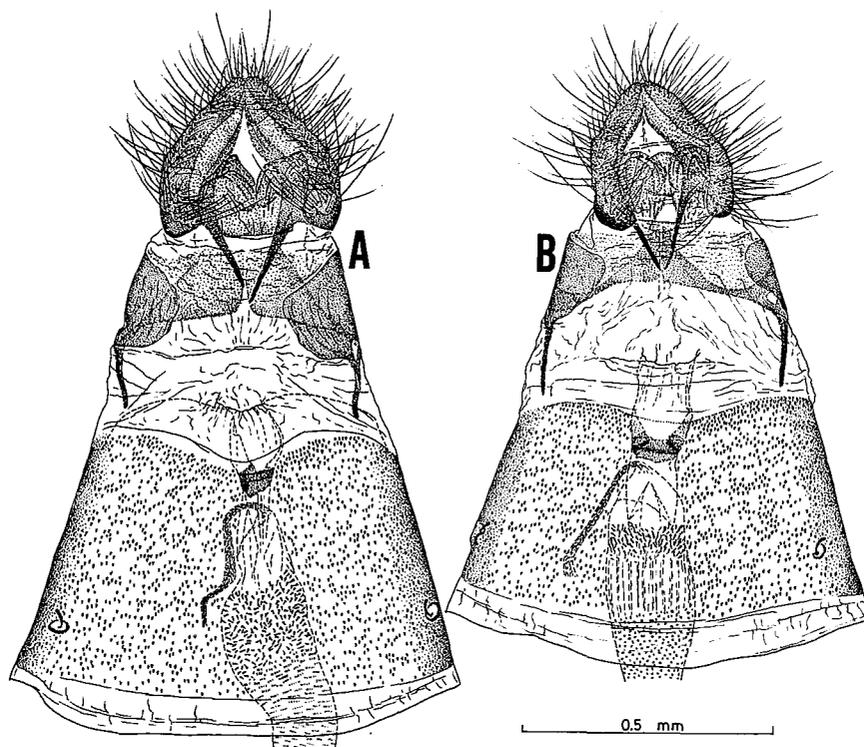


Fig. 26. A: *Spulerina corticicola* Kumata, female genitalia in ventral view, apical part of bursa copulatrix omitted [Grc-3072, Zyōzankei, Hokkaidō, em. 24/vii/1963, ex *Abies sachalinensis*].

B: *Spulerina astaurota* (Meyrick), female genitalia in ventral view, apical part of bursa copulatrix omitted [Grc-3074, Izaka, Iwate-ken, em. 22/vii/1966, ex *Matsumyia pumila*].

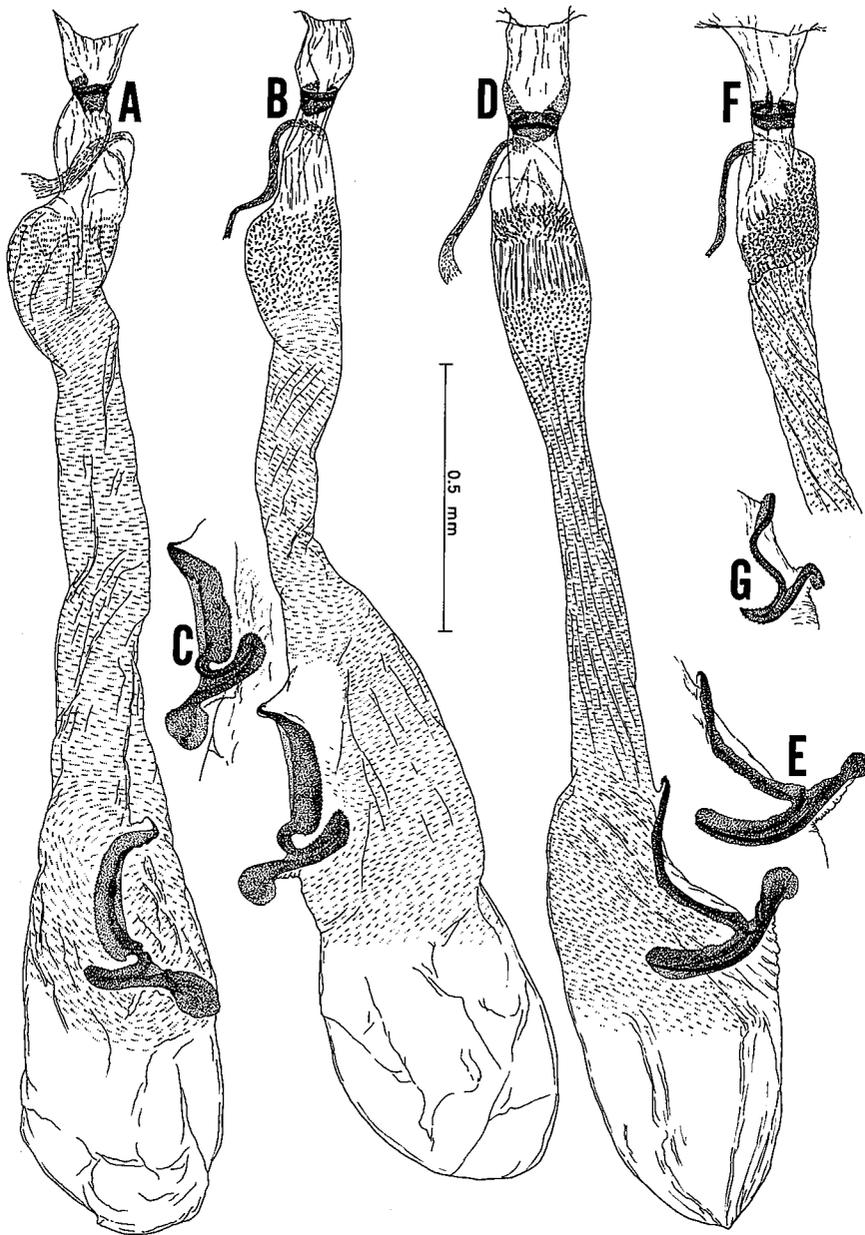


Fig. 27. A: *Spulerina simploniella* (F.R.), bursa copulatrix [Grc-531, Berlin, Lundwinst, 5/vii/'57, ex *Quercus robur*, Schönherr leg.].  
 B-C: *Spulerina corticicola* Kumata. B: Bursa copulatrix [Grc-3072] — C: Signum [Grc-1541, Apoi, Hidaka, Hokkaidō, em. 15/vii/1967, ex *Pinus strobus*].  
 D-E: *Spulerina astaurota* (Meyrick). D: Bursa copulatrix [Grc-3074, Izaka, Iwateken, em. 22/vii/1966, ex *Malus pumila*] — E: Signum [Grc-1537, Kawatinagano, Ōsaka, em. 5/vii/1955, ex *Pyrus communis*].  
 F-G: *Spulerina malicola* (Meyrick). F: Basal part of bursa copulatrix [BM-23990, Khasis 5000ft., Shillong, 19/v/1923, Fletcher coll.] — G: Signum [ditto].

Colour-pattern of fore wing as described originally, but preapical white streak interrupted by ground colour in disc into a costal triangular blotch and a small dorsal spot in most specimens; cilia with 1 or 2 apical fringe lines of blackish irrorations along termen.

Male genitalia (Figs. 23: C-D, & 25: A-C): Tegumen moderate in length, somewhat spatulate in ventral view, with a pair of subapical setae and 2 or 3 setae on each lateral margin; subscaphium narrowly sclerotized. Valva about 1.6 times as long as tegumen, slightly upturned at about apical 2/5, gradually narrowed apically beyond apical 2/5, with a blunt apex; inner surface covered with slender setae rather densely except on costal area; a fan-shaped comb of 9-15 apically spreading teeth situated at apical 2/5 in disc; outer surface with long, slender androconial scales on basal area and rather wide, long scales arranged in a row near costal margin near base. Vinculum about half as long as tegumen, triangular, with blunt apex. Aedeagus about as long as valva, tubular, straight, blunt apically, covered with dense spinules around apical area; vesica with needle-shaped spinules on median area of aedeagus; ductus ejaculatorius J-shaped, about 2/3 as long as aedeagus. Eighth abdominal segment a little shorter than the 7th, deeply notched ventrally; dorsocephalic apodeme about half as long as 7th segment, rather wide, truncated apically or shortly bifurcated, with a narrow median sclerotization extending onto 8th tergite; a pair of ventral invaginations a little longer than dorsal apodeme, stringy, more or less capitated. (Ten slides examined.)

Female genitalia (Figs. 26: B, & 27: D-E): Papilla analis short, covered with microscopic spinules and usual slender setae on caudal area rather densely; apophysis posterioris slightly widened basally, a little longer than apophysis anterioris. Ostium bursae rather small in opening size; antrum shortly sclerotized, ring-shaped; ductus bursae slightly swollen beyond antrum, then tubular and gradually dilated towards corpus bursae, with its short caudal area lined with needle-shaped spines, followed by longitudinally carinated short part, and remaining main part again lined with comb-like spinules, the caudal spinose area about as long as antrum and 1/2 to 1/3 as long as the following carinated area; signum with median projection about twice as long as anterior arm, widely rounded apically and minutely serrated, and posterior arm slender in whole length. (Seven slides examined.)

Specimens examined: 15♂♂ & 12♀♀. Holotype: ♂, labelled "Shillong, Assam, T.B.F., 7. 24", "*Acrocercops astaurota* Meyrick", "BM Genitalia Slide No. 16925", deposited in British Museum (N.H.). Further specimens: HONSYŪ — 4♀♀ & 5♀♀, Izaka, Iwate-ken, em. 21-24/vii/1966, ex pear (*Pyrus communis*), Morioka Branch Hort. Res. Sta.; 6♂♂ & 5♀♀, ditto, em. 14-24/vii/1966, ex apple (*Malus domestica*), Morioka Branch Hort. Res. Sta.; 1♂ & 2♀♀, Kawatinagano, Ōsaka, em. 29/vi-5/vii/1955, ex *Pyrus communis*, S. Issiki leg., determined as *Acrocercops astaurota* by Issiki, 1957; 1♂, ditto, em. 25/vi/1955, ex *Malus domestica*, S. Issiki leg., determined as *A. astaurota* by Issiki, 1957; 1♂, ditto, em. 9/vii/1954, ex *P. communis*, S. Issiki leg.; 1♂, ditto, em. 2/vii/1954, ex *P. communis*, T. Yasuda leg.

Distribution: Japan (Honsyū; Sikoku; Kyūsyū); Korea; and India (Shillong).

Food plants: *Chaenomeles* sp., *Malus domestica* Borkh. (= *M. sylvestris*), *M. sieboldii* Rehder var. *zumi* Asani (= *M. zumi*), *Prunus domestica* Linn., *Pyrus communis* Linn. and *P. pyrifolia* Nakai (Rosaceae) in Japan.

Remarks: This species is a stem-miner of various rosaceous trees as reported by Harukawa and Kumashiro (1930, '32) in detail. Indeed, the present specimens reared from apple-trees exactly agree with those from pear-trees. The Japanese

specimens at hand all agree with the holotype of *astaurota* collected from Shillong, India. On the other hand, they evidently disagree with the types of *Spulerina malicola*<sup>1)</sup> which was also described from Shillong on the basis of specimens reared from stem-mining larvae on apple trees. *S. astaurota* is undoubtedly very close to *S. malicola*, but it may be distinguished from the latter by the lining pattern of spinules on the ductus bursae and by the shape of the female signum as shown in Fig. 27, as well as by the lighter ochreous ground colour of the fore wing and by 3 basal white fasciae of the fore wing being nearly as wide as the neighbouring fasciae of the ground colour.

39. *Spulerina castaneae* Kumata et Kuroko, sp. nov.

[Figs. 28(A-C), 29(A-C) and 39(C-D)]

*Acrocercops* sp.: Suenaga, 1938, Ôyô-Dobutugaku-Zasshi 10: 108-109 [Japan (Honsyû); host: *Castanea crenata*, *Quercus* sp.]; Kawada et Suenaga, 1940, Ôyô-Kontyû 2: 192-201, 240-255 [Bionomics].

♂ ♀. Expanse of wings: 8.5-9.0 mm (in holotype). Length of fore wing: 4.2-4.5 mm (in holotype).

Face, head and palpi white; maxillary palpus with a fuscous median ring; 2nd segment of labial palpus dark fuscous except on upper edge, the apical segment with a fuscous median ring. Antenna light ochre-gray, whitish basally; scape white, very narrowly blackish apically, with a rather large ventral flap of leaden-metallic gray scales. Thorax white, faintly irrorated with ochre-brown scales on anterior area; tegulae white, suffusedly irrorated with light ochre and dark fuscous scales at basal area. Legs white; fore coxa brownish at apical extremity; anterior 4 femora dark brownish or fuscous, with 2 whitish spots on dorsal area at middle and near apex; fore tibia blackish on apical half; middle tibia with blackish rings at base, middle and apex; anterior 4 tarsi with 3 fine blackish rings at same intervals; hind coxa apically, the femur subapically and the tibia basally and subapically suffused with dark fuscous or blackish scales on lateral surfaces rather broadly; hind tarsus with 4 blackish short rings at nearly same intervals.

Fore wing light ochreous-brown in ground colour, more or less irrorated with blackish scales along costa of wing, with white markings margined with blackish scales, the marginal blackish scales being more conspicuous on costal side; a basal

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1)

*Spulerina malicola* (Meyrick), comb. nov.

[Figs. 25(D-E) and 27(F-G)]

*Acrocercops malicola* Meyrick, 1921, Exot. Microlep. 2: 416 [India (Shillong); host: *Pyrus malus*].

Specimens examined: 1♂, syntype, labelled "Shillong, 5000 ft., 30. vi, '18, June-July, '18, apple-bark, Fletcher coll.", "Paratype, *Acrocercops malicola* Meyr., Meyrick det. 1920", "BM Genitalia Slide No. 23991"; 1♂, labelled "Khasis: 5000 ft., Shillong, 19. May, 1928, Fletcher coll.", "*Acrocercops malicola* Meyr.", "BM Genitalia Slide No. 23990".

Distribution: India (Khasi Hills).

Food plant: *Malus domestica* Borkh. (= *Pyrus malus* Linn.) (Rosaceae).

Remarks: The genital structure shows that this species is definitely a member of the genus *Spulerina*.

patch occupying 1/6 of wing, containing a black spot at base of costa; 5 fasciae slightly oblique outwardly, nearly parallel to each other, slightly wider than or as wide as the preceding fasciae of ground colour, respectively, 1st at about basal 1/4 and widest of fasciae, 2nd at middle and as wide as or slightly narrower than 1st, 3rd at basal 2/3 and constricted or interrupted by ground colour in disc, 4th at about basal 3/4, narrower than 3rd and irregularly interrupted by brownish scales near dorsum, 5th preapical, approximated to 4th and also irregularly interrupted as in 4th; a round white spot at apical extremity of wing, externally margined with rather broad, black fringe line; interspace between 5th white fascia and apical spot suffusedly irrorated with blackish scales, stretching blackish cilia towards costal and dorsal sides widely; remaining part of cilia ochreous-gray or light gray, dashed with

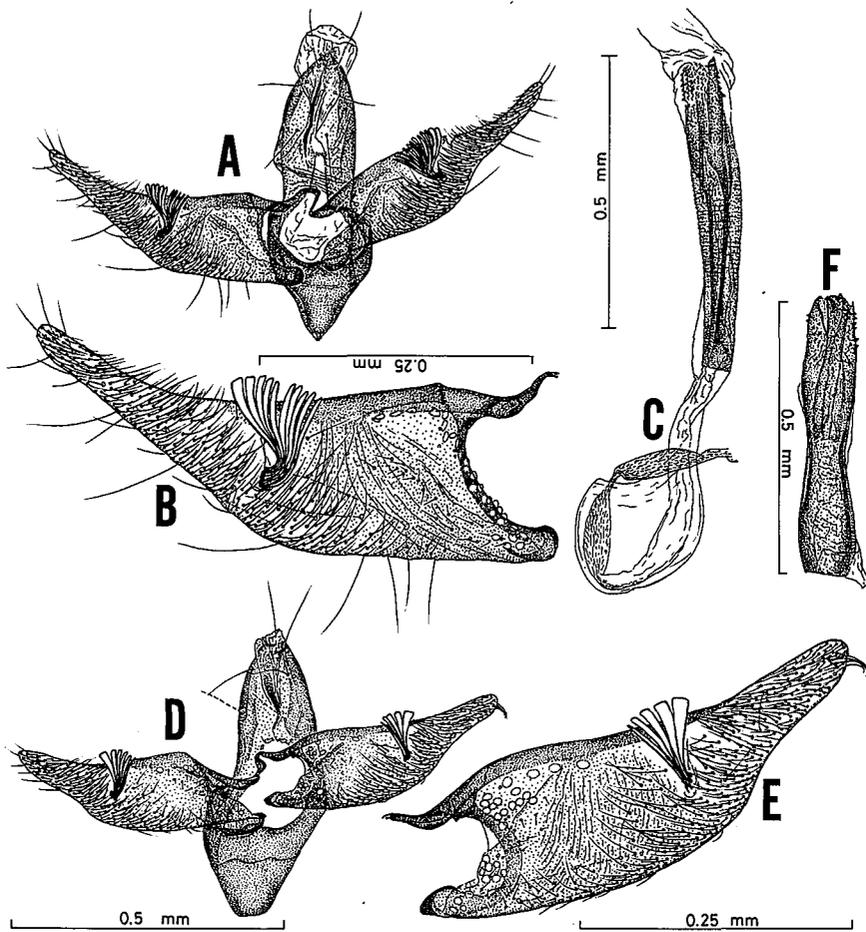


Fig. 28. A-C: *Spulerina castaneae* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-1524, holotype] — B: Left valva enlarged [ditto] — C: Aedeagus [ditto].  
 D-F: *Spulerina virgulata* Kumata et Kuroko, sp. nov. D: Male genitalia in caudal view, aedeagus omitted [Kuroko-97, Kawatinagano, Ōsaka, 7/v/1957] — E: Right valva enlarged [ditto] — F: Aedeagus [ditto].

white on termen below white marks, with a blackish subapical fringe line running along termen. Hind wing rather dark gray, with cilia light gray.

Male genitalia (Fig. 28 : A-C) : Tegumen moderate in length, elongate-ovate in ventral view, with a pair of slender subapical setae and 2 pairs of ventral ones ; tuba analis covered with spinules on ventral surface, with a very weakly sclerotized, narrow subscaphium. Valva about 1.5 times as long as tegumen, wing-shaped, slightly upturned at middle, rather abruptly narrowed beyond middle towards apex ; inner surface covered with slender setae except on costal area, with a fan-shaped comb at apical 2/5 in disc, the comb consisting of 10-12 upcurved teeth ; outer surface with a few long, slender androconial scales at base and near costal margin. Vinculum about 2/5 as long as tegumen, triangular with rather acute apex, very shallowly constricted beyond middle. Aedeagus a little longer than valva, tubular, with apical area covered with acute spines rather densely ; vesica with a very weakly sclerotized, long bar, and with microscopic spines behind this bar ; ductus ejaculatorius J-shaped, about 3/4 as long as aedeagus. Eighth abdominal segment about as long as the 7th, deeply notched ventrally ; dorsocephalic apodeme truncated apically, slightly broadened basally, with its slender median sclerotization extending onto tergite ; a pair of stringy ventral invaginations slightly capitated apically, about 1.3 times as long as dorsal apodeme. (One slide examined.)

Female genitalia (Fig. 29 : A-C) : Papilla analis rather short ; apophysis posterioris acute apically, about as long as apophysis anterioris. Ostium bursae moderate in opening size ; antrum shortly sclerotized, ring-shaped ; ductus bursae partly swollen near caudal end beyond antrum, the swollen part irregularly carinated and lined with thorn-like spines in moderate density ; remaining main cephalic part of ductus bursae and whole corpus bursae membranous, rather densely lined with more minute comb-like spinules ; signum as in *S. astaurota*, but median projection comparatively short, about as long as anterior arm, ensiform with acute apex. (Three slides examined.)

Specimens examined : 1♂ & 3♀. Holotype : ♂, Morioka, Honsyū, em. 10/v/1971, ex *Castanea crenata*, S. Takamura leg., Gen. sl. no. Grc-1524. Paratypes : 3♀, with same data as holotype.

Distribution : Japan (Honsyū).

Food plants : *Castanea crenata* Sieb. et. Zucc. and *Quercus* sp. (after Suenaga, 1938) (Fagaceae).

Remarks : This species is a stem-miner of chestnut-trees, and sometimes causes some damage to this plant in Japan (Suenaga, 1938 ; Kawada et Suenaga, 1940). It is distinguished from the preceding *S. astaurota* by the smaller size (wing expanse, 7.0-9.0 mm in *S. castaneae*, while 9.2-11.2 mm in *S. astaurota*), by the blackish subapical fascia of the fore wing, by the male valva narrowed abruptly from the middle towards the apex, by the lining pattern of spinules on the female ductus bursae (Fig. 29 : A), and by the shape of the female signum (Fig. 29 : B-C).

#### 40. *Spulerina virgulata* Kumata et Kuroko, sp. nov.

[Figs. 28(D-F), 29(D) and 39(E-F)]

♂♀. Expanse of wings : 7.0-9.0 mm (7.5 mm in holotype). Length of fore wing : 3.5-4.4 mm (3.7 mm in holotype).

Face white, mixed with brownish scales anteriorly; head white, very finely mixed with brownish scales in centre. Palpi white; maxillary palpus medianly, 2nd segment of labial palpus apically and the apical segment medianly ringed with black. Antenna as in *S. castaneae*. Thorax white, with a fine, more or less V-shaped mark on dorsum, anterior apices of this mark reaching bases of tegulae. Legs as in *S. castaneae*, but basal 2 blackish rings of hind tarsus longer, as long as or a little longer than white interspace between them.

Fore wing grayish-brown in ground colour, suffusedly mottled or irrorated with dark fuscous on almost whole surface, with markings white and heavily margined with blackish scales internally and externally; a short, vertical strigula near base of costa, narrow, sometimes confluent with a short streak at base of dorsum of wing; 1st fascia at about basal 3/10, slightly oblique outwardly from costa, nearly parallel-sided or slightly widened dorsally; 2nd fascia at middle, slightly more oblique than the 1st, parallel-sided or slightly constricted in disc, about as wide as the 1st and about half as wide as interspace between 1st and 2nd fasciae; a pair of costal and dorsal strigulae at about basal 7/10, nearly vertical, the costal one usually larger than the dorsal; 3rd fascia at basal 4/5, narrower and more strongly oblique than preceding fasciae; a minute spot on dorsum just before 3rd fascia; a triangular or wedge-shaped costal blotch placed just beyond 3rd fascia, sometimes connected dorsally with 3rd fascia to form a V-shaped mark; apical cilia white on basal third, then median third blackish and forming a round fringe line, and remaining apical third whitish-gray; terminal cilia dark fuscous, dashed with white, with a light gray subapical fringe line; dorsal cilia light gray, faintly mixed with whitish or brownish shorter hairs. Hind wing and its cilia light gray.

Male genitalia (Fig. 28: D-F): Tegumen oblong in ventral view, with 3 or 4 pairs or rather long, slender setae, 1 pair of them at apex and remaining pairs on lateral margins; tuba analis spinulose on apical area, with a narrow subscaphium. Valva about 1.4 times as long as tegumen, slightly upturned and narrowed beyond middle towards round apex, setose as usual on inner surface except on costal area, with a fan-shaped comb at apical 2/5 in disc, the comb consisting of 5-10 apically spreading teeth; outer surface with long, narrow androconial scales around basal area densely. Vinculum about 1/2 as long as tegumen, widely rounded apically. Aedeagus about as long as valva, tubular, slightly constricted at middle, sparsely spinose around apical area; vesica with a weakly sclerotized long bar alone; ductus ejaculatorius about 3/4 as long as aedeagus, well dilated terminally. Eighth abdominal segment about 4/5 as long as the 7th, moderately notched ventrally; dorsocephalic apodeme reaching middle of 7th segment, slightly widened apically, with a median sclerotization extending onto almost whole length of tergite; a pair of ventral invaginations stringy, slightly capitated, about 1.7 times as long as dorsal apodeme. (Three slides examined.)

Female genitalia (Fig. 29: D): Ostimum bursae rather small; antrum narrowly sclerotized, tubular, gradually weakened caudally; ductus bursae rather strongly swollen on caudal part beyond antrum, the median area of this swollen part being clearly striated with longitudinal hollows which are abruptly disappeared at a transverse shallow constriction; complex of ductus and corpus bursae lined with fine, comb-like spinules except on median and apical areas; signum with its median projection very wide, and posterior arm slender, long and nearly straight. The

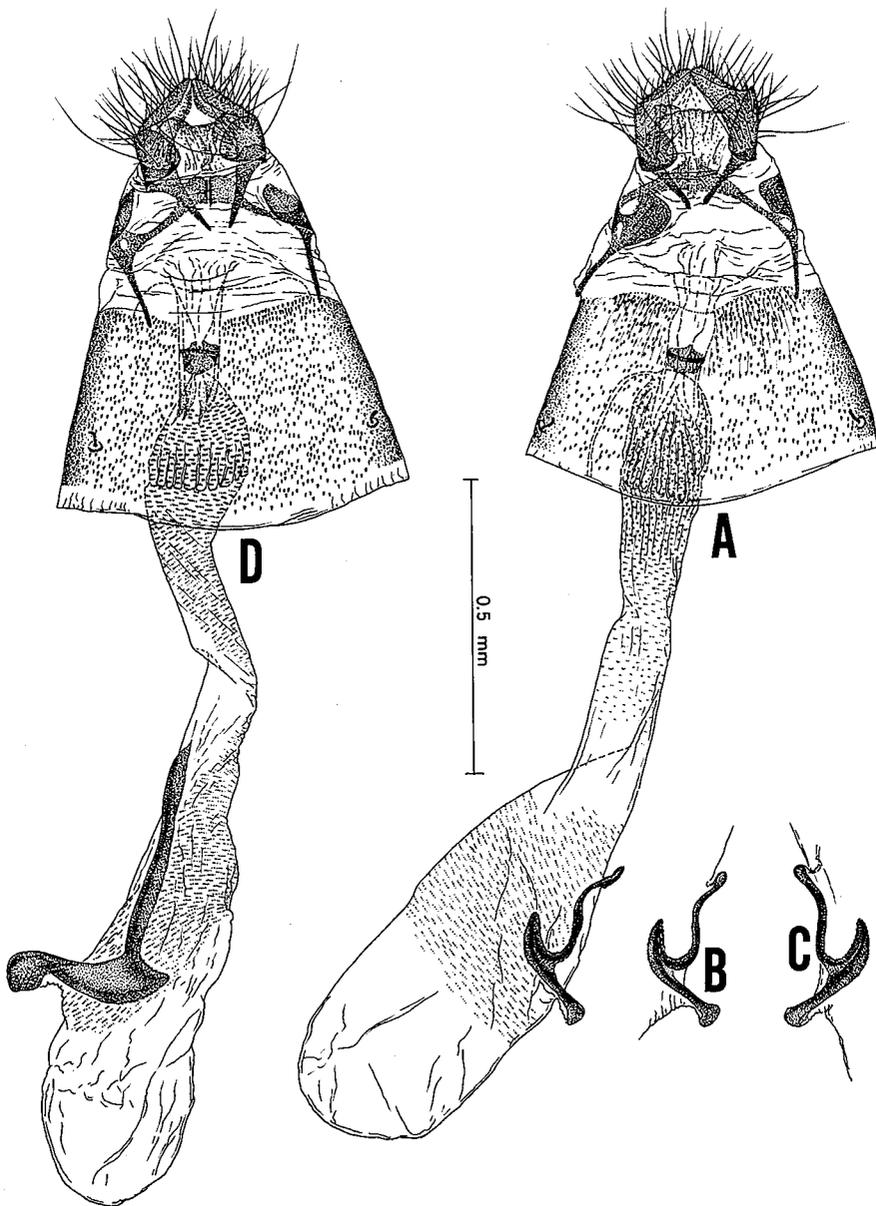


Fig. 29. A-C: *Spulerina castaneae* Kumata et Kuroko, sp. nov. A: Female genitalia in ventral view [Grc-1525, Morioka, Iwate-ken, 10/v/1971, ex *Castanea crenata*, S. Takamura leg.] — B: Signum [Grc-1523, ditto] — C: Ditto [Grc-1526, ditto]. D: *Spulerina virgulata* Kumata et Kuroko, sp. nov., female genitalia in ventral view [Grc-2021, holotype].

other structures are as in *S. castaneae*. (One slide examined.)

Specimens examined: 3♂♂ & 1♀. Holotype: ♀, Kawatinagano, Ōsaka, Honsyū, em. 7/v/1957, ex *Quercus acutissima*, Gen. sl. no. Grc-2021, deposited in the Entomological Laboratory, University of Ōsaka Prefecture. Paratypes: HONSYŪ — 1♂, Kamanosawa, Azusagawa, Nagnoken, 30/vii/1978, N. Hirano leg.; 1♂, ditto, 22/vii/1979, N. Hirano leg.; 1♂, with same data as holotype.

Distribution: Japan (Honsyū).

Food plant: *Quercus acutissima* Carruth. (Fagaceae).

Remarks: This species is a stem-miner of oaks in the larval stage. It is very similar to the preceding *S. castaneae*, but is distinguished from the latter by the following characters: the much darker ground colour of the fore wing; the narrower white fasciae of the wing; the shape of the female signum; the striation and lining pattern of the spinules on the female ductus bursae; and the shape of the comb of the male valva.

#### 41. *Spulerina parthenocissi* Kumata et Kuroko, sp. nov.

[Figs. 30, 31(A-C), 39(G-H), 40(A), 45(D), 50(A) and 55(C-D)]

♂♀. Expanse of wings: 6.0-8.0 mm (6.2 mm in holotype, 7.11 mm on an average of 20 specimens). Length of fore wing: 3.0-3.9 mm (3.1 mm in holotype, 3.49 mm on an average of 20 specimens).

Face, head and palpi white; apical segment of maxillary palpus fuscous except on apex; 2nd segment of labial palpus rather broadly fuscous at apex and the apical segment narrowly fuscous at middle. Antenna light brownish except for white scape and pedicel, with rather broad, but indistinct, darker annulations; scape narrowly ringed with black apically, with a ventral flap of grayish scales, which are sometimes whitish apically. Thorax white; tegulae whitish apically, brownish or fuscous basally. Legs white; fore coxa with a fuscous apical spot; fore and middle femora dark fuscous, with 2 light brown to whitish spots on dorsal sides near apex; fore and middle tibiae blackish on apical half, with a small subbasal ring on fore tibia and a rather broad basal ring on middle tibia blackish; hind coxa apically, the femur postmedianly, and the tibia basally and postmedianly blotched with black on outer surfaces; fore and middle tarsi with 3 short, black rings, and the hind one with 4 similar rings, of which the basalmost is about 1.5 times as wide as the 2nd.

Fore wing ochreous-brown in ground colour, sparsely irrorated with blackish scales along costa, with 5 white fasciae distinctly margined with blackish irrorations externally and internally; 1st fascia occupying basal 1/7 of wing, slightly oblique inwardly in external margin, containing a triangular costal spot of ground colour at base; 2nd fascia at basal 2/7, much wider than the preceding fascia of ground colour, widened dorsally, with its external margin angulated outwardly near dorsum in most specimens; 3rd fascia at middle, slightly oblique outwardly, nearly parallel-sided or widened dorsally, about as wide as the preceding fascia of ground colour; 4th fascia at apical 1/3, oblique outwardly, about 1/2 as wide as the 3rd, somewhat interrupted by ground colour in disc in most specimens; 5th fascia at apical 1/6, well oblique outwardly, much wider than the 4th, with an irregular transverse line of blackish irrorations in its centre; a white spot at apical extremity of wing, followed by a broad blackish apical fringe line; interspace between this apical spot and 5th

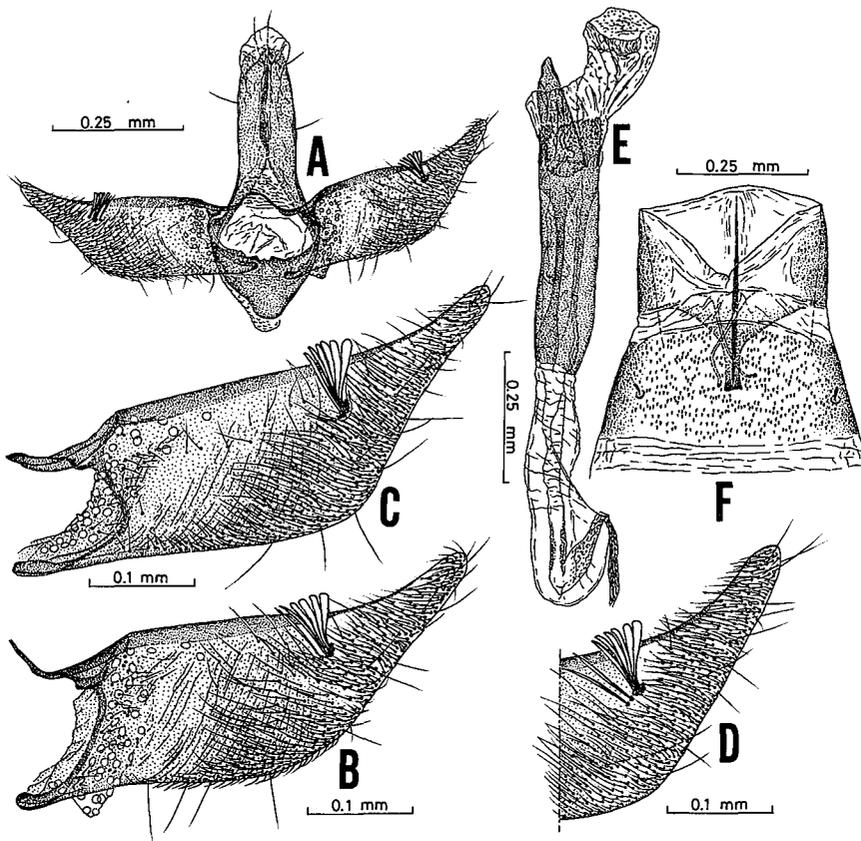


Fig. 30. *Spulerina parthenocissi* Kumata et Kuroko, sp. nov. A: Male genitalia in caudal view, aedeagus omitted [Grc-3083, holotype] — B: Right valva enlarged [ditto] — C: Ditto [Grc-3081, Kishokusima, Nagano-ken, em. 25/vii/1975, ex *Parthenocissus tricuspadata* (1426)] — D: Apical part of right valva [Grc-1531, Kihune, Kyôto, em. 16/v/1967, ex *P. tricuspadata*] — E: Aedeagus [holotype] — F: Male 7th and 8th abdominal segments in ventral view [ditto].

fascia widely blackish, stretching blackish cilia towards costal and dorsal sides; remaining part of cilia whitish-gray, dashed with white on termen below white fasciae, with blackish subapical fringe line along termen. Hind wing gray, with cilia whitish-gray.

Male genitalia (Fig. 30): Tegumen elongate-oblong with an acuminate apex in ventral view, moderate in length, with 2 or 3 pairs of setae like *S. virgulata* and *S. castaneae*; tuba analis with a weakly sclerotized subsclerophium, not spinulose. Valva about 1.4 times as long as tegumen, slightly upturned and narrowed beyond basal 2/3 towards blunt apex, setose as usual on inner surface, with a fan-shaped comb at apical 1/3 in disc rather nearer to costa, the comb consisting of 5-9 (6 in holotype) teeth, of which internal 1 or 2 are acute apically and isolated from other apically spreading teeth in most specimens; long, slender androconial scales on outer surface near base. Aedeagus about as long as valva, tubular, densely spinose on apical area; vesica with a large conical sclerotization and microscopic spinules

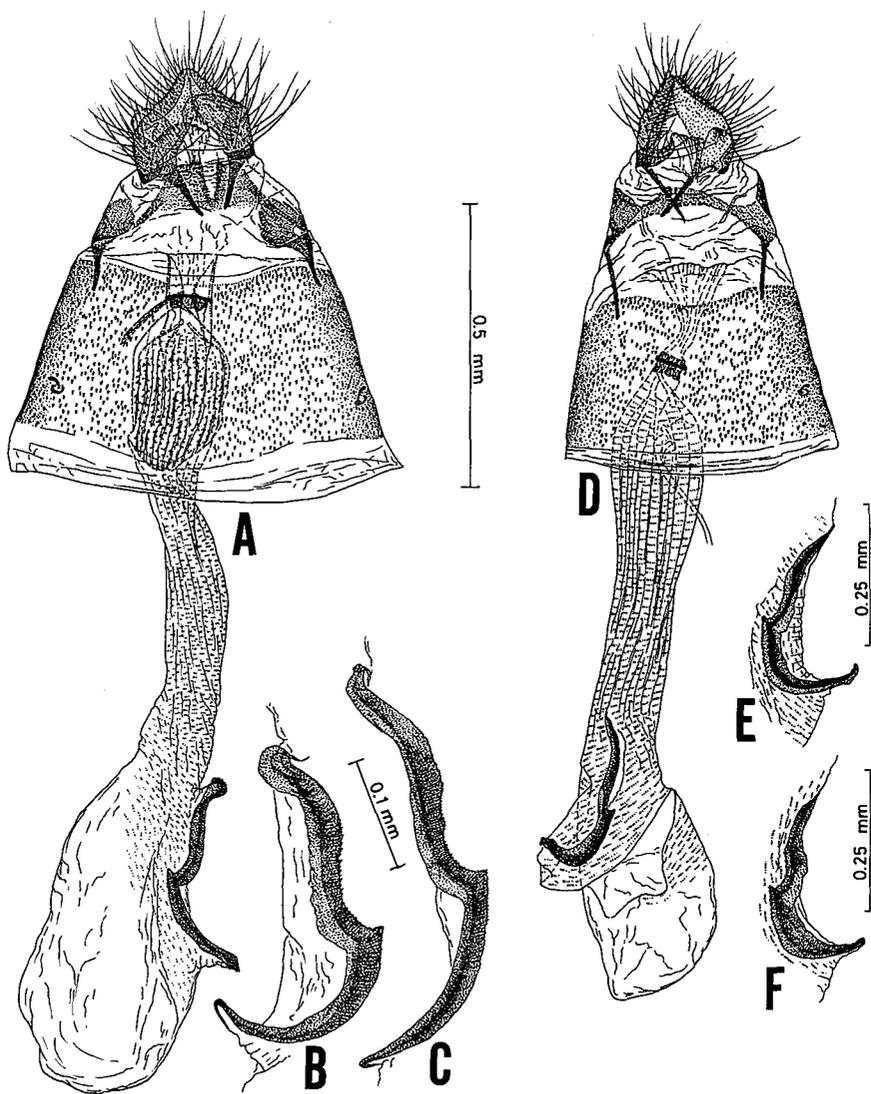


Fig. 31. A-C: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov. A: Female genitalia in ventral view [Grc-1533, Sapporo, Hokkaidō, em. 27/vii/1967, ex *Parthenocissus tricuspidata* (879)] — B: Signum enlarged [Grc-837, Morioka, Iwate-ken, em. 29/vii/1957, ex *P. tricuspidata* (301)] — C: Ditto [Grc-3084, Kisohukusima, Nagano-ken, em. 21/vii/1975, ex *P. tricuspidata* (1426)]. D-F: *Spulerina dissotoma* (Meyrick). D: Female genitalia in ventral view [Grc-3011, Kamitusima, Tusima, em. 6/vi/1980, ex *Pueraria lobata* (2128)] — E: Signum [Grc-3009, Todorokikyō, Taradake, Nagasaki-ken, 20/ix/1979, I. Kanazawa leg.] — F: Ditto [Grc-3008, Ino, Kōti-ken, em. 15/v/1981, ex *Lespedeza cyrtobotrya* (2185)].

sparsely; ductus ejaculatorius a little shorter than valva, J-shaped. Eighth abdominal segment about as long as the 7th, moderately notched ventrally; dorsocephalic apodeme widened basally, truncated apically; a pair of stringy ventral invaginations a little longer than dorsal apodeme, slightly capitated. (Seven slides examined.)

Female genitalia (Fig. 31: A-C): Ostium bursae rather small; antrum weakly sclerotized, short, ring-shaped; ductus bursae with its caudal 1/3 moderately swollen, weakly carinated and rather densely lined with thorn-like spinules mostly along carinae; the remaining part of ductus bursae membraneous, lined with minute comb-like spinules; corpus bursae slightly more swollen than ductus, membraneous, lined with more minute comb-like spinules; signum rather long, slender, with median projection very short and represented by an acute point, anterior arm rather strongly curved, and posterior arm sinuate, nearly parallel-sided and serrulated on inner margin. Papilla analis and 8th abdominal segment as in *S. virgulata*, but apophyses shorter. (Seven slides examined.)

Specimens examined: 56♂♂ & 55♀♀. Holotype: ♂, Ino, Kôti-ken, Sikoku, em. 21/v/1981, ex *Parthenocissus tricuspidata* (2189), Gen. sl. no. Grc-3083. Paratypes: HOKKAIDÔ — 13♂♂ & 14♀♀, Sapporo, em. 13-25/viii/1964, ex *P. tricuspidata* (707); 4♂♂ & 4♀♀, ditto, em. 27/vii/1967, ex *P. tricuspidata* (879). HONSYÛ — 5♂♂ & 12♀♀, Morioka, Iwate-ken, em. 29/vii/1957, ex *P. tricuspidata* (301); 2♂♂ & 1♀, Higasikawate, Akasina, Nagano-ken, em. 29-30/vii/1982, ex *P. tricuspidata*, N. Hirano leg.; 4♂♂ & 1♀, Kisohukusima, Nagano-ken, em. 21-25/vii/1975, ex *P. tricuspidata* (1426); 1♂, ditto, 6/vii/1975; 4♂♂ & 3♀♀, Amagi, Sizuoka-ken, em. 10-17/vii/1971, ex *P. tricuspidata* (1093); 1♂, Kihune, Kyôto, em. 16/v/1967, ex *P. tricuspidata*; 1♂ & 3♀♀, Minoo, Ôsaka, em. 21-23/vii/1975, ex *P. tricuspidata*; 9♂♂ & 8♀♀, Taizi, Wakayama-ken, em. 15-25/vi/1964, ex *P. tricuspidata*. SIKOKU — 2♂♂ & 4♀♀, with same data as holotype except on dates emerged, 11-30/v/1981; 9♂♂ & 5♀♀, Asizuri-misaki, Kôti-ken, em. 11/v-8/vi/1981, ex *P. tricuspidata* (2244).

Distribution: Japan (Hokkaidô; Honsyû; Sikoku).

Food plant: *Parthenocissus tricuspidata* Planch (Vitaceae).

Remarks: This new species is a leaf-miner of a deciduous ivy, *Parthenocissus tricuspidata*, the mines commonly occurring on both the upper and lower sides of the leaves. In colour-pattern it is similar to the stem-mining *S. castaneae* rather than to the leaf-mining *S. dissotoma*, but is at once distinguished from *S. castaneae* by the shape of the comb of the male valva and by the shape of the female signum in addition to the difference of the larval habit and food plant.

#### 42. *Spulerina dissotoma* (Meyrick), comb. nov.

[Figs. 31(D-F), 32, 40(B-D), 45(E), 50(B) and 56(A-C)]

*Acrocercops dissotoma* Meyrick, 1931, Exot. Microlep. 4: 168 [India (Bihar); host: *Flemingia lineata*]; Fletcher, 1933, Imp. Counc. Agr. Res., Sci. Monogr. 4: 49, pl. 45; Kuroko, 1961, Sci. Bull. Fac. Agr. Kyushu Univ. 18: 316 [Japan (Kyûsyû)]; host: *Lespedeza cyrtobotrya*, *Pueraria lobata*].

*Spulerina lespedezifoliella* Kuroko, 1982, Moths Jap. 1: 189, & 2: 450, pl. 6(22) [Japan (Honsyû, Kyusyû)]; host: *Lespedeza cyrtobotrya*, *Pueraria lobata*]; Park, 1982, Ill. Flora & Fauna Korea 27: 590, pl. 38(670) [Korea]. Syn. nov.

Original description of *A. dissotoma*: "♂♀. 5-6 mm. Head whitish, crown sometimes tinged grey. Palpi slender, white, terminal joint with two fuscous rings. Scape blackish and somewhat dilated with scales. Thorax white suffusedly mixed with dark grey. Forewings narrow, pointed; dark grey; markings white, finely edged blackish; a dot on costa at 1/5; slender oblique fasciae at 1/3 and beyond middle, first sometimes interrupted in disc or incomplete dorsally; a short mark from costa at 3/4, and two near together and converging between this and

apex, all these sometimes almost extended with white scales to tornus : cilia grey-whitish, at apex a white basal dot edged blackish and dark grey hook beyond this. Hindwings grey ; cilia pale greyish."

Original description of *S. lespedezioliella* : "Expanse, 6-7 mm. Antennal scape with a ventral flap of dark grey scales. Fore wing variable in ground colour from dark brown to brown, with oblique white fasciae situated at same places as those of the preceding species [*S. astaurola*] and partly margined with blackish scales. These fasciae are rather slender ; by this character the new species can easily be separated from the other member of the genus." [Translated from the Japanese text, vol. 1, p. 189.] "This species was recorded from Japan by Kuroko (1961) under the name of *Acrocercops dissotoma* Meyrick, but male genitalia are larger (1.2-1.3 times as large as *dissotoma*) and comb on valva has more teeth (11) than that of *dissotoma*." [Vol. 2, p. 450.]

Additional description : Expanse of wings : 5.8-7.6 mm (7.03 mm on an average of 20 specimens). Length of fore wing : 2.9-3.8 mm (3.45 mm on an average of 20 specimens).

Face white, somewhat mixed with brownish to dark fuscous scales laterally and posteriorly in most specimens. Maxillary palpus roughened with blackish scales medianly ; middle segment of labial palpus blackish on its apical half, the terminal segment ringed with black medianly. Antenna light fuscous except for whitish scape and pedicel, indistinctly annulated with darker fuscous ; scape sometimes blackish except on narrow whitish dorsal area, with a ventral flap of dark grayish to blackish scales. Thorax as described originally for *A. dissotoma* ; tegulae usually darkened anteriorly. Legs as in the preceding *S. parthenocissi* in colouration, but a postmedian blackish blotch on hind tibia larger and occupying almost apical half of the segment.

Fore wing variable in ground colour from light grayish-brown to dark brown in Japanese specimens as described originally for *S. lespedezioliella*, but always suffused or irrorated with a little darker colour ; dorsum becoming paler towards base in most specimens ; white markings as in original description of *A. dissotoma*, but the 1st fascia at basal 1/3 usually complete, slightly arched outward in most specimens, and about 1/3 as wide as the following fascia of ground colour ; 2nd fascia more oblique and a little narrower than the 1st ; a short mark from costa at basal 3/4 usually opposed to a similar mark from dorsum, rarely confluent with each other to form a fascia ; further 2 marks from costa situated near apex, set close and converging dorsally as described originally for *A. dissotoma* ; cilia as in original descriptions of *A. dissotoma* and *S. parthenocissi*.

Male genitalia (Fig. 32) : Tegumen moderate in length, slightly narrowed apically, with apex somewhat bilobed ; a pair of moderately long setae at apex and further 2 or 3 pairs of shorter ones on lateral margins ; tuba analis with a slender subsca-phium, not spinulose. Valva about 1.5 times as long as tegumen, nearly straight and parallel-sided on basal 2/3, then strongly narrowed and upcurved apically, thus costal margin shallowly concave at its apical 1/3, setose as usual ; a fan-shaped comb placed in disc at apical 1/3 of valva, with 7-10 (8-9 in most specimens) apically acute teeth ; long, slender androconial scales on outer surface near base of valva. Vinculum about 3/5 as long as tegumen, narrowed towards bluntly pointed apex. Aedeagus about as long as valva, rather thickly tubular, straight, not spinose on apical area ; vesica with a weakly sclerotized, apically bilobed semitubular plate and with a curved, slender sclerite projecting from median part of this plate, and with needle-shaped, minute spinules scattered behind the plate ; ductus ejaculatorius

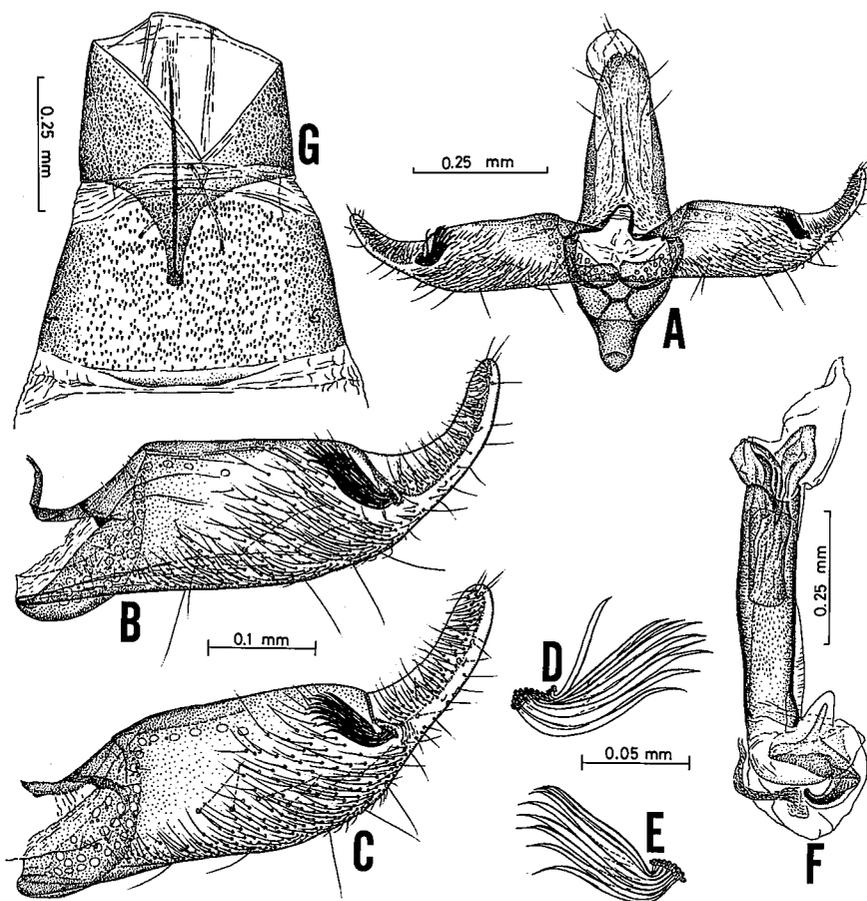


Fig. 32. *Spulerina dissotoma* (Meyrick). A: Male genitalia in caudal view, aedeagus omitted [Grc-3010, Izuhara, Tusima, em. 4/vi/1980, ex *Pueraria lobata* (2052)] — B: Right valva enlarged [ditto] — C: Ditto [Grc-3007, Ino, Kôti-ken, em. 23/v/1981, ex *Lespedeza cyrtobotrya* (2185)] — D: Comb of left valva enlarged [Grc-3010] — E: Comb of right valva [Grc-3007] — F: Aedeagus [Grc-3010] — G: Male 7th and 8th abdominal segments in ventral view [ditto].

about half as long as aedeagus, well swollen, with a sclerotized hook present in its inside. Pregenital segments as in *S. parthenocissi*. (Ten slides examined.)

Female genitalia (Fig. 31 : D-F) : Ostium bursae large, tapering towards antrum which is short and ring-shaped ; ductus bursae well swollen just beyond antrum, slightly narrowed medianly, then dilated towards corpus bursae, membranous, weakly striated on almost whole length in some slides, lined with comb-like spinules on almost whole area and around signum, which is similar to that of *S. parthenocissi* in form, but is comparatively short, with anterior arm much curved and dilated on its median area. Papilla analis and 8th abdominal segment as in *S. parthenocissi*. (Eleven slides examined.)

Specimens examined : 64♂♂ & 59♀♀. HOKKAIDÔ — 19♂♂ & 14♀♀, Kenebetu, Nemuro, em. 2-5/vi/1980, ex *Lespedeza bicolor* (2016) ; 4♂♂ & 5♀♀, Apoi, Hidaka, em. 9/ix/1957, ex *L.*

*bicolor* (363); 3♂♂, Eniwa, 30/ix/1962; 1♂, Teine, em. 23/vii/1957, ex *L. bicolor*; 2♀♀, ditto, em. 22/iv/1958, ex *L. bicolor*. HONSYŪ — 11♂♂ & 8♀♀, Nisinasuno, Totigi-ken, em. 7/v-3/vi/1976, ex *L. bicolor* (1632); 1♀, Ueno, Azusagawa, Nagano-ken, 3/vii/1979, N. Hirano leg.; 1♀, Okutizawa, Toyosima-tyō, Nagano-ken, 23/vi/1979, N. Hirano leg.; 2♀♀, Agematu, Nagano-ken, em. 22/ii/1958, ex *L. bicolor*, K. Kamiyo leg.; 5♂♂ & 7♀♀, Kisohukusima, Nagano-ken, em. 6-24/v/1976, ex *L. bicolor* (1508); 2♂♂, ditto, em. 8-12/v/1976, ex *Pueraria lobata* (1502); 1♂, Kihune, Kyōtō, em. 14/v/1967, ex *L. bicolor*; 1♀, Kozagawa, Wakayama-ken, em. 28/ix/1974, ex *L. cyrtobotrya* (1331); 2♂♂, ditto, em. 21/ix/1974 & 16/v/1975, ex an undetermined leguminose (1324). SIKOKU — 7♂♂ & 7♀♀, Ino, Kōti-ken, em. 11/v-15/vi/1981, ex *L. cyrtobotrya* (2185); 1♂ & 1♀, ditto, em. 13-25/v/1981, ex *P. lobata* (2190); 1♂ & 1♀, Tosasimizu, Kōti-ken, em. 14-19/v/1981, ex *L. cyrtobotrya* (2233). KYŪSYŪ — 1♀, Todorokikyō, Tara-dake, Nagasaki-ken, 20/ix/1979, I. Kanazawa leg. TUSIMA — 2♂♂ & 2♀♀, Kamitusima, em. 3-6/vi/1980, ex *P. lobata* (2128); 1♂, Izuhara, em. 4/vi/1980, ex *P. lobata* (2052). NANSEI IS. — 1♂ & 2♀♀, Onoaida, Yakusima, em. 9-16/xi/1973, ex *L. cyrtobotrya* (1208); 1♂ & 2♀♀, Mugiō, Yaku-sima, em. 10-20/xi/1973, ex *P. lobata* (1181). TAIWAN — 1♂, Kenting Kunyen, Pintung, em. 26/vii/1979, ex *P. thunbergiana* (1981). INDIA — 1♂ & 1♀, Mettupalayam, Nilgiri Hills, Tamil Nadu, em. 21-22/ii/1978, ex an undetermined leguminose (Ind-18).

Distribution: Japan (Hokkaidō; Honsyū; Sikoku; Kyūsyū; Tusima; Nansei Is.); Korea; Taiwan (new record); and India (Bihar; Tamil Nadu).

Food plants: *Lespedeza bicolor* Turcz., *L. cyrtobotrya* Miq., *Pueraria lobata* Ohwi in Japan; *Pueraria thunbergiana* in Taiwan; and *Flemingia lineata* in India; all belong to Leguminosae.

Remarks: When Kuroko (1982) described *S. lespedezifoliella* for the Japanese form of a leguminous leaf-miner of *Spulerina*, he argued that the species differs from Indian *Acrocercops dissotoma* by the larger male genitalia and by the more numerous teeth (11) of the comb on the male valva. In spite of his argument, the Japanese form is not sufficiently different from the Taiwan and Indian forms in the relative length of the male valva to the fore wing and in the number of teeth of the comb on the valva (see Table 1). Moreover, it exactly agrees with the latter in the shape of the male valva and that of the female signum. Based on these facts *S. les-*

Table 1. Relative length of valva to fore wing and number of teeth of comb in *Spulerina dissotoma*.

Locality	Food plant	Genitalia slide no. Grc-	Length of valva in mm (A)	Length of fore wing in mm (B)	B/A	Number of teeth of comb	
						Left	Right
India	Unidentified leguminose	2282	0.44	3.0	6.81	9	8
Taiwan	<i>Pueraria</i>	2589	0.51	3.0	5.88	8	9
Hokkaidō	<i>Lespedeza</i>	849	0.50	3.0	6.00	8	9
"	"	1543	0.55	3.6	6.54	10	9
"	"	847	0.55	3.5	6.34	9	9
Honsyū	Unidentified leguminose	2082	0.49	3.1	6.32	?	7
"	"	2081	0.49	3.1	6.32	8	8
"	<i>Lespedeza</i>	1544	0.54	3.2	5.92	7	9
Sikoku	"	3007	0.52	3.1	5.96	8	8
Tusima	<i>Pueraria</i>	3010	0.51	3.4	6.66	9	9

*pedezifoliella* should be treated as a junior synonym of *Acrocercops dissotoma*. The Japanese form is slightly different from the Indian form by the paler ground colour and the wider white markings of the fore wing.

## XVII. GENUS DENDRORYCTER KUMATA

*Dendrorhycter* Kumata, 1978, *Ins. matsum. n.s.* 13 : 3.

Type-species: *Dendrorhycter marmaroides* Kumata, 1978.

♂ ♀. Face and head smooth-scaled; scales on face shortly hanging over labrum towards base of proboscis, which is moderately developed and naked; ocelli absent. Labial palpus comparatively short, slender, drooping, smooth-scaled, pointed apically; apical segment about as long as the 2nd. Maxillary palpus very minute, about half as long as apical segment of labial palpus, porrect, smooth-scaled, pointed apically. Antenna filiform, a little longer than fore wing, simple in both sexes; scape slightly thickened, with a pecten of a few narrow scales, which sometimes form a minute ventral flap pointing distad. Legs slender, moderately long, smooth; middle tibia slightly thickened apically; hind tibia and 1st hind tarsal segment with a row of bristly scales above, the scales on 1st tarsal segment being shorter than those on the tibia and diminishing towards apex of segment; hind tarsus a little longer than the tibia.

Fore wing lanceolate, acutely pointed apically; discoidal cell narrow, long, occupying basal 11/13 of wing, slightly widened distally, with distal margin angulated outwards, and upper vein weakened on its basal half; 8-veined, with veins  $R_1$ ,  $R_5$ ,  $M_2$ ,  $M_3$  and  $Cu_{1b}$  absent;  $R_2$  and  $R_3$  nearly parallel to each other;  $R_4$  and  $M_1$  originated near distal angle of cell;  $Cu_{1a}$  from lower angle of cell and distal to level of  $R_2$ ;  $Cu_2$  completely obsolescent; An long, nearly straight, connected with dorsal margin at about basal 3/5 of wing. Hind wing a little shorter than and about half as wide as fore wing, attenuated towards apex, with cell opened between  $M_1$  and  $Cu_{1a}$ ; 5-veined, with veins  $M_2$  and  $M_3$  absent; Rs simple;  $M_1$  terminating at dorsal margin near apex;  $Cu_{1a}$  stalked with  $Cu_{1b}$ ; cilia long, 4-5 times of wing-width.

Male genitalia: Tegumen short, round apically, squamose on dorsal surface, without any setae along lateral margins; tuba analis with an elliptical subscaphium. Valva rather long, upturned at middle, attenuated towards round apex, setose inside, with a single comb bearing many short teeth; transtilla incomplete, with labides slender. Vinculum with a long saccus about 1.7 times as long as valva, and with a small patch bearing a few androconial scales at each side near base. Diaphragma with a large obovate juxta. Aedeagus very large, about 3 times as long as valva, tubular; vesica with cornuti; ductus ejaculatorius short, dilated distally. Eighth abdominal tergum weakly sclerotized, trapeziform, sparsely squamose along caudal margin alone; the sternum membranous, with a pair of anterior invaginations containing many long linear androconial scales (coremata). Seventh abdominal segment normal in structure as in the preceding ones.

Female genitalia: Papilla analis short, obliquely transverse in lateral view, rather densely setose on whole surface; apophysis posterioris slender, widened basally. Eighth abdominal segment short, weakly sclerotized dorsally and membranous ventrally; apophysis anterioris slender, about as long as apophysis posteri-

oris. Ostium bursae opened near cephalic area of 8th sternum, rather large in opening size, without any sclerous genital plate; antrum long, tapering distally, irregularly striated, well sclerotized on median area; ductus bursae long, tubular, membranous on whole length; corpus bursae rather small, pyriform, faintly shagreened, with a minute elliptical signum. Seventh abdominal segment normal in structure as in the preceding ones.

Body chaetotaxy of last instar larva (Fig. 50 : C): Prothorax with setae XD2, L3 and SV2 absent; SD2 anterolateral to SD1. Mesothorax and metathorax with 7 setae on each side except for proprioceptors, with L2 and L3 absent, SD1 closer to L1 than to SD2. First to 8th abdominal segments with setae V1 and L2 absent, D1 anterolateral to D2 as in most larvae of *Acrocercops*-group, L3 longer than L1; SV2 and SV3 absent on 1st, 2nd and 6th to 8th abdominal segments, while SV3 alone absent on the 3rd to 5th; proprioceptor MV3 absent on the 8th. Ninth abdominal segment with 3 setae and 1 proprioceptor on each side, with setae SD1, SD2, L2, L3, SV1, SV2, SV3 and V1, and proprioceptor MV3 absent.

Arrangement of crochets (Fig. 50 : D): Ventral prolegs on 3rd to 5th abdominal segments with crochets absent, while with a minute apical sclerite bearing many crochet-like spines; anal proleg without any trace of crochets.

Larval habit: The larva of this genus is a stem-miner throughout its feeding stage. The mine occurs just beneath the epidermal layer of a young trunk or twig of the food plant, being a long gallery extending along the long axis of the trunk or twig, often irregularly curved around the stem, and gradually broadened distally with the growth of the larva. Eventually it exceeds 1 m in length. Finally it is suddenly expanded into a large blotch with diameter of 5-6 cm. The final instar larva of spinning form, which is creamy-yellowish in body colour, leaves the mine through a semicircular slit. The cocoon is usually found under the leaves located above the last mining site, boat-shaped as usual, and covered with 14-42 whitish bubbles. The further larval habit and larval transformation of the type-species are described by Kumata (1978) in detail.

Remarks: This genus seems to be related to the genus *Marmara* Clemens of North and Central America in very reduced venation of both the wings, but is at once distinguished from the latter by the absence of the vein  $R_1$  of the fore wing, by the stalked veins  $Cu_{1a}$  and  $Cu_{1b}$  of the hind wing, by the presence of the bristly scales of the hind tibia, and by the simple male valva with a long comb in the disc.

The genus *Dendrorhycter* is somewhat unusual in the *Acrocercops*-group in having the long anal vein of the fore wing, in lacking the anterior apodeme of the male 8th abdominal tergum, and in having the seta L1 alone among the lateral group of setae on the larval mesothorax and metathorax, but the other characters of the larval chaetotaxy (seta D1 located anterolateral to seta D2 on all the abdominal segments), as well as the adult hind tibia (having a row of bristly scales above) and the male valva (having a comb), indicate that it belongs to the group. There is still some doubt about the inclusion of *Dendrorhycter* in the *Acrocercops*-group, but we tentatively place it in the group and near *Spulerina*, which also contains some stem-mining species.

Up to the present, the genus contains the following species alone, which is a stem-miner of *Alnus* (Betulaceae) in Japan.

43. *Dendrorhycter marmaroides* Kumata  
[Figs. 33, 40(E-F), 41(I), 44(F), 50(C-D) and 56(D-E)]

*Dendrorhycter marmaroides* Kumata, 1978, Ins. matsum. n.s. 13: 6, figs. 1-4, 7-8 [Japan (Hokkaidō); host: *Alnus hirsuta*, *A. japonica*]; Kuroko, 1982, Moths Jap. 1: 189, & 2: pl. 6(23).

Original description: "♂ ♀. Expanse of wings: 7.0-8.8 mm (7.0 mm in holotype, 7.9 mm in average of 8 specimens). Length of fore wing: 3.3-4.2 mm (3.3 mm in holotype, 3.7 mm in average of 9 specimens)."

"Colour: Head and face black with a coppery lustre under some light, with vertex between antennae slightly paler. Maxillary palpus entirely black. Labial palpus whitish, somewhat leaden-metallic under some light, with a longitudinal, narrow, blackish line outside except for apical extremity. Antenna pale ochreous, faintly annulated with a little darker colour; scape and its pecten entirely blackish. Thorax black with a coppery lustre, with a broad, silvery-whitish band on each pleural area. Legs blackish; basal halves of fore and hind coxae, and median area of hind femur silvery-whitish; a postmedian ring of mid tibia, a subbasal ring and preapical one of hind tibia white and broad; fore and mid tarsi white, with 2 black rings, one placed at middle and the other at apex; hind tarsus black, with 2 white rings, one situated just beyond middle and the other near apex; all tibial spurs whitish apically. Fore wing black with a coppery lustre under some light, with markings silvery-white; a transverse band placed at basal 1/5 of wing, straight, perpendicular to costa or very slightly oblique inwardly, slightly widened towards dorsal margin; 1st pair of costal and dorsal blotches at middle of wing, quadrate, perpendicular to margins, the costal one being a little longer than the dorsal one and situated a little basally than the latter; 2nd pair of blotches just opposite at apical 1/4 of wing, wedge-shaped, the costal one a little larger than the dorsal; a spot at apex of wing round; a small spot sometimes situated on costa between 2nd costal blotch and apical spot; cilia dark gray, with fringe line and terminal margin around apex of wing blackish narrowly. Hind wing dark fuscous, with cilia dark gray. Abdomen dark fuscous; ventrum with a broad, silvery-white band on apical margin of each segment."

"Male genitalia: Valva with a comb consisting of 28-29 teeth; coremata a little longer than 7th abdominal segment."

Additional description: Male genitalia (Fig. 33: A-C): Tegumen short, round apically in ventral view, without marginal or apical setae. Valva with a moderately long comb or row of thickened setae arranged on inner surface near ventral margin of apical half. Juxta obovate, striated near apical area. Saccus about 1.7 times as long as valva, lanceolate. Aedeagus about 3 times as long as valva, thick-tubular, with acute cornuti arranged in a double row, each row consisting of about 15 spines, which diminish towards the base of aedeagus. (Three slides examined.)

Female genitalia (Fig. 50: D): Papilla analis covered with microspines on whole surface besides usual setae; apophysis posterioris about as long as apophysis anterioris. Antrum rather long, narrowing towards ductus bursae, striated, and well-sclerotized on its median area; ductus bursae moderate in length, membranous; corpus bursae pyriform, membranous, with a signum of small elliptical plate. (Four slides examined.)

Specimens examined: 3♂♂ & 6♀♀. Holotype: ♂, Misumai, Sapporo, Hokkaidō, em. 13/vi/1975, ex *Alnus hirsuta* (1401), Gen. sl. no. Grc-2040. Paratypes: HOKKAIDŌ—2♀♀, Apoi, Hidaka, em. 17/vii/1973, ex *A. hirsuta* (1162): 1♀, Misumai, Sapporo, em. 21/vi/1974, ex *A. hirsuta* (1272); 2♂♂ & 2♀♀, ditto, em. 9-19/vi/1975, ex *A. hirsuta* (1401); 1♂, Sapporo, em. 28/vii/1957, ex *A. japonica*.

Distribution: Japan (Hokkaidō).

Food plants: *Alnus hirsuta* Turcz. and *A. japonica* Steud. (Betulaceae).

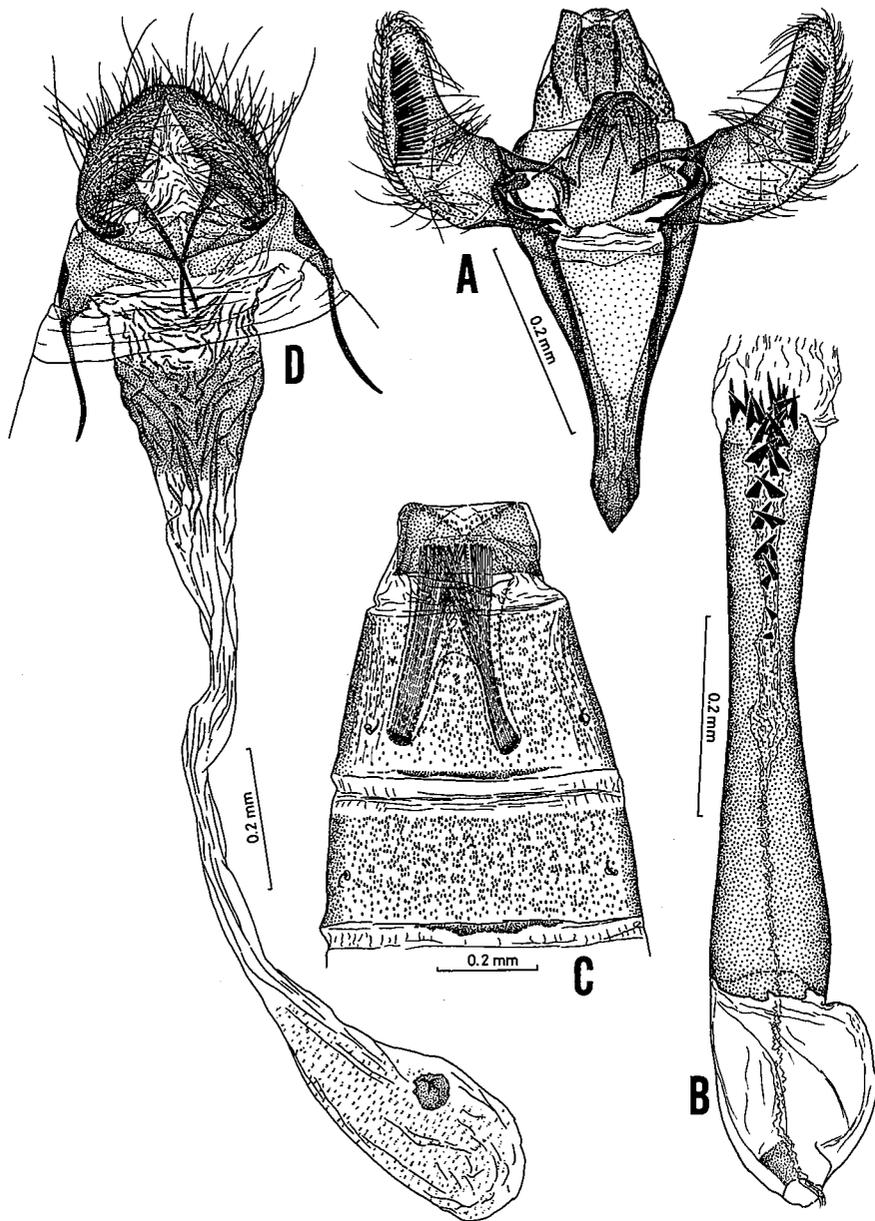


Fig. 33. *Dendrorhycter marmoroides* Kumata. A: Male genitalia in caudal view, aedeagus omitted [Grc-2040, holotype] — B: Aedeagus [ditto] — C: Male 6th to 8th abdominal segments in ventral view [ditto] — D: Female genitalia in ventral view [Grc-1693, Apoi, Hidaka, Hokkaido, em. 17/vii/1973, ex *Alnus hirsuta* (1162)].

Ramarks : This species is a stem-miner of alder. It is rather similar to some species of the North and Central American genus *Marmara* Clemens in the colour-pattern and larval habit, but is quite different from the *Marmara*-species by the male genital structures, especially by the valva consisting of a single lamella and bearing a comb as in *Acrocercops*-species.

### XVIII. A FORM UNKNOWN TO US

#### “*Acrocercops*” *albofasciella* Yazaki

*Acrocercops albofasciella* Yazaki, 1926, Bull. Kagoshima Imp. Coll. Agr. Forest 6 : 36 & 38, pl. 5 (8-11) [Japan (Honsyû, Kyûsyû)] ; Inoue, 1954, Check List Lep. Jap. 1 : 27.

Original description : “Tête blanc argenté, face dorée dormant quelques écailles d’un blanc argenté. Palpes labiales ont la première phalange noire, la deuxième à peu toute noire, excepté le bout qui est blanc argenté, la troisième est d’un blanc argenté avec le bout doré. Palpes maxillaires blanc argenté. Proboscide doré et beaucoup développé. Leux tout noire et semisphériques. Antennes simples et d’un brun léger. Pieds blanc argenté et bariolés de noir. La partie dorsale du thorax est aussi d’un blanc argenté, mais la partie ventrale de l’abdomen est dorée avec des écailles argentées. Franges anales dorées. Les ailes antérieures et postérieures sans lancéolées.

“Ailes antérieures un peu brunes et éclatantes portent plusieurs ceintures argentées. Il y a une d’abord vers le milieu de la base, courte et verticale. Une autre se trouve au milieu ayant la forme d’un V dont les branches atteignent les deux bords de l’aile. Une autre voisine de celle-ci à peu près la même forme. Puis une autre vers le bord de l’aile a la forme d’un X. L’apex est argenté et entre celui-ci et la ceinture ayant la forme d’un X, tout près du bord intérieur, il y a une partie blanche entourée, par des écailles noires, les autres écailles d’alentour sans dorées, de plus des écailles d’un brun foncé bordent les deux ceintures à forme de V celles qui bordent la ceinture forme X sont argentées. Quant aux franges de l’aile elles sont brunes.

“Ailes postérieures brun foncé, ses franges de même couleur sont longues.

“L’envergure des ailes est de 7.5 mm.”

Distribution : Japan (Honsyû ; Kyûsyû).

Food plant : Unknown.

Remarks : The specific name of this species is erroneously printed in the original description as *aldofasciella* on page 36 and *allobfasciella* on page 38, though correctly written 2 times as *albofasciella* in the explanation of the figures.

The type specimens of this species seem to be lost, because we could not find them in the insect collection of Kagoshima University, formerly Kagoshima Imperial College of Agriculture and Forest, where the author worked. According to the figures given originally, this species seems to belong to the genus *Aristaea* Meyrick or its related genera on account of the absence of the vein  $M_3$  on the hind wing.

### KEYS TO THE GENERA OF ACROCERCOPS-GROUP OF JAPAN

#### I. Based on adult characters

1. Hind wing with cell closed and with 6 veins, the veins  $M_1$  and  $M_2$  completely coincident into a single vein ; male diaphragma sclerotized in a slender tube enclosing aedeagus ; male 8th abdominal sternum convex caudad ; female ostium bursae with a lamella antevaginalis and a lamella postvaginalis. . . . . I. *Callicercops* Vári
- Hind wing with cell opened between  $M_2$  and  $M_3$  or  $M_1$  and  $Cu_{1a}$ , and with 7 or 5 veins ; male

- diaphragma membranous or sclerotized only on juxta, and never forming a slender tube ; male 8th abdominal sternum deeply concave or incised, or completely membranous ; female ostium bursae without sclerosed genital plate, or with a single sclerite, either lamella antevaginalis or postvaginalis. .... 2
2. Fore wing with vein An long, connected with dorsal margin of wing beyond middle ; hind wing with 5 veins, veins  $M_2$  and  $M_3$  absent,  $M_1$  separated from other veins and  $Cu_{1a}$  and  $Cu_{1b}$  stalked ; male tegumen covered with normal scales dorsally ; male diaphragma with a large sclerotized juxta ; male 8th abdominal tergum without anterior apodeme, and the sternum entirely membranous. .... XVII. *Dendrorhycter* Kumata
- Fore wing with vein An short, connected with dorsal margin before middle ; hind wing with 7 veins, veins  $M_1$  and  $M_3$  stalked with veins  $M_2$  and  $Cu_{1a}$ , respectively, then common stem of  $M_3$  and  $Cu_{1a}$  branched from  $Cu_{1b}$  ; male tegumen never covered with scales dorsally ; male diaphragma without any particular sclerite ; male 8th abdominal tergum with an anterior apodeme or a pair of apodemes, and the sternum more or less deeply concave or incised. .... 3
3. Fore wing with vein  $R_1$  absent. .... 4
- Fore wing with vein  $R_1$  present. .... 6
4. Fore wing with veins  $R_4$  and  $R_5$  separated ; antennal scape simple, without pecten or flap ; middle femur entirely slender ; male valval cucullus very slender with a gap between this and widened sacculus ; female corpus bursae with a patch-like signum bearing many cone- or needle-shaped projections. .... XIV. *Chrysocercops* Kumata et Kuroko
- Fore wing with veins  $R_4$  and  $R_5$  stalked ; antennal scape with a ventral flap of scales ; middle femur expanded with scales beyond middle ; male valva somewhat wing-shaped and round or blunt apically ; female corpus bursae with a slender and long signum bearing a short median projection. .... 5
5. Male valva simple, without any comb on inner surface ; female signum, if present, elongate-navicular, with an apically bifurcated exterior projection. .... XV. *Telamoptilia* Kumata et Kuroko
- Male valva with a fan-shaped comb in central area on inner surface ; female signum slender, curved, with a short to long interior projection. .... XVI. *Spulerina* Vári
6. Fore wing with vein  $R_5$  and  $M_1$  stalked. .... 7
- Fore wing with veins  $R_5$  and  $M_1$  separated or connate at base. .... 8
7. Antennal scape with a ventral flap of scales ; middle femur expanded with scales beyond middle ; male valva with 2 combs on inner surface ; male 8th abdominal sternum without any anterior invagination, the tergum with anterior apodeme wide, short and usually bifurcated apically ; male 7th abdominal sternum partly sclerotized on caudal area and more or less bilobed. .... VII. *Dialectica* Walsingham
- Antennal scape simple ; middle femur entirely slender ; male valva simple, without any comb ; male 8th abdominal sternum with a pair of stringy anterior invaginations, the tergum with a slender anterior apodeme ; male 7th abdominal sternum normal in structure as in preceding ones. .... II. *Cryptolectica* Vári (part, for *C. ensiformis*)
8. Fore wing with veins  $R_4$  and  $R_5$  stalked. .... 9
- Fore wing with veins  $R_4$  and  $R_5$  separated or connate at base. .... 15
9. Fore wing with vein  $Cu_{1b}$  present. .... 10
- Fore wing with vein  $Cu_{1b}$  absent. .... 13
10. Antennal scape slightly flattened, with a conspicuous ventral flap of scales ; middle femur expanded with scales beyond middle ; male valva with a conspicuous calceoliform or cupuliform projection protruded from middle of costa ; female corpus bursae with signum absent, if present, then it is a large plate bearing many spines which are surrounded by carinae radiated from the base. .... IX. *Gibbovalva* Kumata et Kuroko
- Antennal scape smooth ; middle femur entirely slender ; male valva without such projection at costa, or with a small fan-shaped plate near costal margin ; female corpus bursae with signum or signa of other shape. .... 11
11. Fore wing blunt or round apically ; male 8th abdominal tergum with a median sclerotized ridge extending from anterior apodeme ; male valva long, slender, with a small fan-shaped plate projected from median area near costa. .... XII. *Borboryctis* Kumata et Kuroko
- Fore wing acutely pointed or acuminate apically ; male 8th abdominal tergum without a

- median sclerotized ridge; male valva moderate in length, simple, without any projection near costal margin. ....12
12. Male valva somewhat shell-shaped, much widened towards round apex; median sclerotization of anterior apodeme of male 8th abdominal tergum narrow entirely, not bifurcated caudally; male aedeagus simple, without carina penis; female ductus bursae with a pair of well-sclerotized, valve-like projections at its cephalic end. ....III. *Eteoryctis* Kumata et Kuroko
- Male valva elongate elliptical, widest at median area; median sclerotization of anterior apodeme of male 8th abdominal tergum bifurcated caudally; male aedeagus with a beak-shaped subapical carina penis; female ductus bursae simply tubular, without any sclerotized projection. ....II. *Cryptolectica* Vári (part, for *C. pasaniae*)
13. Male tegumen with a pair of slender subapical falces; valva with a finger-shaped, well-sclerotized projection in centre of disc, but without any projection on costal area; female ostium bursae with a well sclerotized lamella postvaginalis on ventrum of 8th abdominal segment; ductus bursae shorter than 7th abdominal segment. XIII. *Leucospilapteryx* Spuler
- Male tegumen simple, without such falces; male valva with a membranous, small costal projection at middle, but without a finger-like projection in central area; female ostium bursae without any sclerous genital plate; ductus bursae much longer than 7th abdominal segment. ....14
14. Middle femur entirely slender; male 8th abdominal sternum with a pair of very short anterior invaginations which bear a small tuft at the apex; male valva with a small comma-shaped projection protruded from a pocket-like incision at middle of costa; male aedeagus simply tubular; female corpus bursae with a small plate-like signum bearing many minute spines; female 7th abdominal segment normal in structure as in preceding ones. ....X. *Melanocercops* Kumata et Kuroko
- Middle femur expanded with scales beyond middle; male 8th abdominal sternum with a pair of long, stringy invaginations which are capitate apically; male valva with a lobe-like projection protruded from distal end of lobated costa; male aedeagus with a pair of long subbasal projections; female corpus bursae without signum; female 7th abdominal sternum with a large, well-sclerotized and naked part. ....XI. *Phodoryctis* Kumata et Kuroko
15. Fore wing with vein  $R_1$  very short and arising beyond middle of cell; middle femur expanded with scales beyond middle; male 8th abdominal tergum with 2 anterior apodemes; male valva with a large sclerous plate formed by fusion of expanded teeth of comb; female corpus bursae with a long accessory sac extending caudad. ....VIII. *Deoptilia* Kumata et Kuroko
- Fore wing with vein  $R_1$  arising before middle of cell; middle femur entirely slender; male 8th abdominal tergum with a single anterior apodeme; male valva with such a large plate absent, if present, then it is a simple comb bearing slender and short teeth; female corpus bursae without such a caudally projected accessory sac. ....16
16. Fore wing with veins  $R_4$  to  $M_2$  or rarely  $R_5$  to  $M_3$  convergent on distal angle of cell; male valva with a comb bearing short and apically truncated teeth; female corpus bursae with a pair of small signa surrounded by lanceolate sclerites or with a pair of elongate signa covered with acute spines. ....V. *Acrocercops* Wallengeren
- Fore wing with all veins well separated at base; male valva with comb absent, if present, then its teeth are pointed apically; female corpus bursae without signum or with a single signum of different shape. ....17
17. Male valva with a comb bearing apically pointed teeth; male vinculum with a group of minute comma-shaped scent setae on each cephalic side; male 8th abdominal sternum with a pair of very long invagination containing many linear androconial scales (coremata); female corpus bursae with signum absent. ....VI. *Artifodina* Kumata
- Male valva simple, without any comb; male vinculum simple, without such scent setae; male 8th abdominal sternum with invaginations absent, if present, then they are stringy and do not contain androconial scales at all; female corpus bursae with a single signum. ....18
18. Male 8th abdominal sternum without any anterior invagination; male valva very slender, with a tuft of linear androconial scales near base of round sacculus; female corpus bursae with a large plate-like signum bearing many cone-shaped spines which are surrounded by radiated carinae. ....IV. *Psydrocercops* Kumata et Kuroko

- Male 8th abdominal sternum with a pair of long, stringy anterior invaginations; male valva quadrangular, with long linear androconial scales scattered on outer surface near base; female signum small, oblong, and bearing needle-shaped spines.  
 .....II. *Cryptolectica* Vári (part, for *C. chrysalis*)

II. Based on body chaetotaxy and arrangement of crochets  
of last instar larva

1. All abdominal segments with seta D1 anterodorsal to seta D2, and with proprioceptor MV3 present; ventral prolegs with crochets arranged in a circle and a transverse row.  
 .....I. *Callicercops* Vári
- All abdominal segments with seta D1 anterolateral or directly anterior to seta D2; proprioceptor MV3 absent at least on 8th and 9th abdominal segments; ventral prolegs with crochets absent or arranged in a circle or a transverse row. .... 2
2. Mesothorax and metathorax with a single lateral seta, L1; 2nd and 6th abdominal segments with a single subventral seta, SV1; all abdominal segments without seta V1; ventral prolegs without crochets, and with a minute apical sclerite bearing some crochet-like spines.  
 .....XVII. *Dendrorhycter* Kumata
- Mesothorax and metathorax with 2 lateral setae, L1 and L3; 2nd and 6th abdominal segments with at least 2 subventral setae; seta V1 absent at most on 7th to 9th abdominal segments; ventral prolegs with crochets present, if absent, then they lack a such apical sclerite. .... 3
3. Prothorax with seta XD2 present. .... 4
- Prothorax with seta XD2 absent. ....11
4. First to 8th abdominal segments with seta D1 set close to seta D2; 6th abdominal segment with ventral prolegs or proleg-like protuberances. .... 5
- First to 8th abdominal segments with seta D1 well apart from seta D2; 6th abdominal segment without prolegs or proleg-like protuberances on ventrum. .... 7
5. Seventh to 9th abdominal segments with seta V1 present; 2nd abdominal segment with a single subventral seta, SV1; ventral prolegs on 3rd to 6th abdominal segments with crochets absent. ....XVI. *Spulerina* Vári (part, for stem-miner)
- Seventh to 9th abdominal segments with seta V1 absent; 2nd abdominal segment with 2 subventral setae, SV1 and SV2; ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in a transverse row. .... 6
6. Prothorax with seta XD1 located on normal position, directly dorsal to seta XD2.  
 .....XVI. *Spulerina* Vári (part, for leaf-miner)
- Prothorax with seta XD1 shifted caudad, posterodorsal to seta XD2.  
 .....XV. *Telamoptilia* Kumata et Kuroko (part, for most species)
7. Second abdominal segment with 3 subventral setae. ....II. *Cryptolectica* Vári
- Second abdominal segment with 2 subventral setae, SV1 and SV2. .... 8
8. Sixth abdominal segment with 2 subventral setae, SV1 and SV2; ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in a transverse row.  
 .....X. *Melanocercops* Kumata et Kuroko
- Sixth abdominal segment with 3 subventral setae; ventral prolegs with crochets arranged in a circle. .... 9
9. Ninth abdominal segment with 6 setae on each side except for proprioceptor, the seta V1 being present. ....VII. *Dialectica* Walsingham
- Ninth abdominal segment with 5 setae on each side except for proprioceptor, the seta V1 being absent. ....10
10. Ninth abdominal segment with proprioceptor MD1 absent.  
 .....III. *Eteoryctis* Kumata et Kuroko
- Ninth abdominal segment with proprioceptor MD1 present.  
 .....IX. *Gibbovalva* Kumata et Kuroko, and XIV. *Chrysocercops* Kumata et Kuroko
11. First to 8th abdominal segments with seta D1 set close to seta D2. ....12
- First to 8th abdominal segments with seta D1 well apart from seta D2. ....13

12. Sixth abdominal segment with 3 subventral setae ; ventral prolegs on 3rd to 6th abdominal segments with crochets absent. . .XV. *Telamoptilia* Kumata et Kuroko (part, for *T. tiliae*)  
 — Sixth abdominal segment with 2 subventral setae, SV1 and SV3 ; ventral prolegs on 3rd to 5th abdominal segments with a few crochets arranged in a transverse row. . . . .VIII. *Deoptilia* Kumata et Kuroko
13. Second abdominal segment with 3 subventral setae. . . . .V. *Acrocercops* Wallengren  
 — Second abdominal segment with 2 subventral setae, SV1 and SV2. . . . .14
14. Seventh and 8th abdominal segments with seta V1 absent ; 9th abdominal segment with merely 5 setae on each side, and all proprioceptors absent. . . . .15  
 — Seventh and 8th abdominal segments with seta V1 present ; 9th abdominal segment with 6 setae and 1 proprioceptor (MD1) on each side. . . . .16
15. Ventral prolegs on 3rd to 5th abdominal segments with crochets arranged in a complete circle. . . . .XIII. *Leucospilapteryx* Spuler  
 — Ventral prolegs on 3rd to 5th abdominal segments with crochets arranged in circle or posterior semicircle, in former case, the crochets on anterior half of circle being shorter and sparser. . . . .XI. *Phodoryctis* Kumata et Kuroko
16. Ventral prolegs with crochets arranged in a circle ; 9th abdominal segment with seta L3 present and seta V1 absent. . . . .IV. *Psydrocercops* Kumata et Kuroko  
 — Ventral prolegs with a few crochets arranged in a transverse row ; 9th abdominal segment with seta L3 absent and seta V1 present. . . . .17
17. Sixth abdominal segment with a pair of ventral prolegs ; anal prolegs with no trace of crochets. . . . .VI. *Artifodina* Kumata  
 — Sixth abdominal segment without ventral prolegs ; anal proleg with a few crochets arranged in a transverse row. . . . .XII. *Borborycter* Kumata et Kuroko

#### A LIST OF ACROCERCOPS-GROUP OF JAPAN

- I. Genus *Callicercops* Vári, 1961.  
 1. *C. yakusimensis* Kumata et Kuroko, 1988.
- II. Genus *Cryptolectica* Vári, 1961.  
 2. *C. pasaniae* Kumata et Kuroko, 1988.  
 3. *C. ensiformis* (Yuan, 1986).  
 4. *C. chrysalis* Kumata et Ermolaev, 1988.
- III. Genus *Eteoryctis* Kumata et Kuroko, 1988.  
 5. *E. deversa* (Meyrick, 1922).  
 6. *E. picrasmae* Kumata et Kuroko, 1988.
- IV. Genus *Psydrocercops* Kumata et Kuroko, 1988.  
 7. *P. wisteriae* (Kuroko, 1982).
- V. Genus *Acrocercops* Wallengren, 1881  
 8. *A. melanoplecta* Meyrick, 1908.  
 9. *A. querci* Kumata et Kuroko, 1988.  
 10. *A. distylii* Kumata et Kuroko, 1988.  
 11. *A. vallata* Kumata et Kuroko, 1988.  
 12. *A. mantica* Meyrick, 1908.  
     = *Acrocercops delographa* Meyrick, 1939.  
 13. *A. unistriata* Yuan, 1986  
 14. *A. transecta* Meyrick, 1931.  
     = *Acrocercops lyoniella* Kuroko, 1982.
- VI. Genus *Artifodina* Kumata, 1985.  
 15. *A. japonica* Kumata, 1985.
- VII. Genus *Dialectica* Walsingham, 1897.  
     = *Eutrichocnemis* Spuler, 1910.  
 16. *D. geometra* (Meyrick, 1916)  
 17. *D. japonica* Kumata et Kuroko, 1988.
- VIII. Genus *Deoptilia* Kumata et Kuroko, 1988.  
 18. *D. heptadeta* (Meyrick, 1936).

- IX. Genus *Gibbovalva* Kumata et Kuroko, 1988.  
 19. *G. quadrifasciata* (Stainton, 1863).  
     = *Gracilaria* (!) *ordinatella* Meyrick, 1880.  
 20. *G. civica* (Meyrick, 1914).  
 21. *G. urbana* (Meyrick, 1908).  
 22. *G. kobusi* Kumata et Kuroko, 1988.  
 23. *G. magnoliae* Kumata et Kuroko, 1988.  
 X. Genus *Melanocercops* Kumata et Kuroko, 1988.  
 24. *M. ficuvorella* (Yazaki, 1926).  
 25. *M. phractopa* (Meyrick, 1918).  
 XI. Genus *Phodoryctis* Kumata et Kuroko, 1988.  
 26. *P. caerulea* (Meyrick, 1912).  
     = *Cyphosticha centrometra* Meyrick, 1920.  
 27. *P. stephaniae* Kumata et Kuroko, 1988.  
 XII. Genus *Borboryctis* Kumata et Kuroko, 1988.  
 28. *B. euryae* Kumata et Kuroko, 1988.  
 29. *B. triplaca* (Meyrick, 1908).  
 XIII. Genus *Leucospilapteryx* Spuler, 1910.  
 30. *L. omisella* (Stainton, 1849).  
     = *Dryadula* (!) *ainoniella* Matsumura, 1931.  
 31. *L. anaphalidis* Kumata, 1965.  
 XIV. Genus *Chrysocercops* Kumata et Kuroko, 1988.  
 32. *C. castanopsidis* Kumata et Kuroko, 1988.  
 XV. Genus *Telamoptilia* Kumata et Kuroko, 1988.  
 33. *T. cathedraea* (Meyrick, 1908).  
 34. *T. hemistacta* (Meyrick, 1924).  
     = *Acrocercops phalarotis* Lefroy, 1909 [nomen nudum].  
 35. *T. prosacta* (Meyrick, 1918).  
 36. *T. tiliae* Kumata et Ermolaev, 1988.  
 XVI. Genus *Spulerina* Vári, 1961.  
 37. *S. corticicola* Kumata, 1964.  
 38. *S. astaurota* (Meyrick, 1922).  
 39. *S. castaneae* Kumata et Kuroko, 1988.  
 40. *S. virgulata* Kumata et Kuroko, 1988.  
 41. *S. parthenocissi* Kumata et Kuroko, 1988.  
 42. *S. dissotoma* (Meyrick, 1931).  
     = *Spulerina lespedezifoliella* Kuroko, 1982.  
 XVII. Genus *Dendrorhycter* Kumata, 1978.  
 43. *D. marmaroides* Kumata, 1978.  
 XVIII. Species unknown to us  
     “*Acrocercops*” *albofasciella* Yazaki, 1926

#### HOST LIST

Food plant	Insect
<i>Abies</i> (Pinaceae) .....	* <i>Spulerina corticicola</i> Kumata
<i>Achyranthes</i> (Amaranthaceae) .....	<i>Telamoptilia hemistacta</i> (Meyrick)
<i>Alnus</i> (Betulaceae) .....	* <i>Dendrorhycter marmaroides</i> Kumata
<i>Anaphalis</i> (Compositae) .....	<i>Leucospilapteryx anaphalidis</i> Kumata
<i>Artemisia</i> (Compositae) .....	<i>Leucospilapteryx omisella</i> (Stainton)
<i>Bauhinia</i> (Leguminosae) .....	<i>Callicercops yakusimensis</i> Kumata et Kuroko
? <i>Camellia</i> (Theaceae) .....	<i>Acrocercops distylii</i> Kumata et Kuroko
<i>Castanea</i> (Fagaceae) .....	* <i>Spulerina castaneae</i> Kumata et Kuroko
<i>Castanopsis</i> (Fagaceae) .....	<i>Acrocercops mantica</i> Meyrick
	<i>Acrocercops melanoplecta</i> Meyrick
	<i>Acrocercops unistriata</i> Yuan

	<i>Chrysocercops castanopsidis</i> Kumata et Kuroko
<i>Chaenomeles</i> (Rosaceae) .....	* <i>Spulerina astaurota</i> (Meyrick)
<i>Chrysanthemum</i> (Compositae) .....	<i>Leucospilapteryx omisella</i> (Stainton)
<i>Cinnamomum</i> (Lauraceae) .....	<i>Gibbovalva civica</i> (Meyrick)
	<i>Gibbovalva quadrifasciata</i> (Stainton)
<i>Distylium</i> (Hamamelidaceae) .....	<i>Acrocercops distylii</i> Kumata et Kuroko
<i>Ehretia</i> (Boraginaceae) .....	<i>Dialectica geometra</i> (Meyrick)
	<i>Dialectica japonica</i> Kumata et Kuroko
<i>Eurya</i> (Theaceae) .....	<i>Borboryctis euryae</i> Kumata et Kuroko
<i>Ficus</i> (Moraceae) .....	<i>Melanocercops flavorella</i> (Yazaki)
	<i>Melanocercops phractopa</i> (Meyrick)
<i>Ipomoea</i> (Convolvulaceae) .....	<i>Telamoptilia prosacta</i> (Meyrick)
<i>Juglans</i> (Juglandaceae) .....	<i>Acrocercops transecta</i> Meyrick
<i>Larix</i> (Pinaceae) .....	* <i>Spulerina corticicola</i> Kumata
<i>Lespedeza</i> (Leguminosae) .....	<i>Spulerina dissotoma</i> (Meyrick)
<i>Litsea</i> (Lauraceae) .....	<i>Gibbovalva quadrifasciata</i> (Stainton)
<i>Lyonia</i> (Ericaceae) .....	<i>Acrocercops transecta</i> Meyrick
<i>Magnolia</i> (Magnoliaceae) .....	<i>Gibbovalva kobusi</i> Kumata et Kuroko
	<i>Gibbovalva magnoliae</i> Kumata et Kuroko
<i>Mallotus</i> (Euphorbiaceae) .....	<i>Deoptilia heptadeta</i> (Meyrick)
<i>Malus</i> (Rosaceae) .....	* <i>Spulerina astaurota</i> (Meyrick)
<i>Michelia</i> (Magnoliaceae) .....	<i>Gibbovalva urbana</i> (Meyrick)
<i>Myrsine</i> (Myrsinaceae) .....	<i>Artifodina japonica</i> Kumata
<i>Neolitsea</i> (Lauraceae) .....	<i>Gibbovalva civica</i> (Meyrick)
<i>Parthenocissus</i> (Vitaceae) .....	<i>Spulerina parthenocissi</i> Kumata et Kuroko
<i>Pasania</i> (Fagaceae) .....	<i>Chrysocercops castanopsidis</i> Kumata et Kuroko
	<i>Chryptolectica pasaniae</i> Kumata et Kuroko
<i>Persea</i> (Lauraceae) .....	<i>Gibbovalva civica</i> (Meyrick)
	<i>Gibbovalva quadrifasciata</i> (Stainton)
<i>Picrasma</i> (Simaroubaceae) .....	<i>Eteoryctis picrasmae</i> Kumata et Kuroko
<i>Pinus</i> (Pinaceae) .....	* <i>Spulerina corticicola</i> Kumata
<i>Platycarya</i> (Juglandaceae) .....	<i>Acrocercops transecta</i> Meyrick
<i>Prunus</i> (Rosaceae) .....	* <i>Spulerina astaurota</i> (Meyrick)
<i>Pterocarya</i> (Juglandaceae) .....	<i>Acrocercops transecta</i> Meyrick
<i>Pueraria</i> (Leguminosae) .....	<i>Spulerina dissotoma</i> (Meyrick)
<i>Pyrus</i> (Rosaceae) .....	* <i>Spulerina astaurota</i> (Meyrick)
<i>Quercus</i> (Fagaceae) .....	<i>Acrocercops querci</i> Kumata et Kuroko
	<i>Acrocercops unistriata</i> Yuan
	<i>Acrocercops vallata</i> Kumata et Kuroko
	<i>Cryptolectica chrysalis</i> Kumata et Ermolaev
	<i>Cryptolectica ensiformis</i> (Yuan)
	* <i>Spulerina virgulata</i> Kumata et Kuroko
? <i>Quercus</i> (Fagaceae) .....	* <i>Spulerina castaneae</i> Kumata et Kuroko
<i>Rhus</i> (Anacardiaceae) .....	<i>Eteoryctis deversa</i> (Meyrick)
<i>Stephania</i> (Menispermaceae) .....	<i>Phodoryctis stephaniae</i> Kumata et Kuroko
<i>Tilia</i> (Tiliaceae) .....	<i>Telamoptilia tiliae</i> Kumata et Ermolaev
<i>Urena</i> (Malvaceae) .....	<i>Telamoptilia cathedraea</i> (Meyrick)
<i>Vigna</i> (Leguminosae) .....	<i>Phodoryctis caerulea</i> (Meyrick)
<i>Wisteria</i> (Leguminosae) .....	<i>Psydrocercops wisteriae</i> (Kuroko)
[Unknown] .....	<i>Borboryctis triplaca</i> (Meyrick)
	" <i>Acrocercops</i> " <i>albofasciella</i> Yazaki

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\* Insects with an asterisk are stem-miners.

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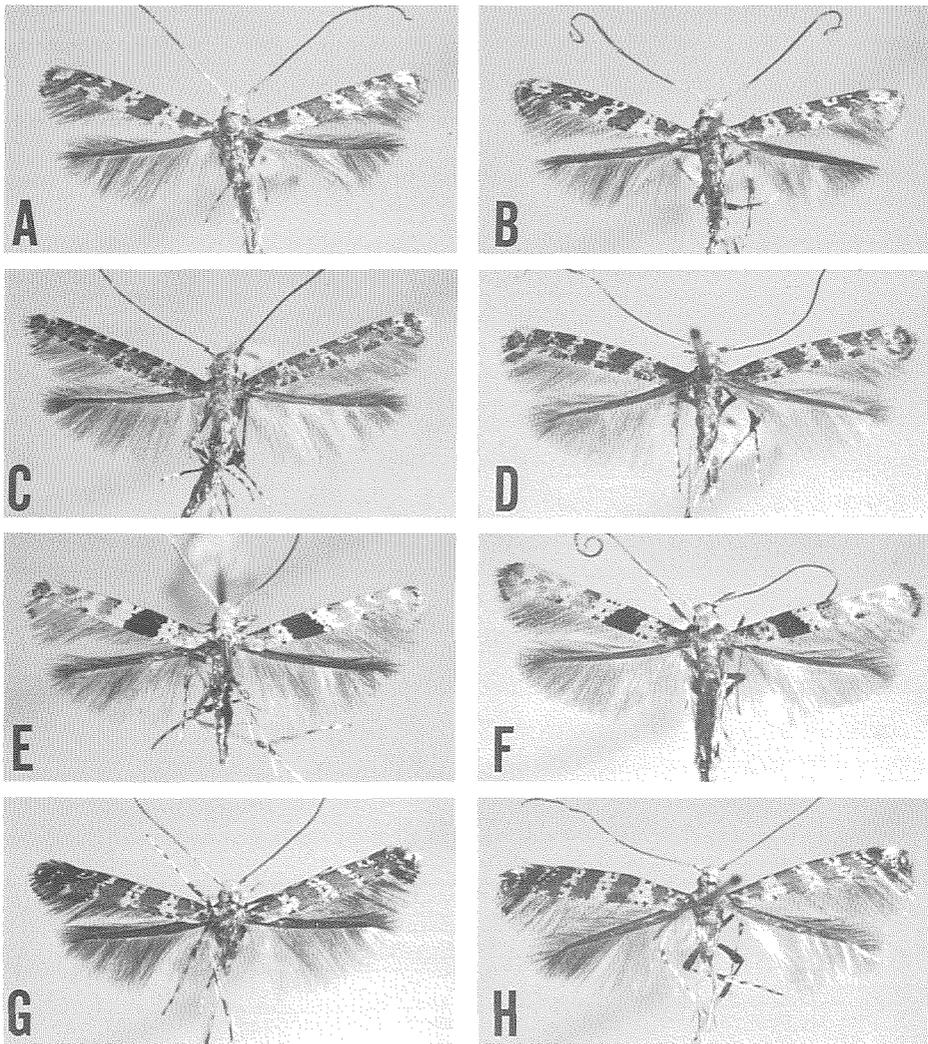
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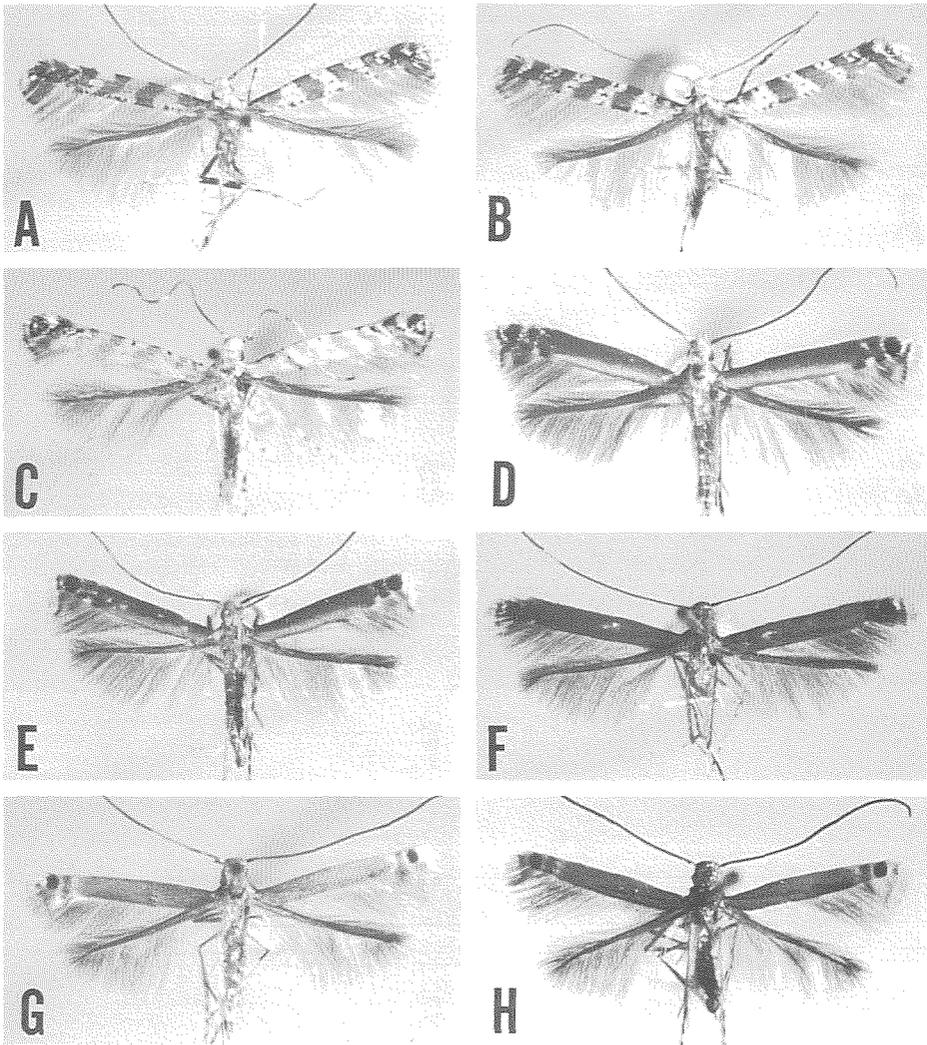
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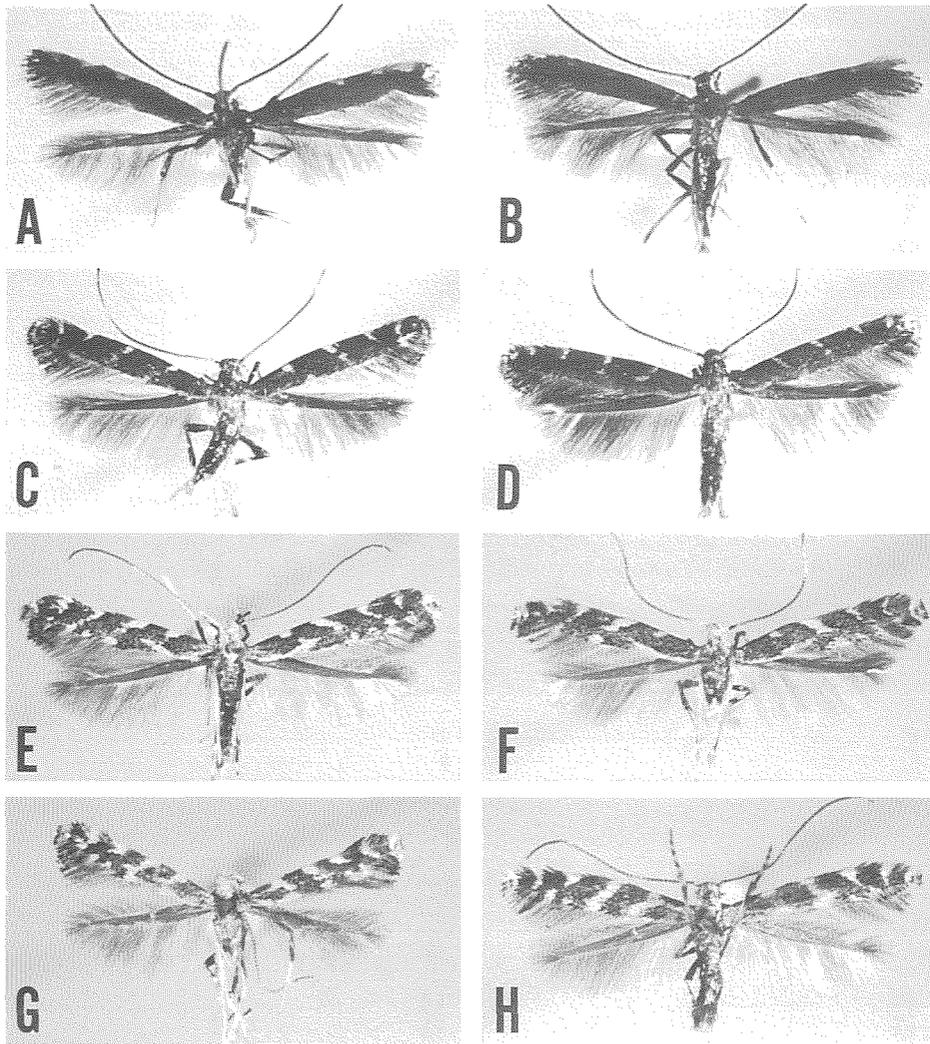
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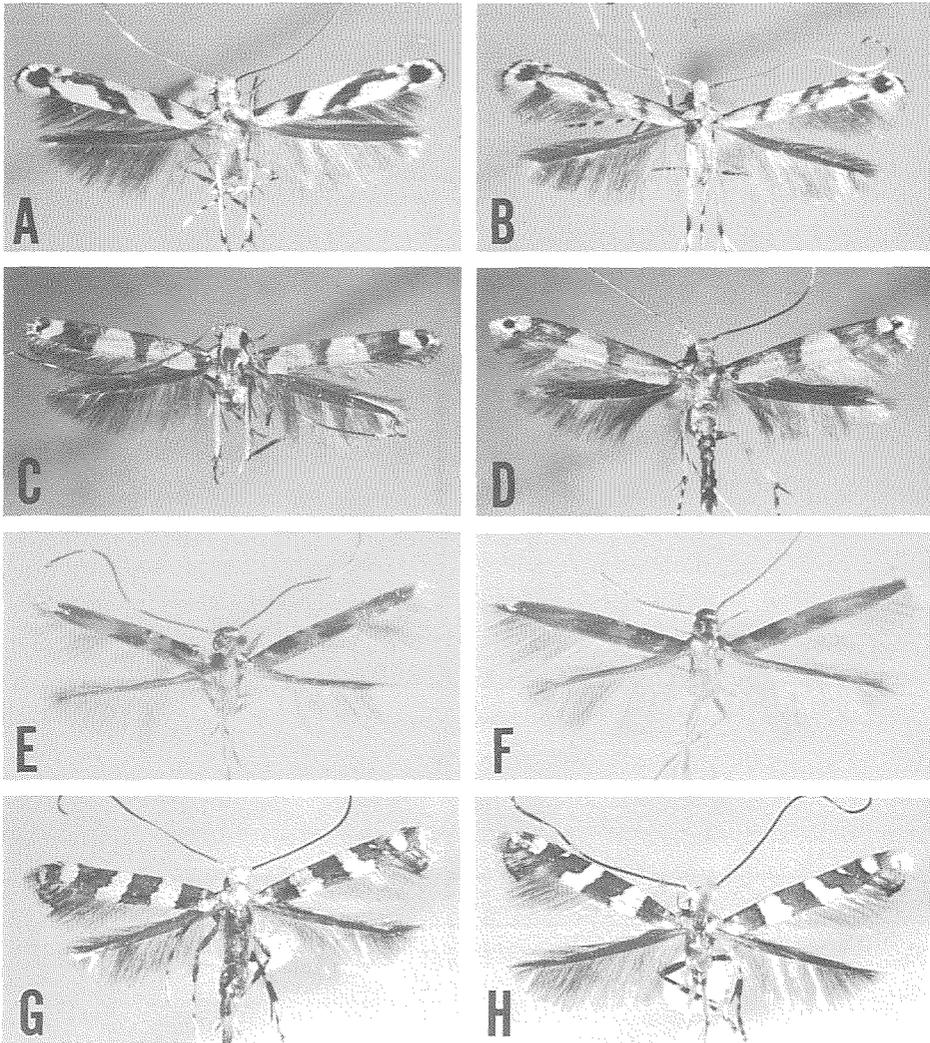
Pl. I: Fig. 34. Adult specimen. A: *Gibbovalva quadrifasciata* (Stainton) [♀, Bannadake, Isigaki, Ryūkyū Is., em. 22/iv/1985, ex *Persea thunbergii* (2593), M. Takeda leg.] — B: Ditto [♀, Mugiō, Yaku-sima, Nansei Is., em. 1/xi/1973, ex *P. thunbergii* (1195)] — C: *Gibbovalva civica* (Meyrick) [♀, Sueyosi, Okinawa, Ryūkyū Is., em. 26/iv/1985, ex *Neolitsea sericea* (2547), M. Takeda leg.] — D: Ditto [♂, Mine, Tusima, em. 5/xi/1979, ex *Cinnamomum sieboldii* (2110)] — E: *Gibbovalva urbana* (Meyrick) [♀, Kii-Ōsima, Wakayama-ken, em. 14/x/1974, ex *Michelia compressa* (1340)] — F: Ditto [♀, Izuhara, Tusima, em. 5/xi/1979, ex *M. compressa* (2040)] — G: *Gibbovalva kobusi* Kumata et Kuroko, sp. nov. [holotype] — H: Ditto [♀, paratype, Moiwa, Sapporo, Hokkaidō, em. 4/v/1970, ex *Magnolia kobus* (930)].



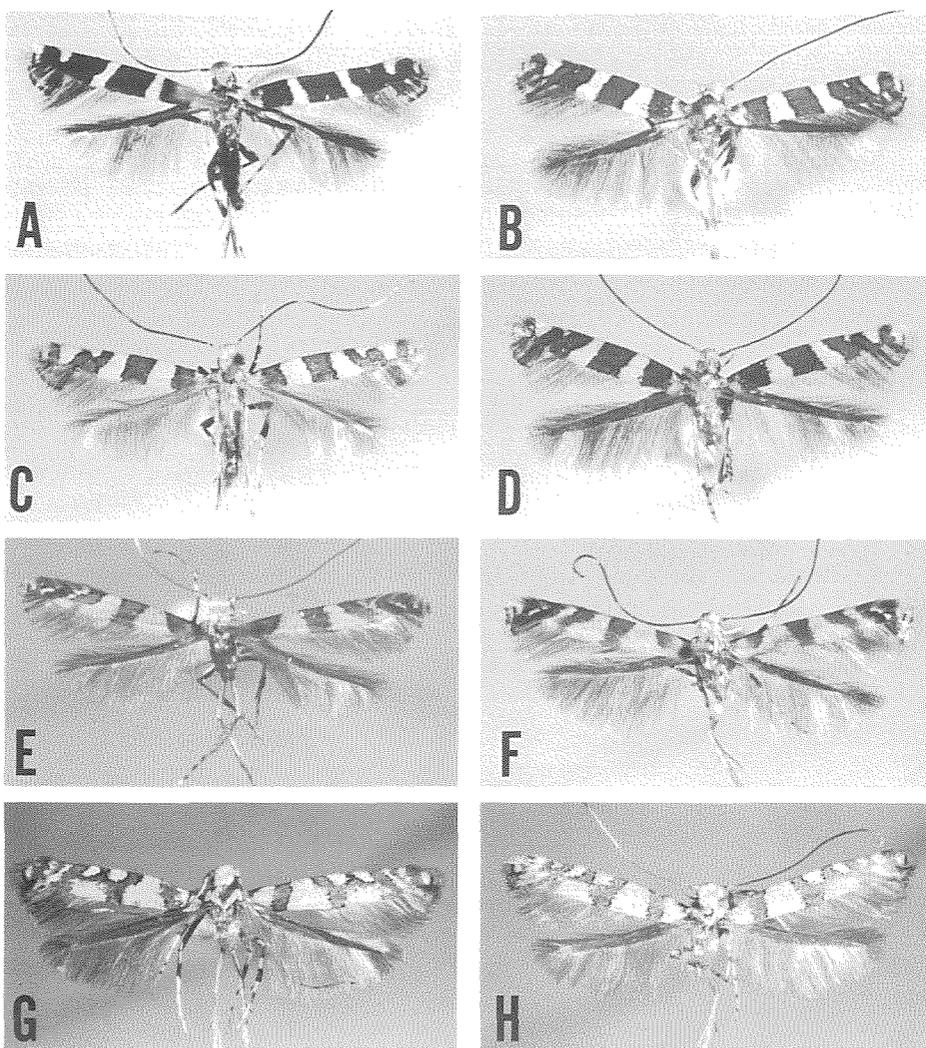
Pl. II : Fig. 35. Adult specimen. A : *Gibbovalva magnoliae* Kumata et Kuroko, sp. nov. [holotype] — B : Ditto [♀, paratype, Tunagi, Morioka, Iwate-ken, em. 7/v/1970, ex *Magnolia obovata*] — C : Ditto [♀, paratype, Siriuti, Osima, Hokkaidō, em. 5/vii/1976, ex *M. obovata* (1685)] — D : *Melanocercops ficuvorella* (Yazaki) [♀, Kozagawa, Wakayama-ken, em. 6/vi/1970, ex *Ficus erecta* (1022)] — E : Ditto [♀, Bannadake, Isigaki, Ryūkyū Is., em. 28/iv/1985, ex *F. erecta* (2540), M. Takeda leg.] — F : *Melanocercops elaphopa* (Meyrick) [♀, Solan, H.P., India, em. 5/xi/1978, ex *Ficus palmata* (Ind-114)] — G : *Melanocercops phractopa* (Meyrick) [♀, Onoaida, Yaku-sima, Nansei Is., em. 3/xi/1973, ex *F. microcarpa* (1200)] — H : Ditto [♀, ditto, em. 5/xi/1973].



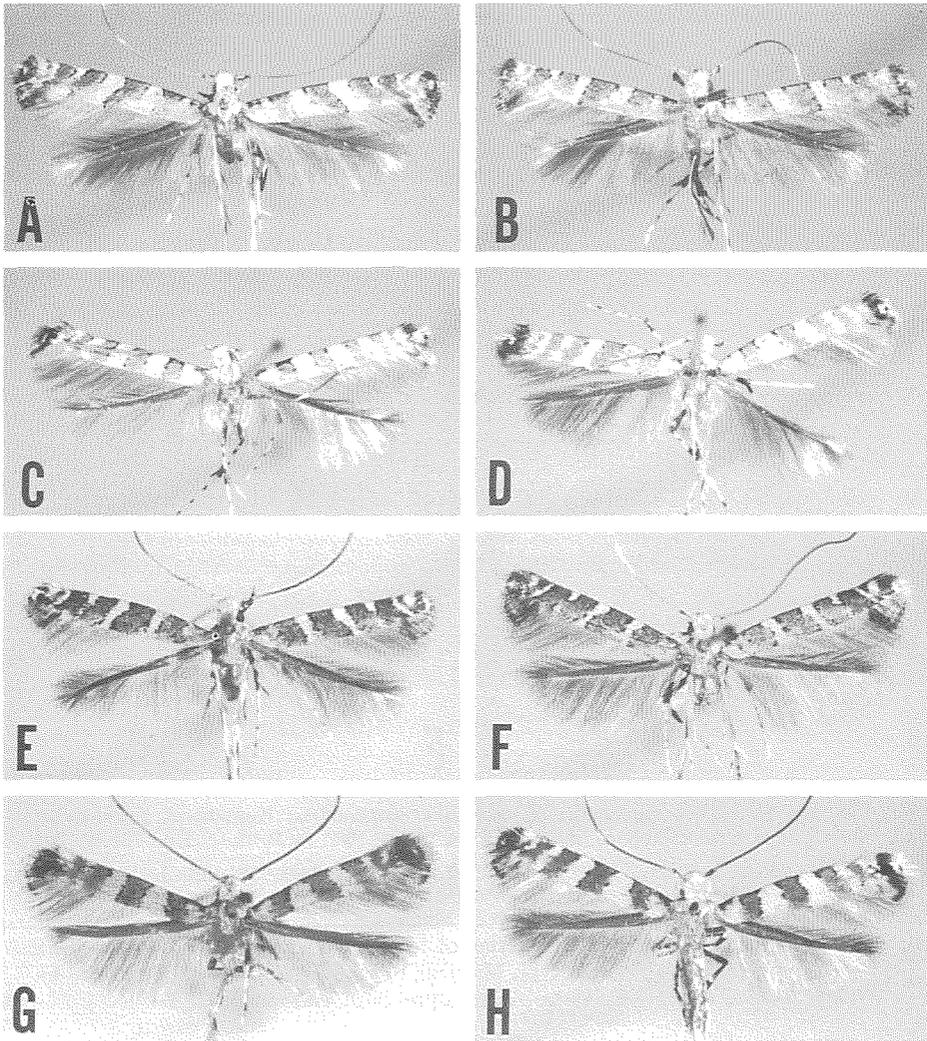
Pl. III: Fig. 36. Adult specimen. A: *Phodoryctis caerulea* (Meyrick) [♂, Onoaida, Yaku-sima, Nansei Is., em. 9/xi/1973, ex *Vigna marina* (1221)] — B: Ditto [♀, ditto, em. 11/xi/1973] — C: *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov. [♀, paratype, Tosasimizu, Kōti-ken, em. 20/xi/1980, ex *Stephania japonica* (2230)] — D: Ditto [♀, paratype, Asizuri, Kōti-ken, em. 19/xi/1980, ex *S. japonica* (2242)] — E: *Leucospilapteryx omissella* (Stainton) [♂, Apoi, Hidaka, Hokkaidō, em. 22/iv/1975, ex *Artemisia montana* (1391)] — F: Ditto [♂, Tosasimizu, Kōti-ken, em. 13/xi/1980, ex *Chrysanthemum ornatum* (2262)] — G: *Leucospilapteryx anaphalidis* Kumata [holotype] — H: Ditto [♂, Kenebetu, Nemuro, Hokkaidō, em. 19/v/1980, ex *Anaphalis margaritacea* (2014)].



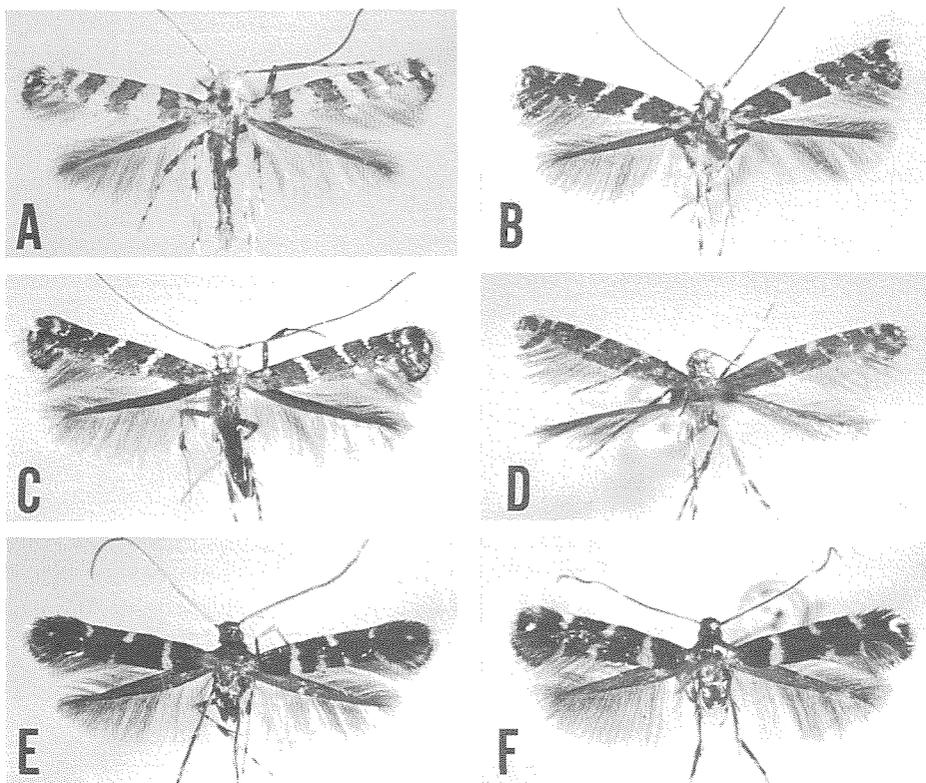
Pl. IV : Fig. 37. Adult specimen. A : *Borboryctis euryae* Kumata et Kuroko, sp. nov. [♀, paratype, Kozagawa, Wakayama-ken, em. 13/vi/1970, ex *Eurya japonica* (1038)] — B : Ditto [♀, paratype, Kozagawa, em. 16/xi/1974, ex *E. japonica* (1290)] — C : *Borboryctis triplaca* (Meyrick) [♂, Yukigaya, Tōkyō, 16/vii/1950, H. Kuroko leg.] — D : Ditto [♂, Sanage-yama, Aiti-ken, 1/vii/1978, B. Tanaka leg.] — E : *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov. [holotype] — F : Ditto [♀, paratype, Ino, Kōti-ken, em. 8/xi/1980, ex *Castanopsis cuspidata* (2200)] — G : *Telamoptilia cathedraea* (Meyrick) [♀, Mugiō, Yaku-sima, Nansei Is., em. 31/xi/1973, ex *Urena lobata* (1179)] — H : Ditto [♂, ditto, em. 4/xi/1973].



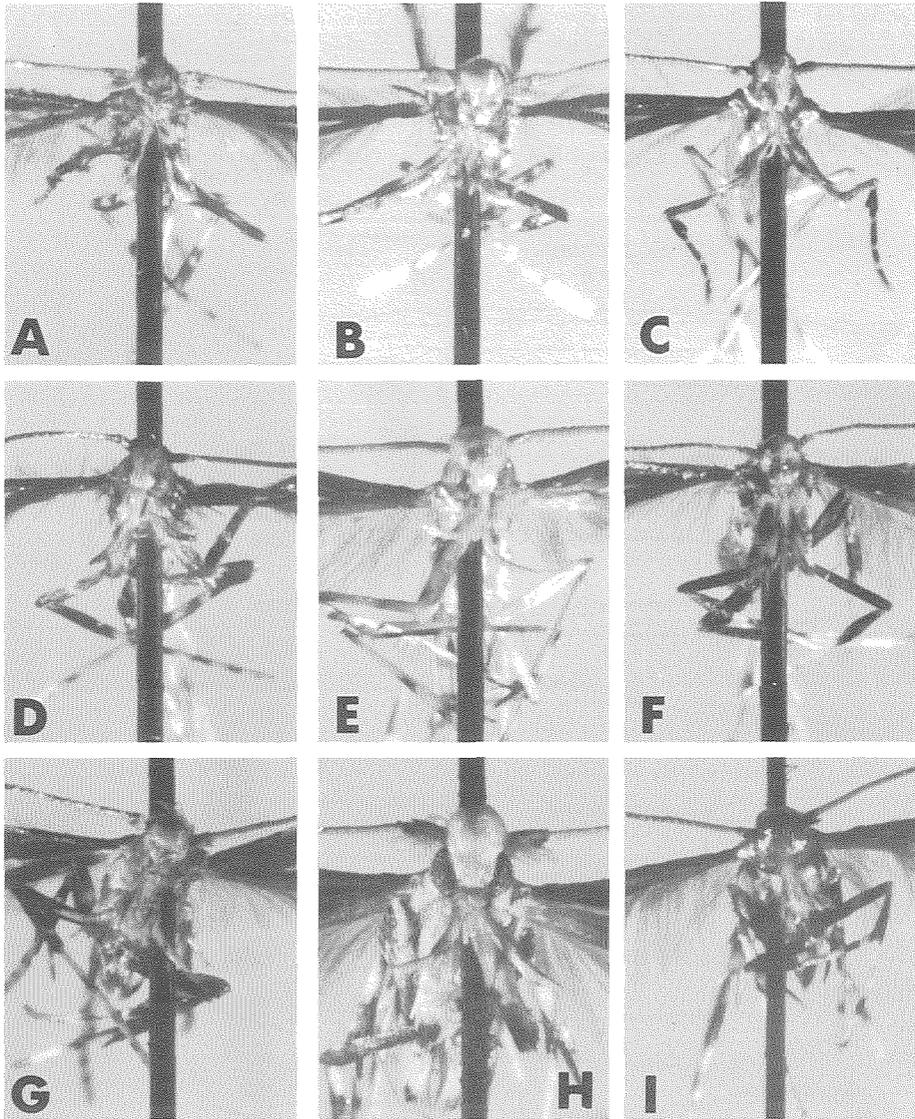
Pl. V : Fig. 38. Adult specimen. A : *Telamoptilia hemistacta* (Meyrick) [♀, Tina, Okinoerabu, Ryūkyū Is., em. 9/xi/1965, ex *Achyranthes japonica* var. *hachijoensis*, H. Kuroko leg.] — B : Ditto [♀, Bangalore, Karnataka, India, em. 8/ii/1978, ex *A. aspera* (Ind-15)] — C : *Telamoptilia prosacta* (Meyrick) [♂, Miyanoura, Yaku-sima, Nansei Is., em. 8/xi/1971, ex *Ipomoea batatas* (1141), K. Kusigemati leg.] — D : Ditto [♀, Sueyosi, Okinawa, Ryūkyū Is., em. 30/iv/1985, ex *Ipomoea* sp. (2549), M. Takeda leg.] — E : *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov. [holotype] — F : Ditto [♀, paratype, Moiwa, Sapporo, Hokkaidō, em. 8/vi/1970, ex *Tilia maximowicziana* (919)] — G : *Spulerina corticicola* Kumata [holotype] — H : Ditto [♀, Apoi, Hidaka, Hokkaidō, em. 15/vii/1967, ex *Pinus strobus*].



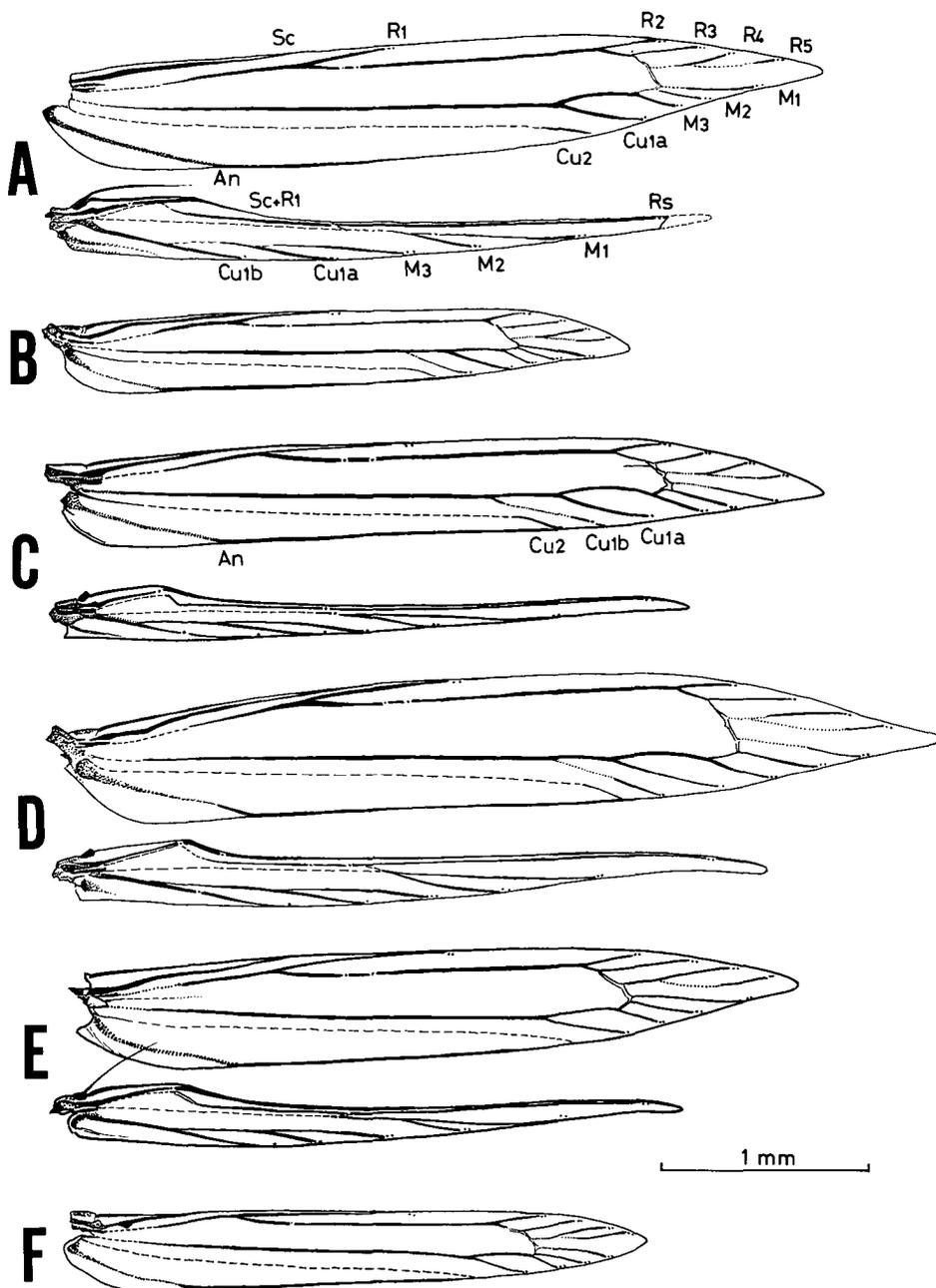
Pl. VI: Fig. 39. Adult specimen. A: *Spulerina astaurota* (Meyrick) [♀, Kawatinagano, Ōsaka, em. 5/vii/1957, ex *Pyrus communis*] — B: Ditto [♂, Kawatinagano, em. 25/vi/1955, ex *Malus pumila*] — C: *Spulerina castaneae* Kumata et Kuroko, sp. nov. [holotype] — D: Ditto [♀, paratype, Morioka, Iwate-ken, em. 10/v/1971, ex *Castanea crenata*, S. Takamura leg.] — E: *Spulerina virgulata* Kumata et Kuroko, sp. nov. [holotype] — F: Ditto [♂, paratype, Kamanogawa, Sagawa, Nagano-ken, 30/vii/1978, N. Hirano leg.] — G: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov. [holotype] — H: Ditto [♀, paratype, Ino, Kōti-ken, em. 11/v/1981, ex *Parthenocissus tricuspidata* (2189)].



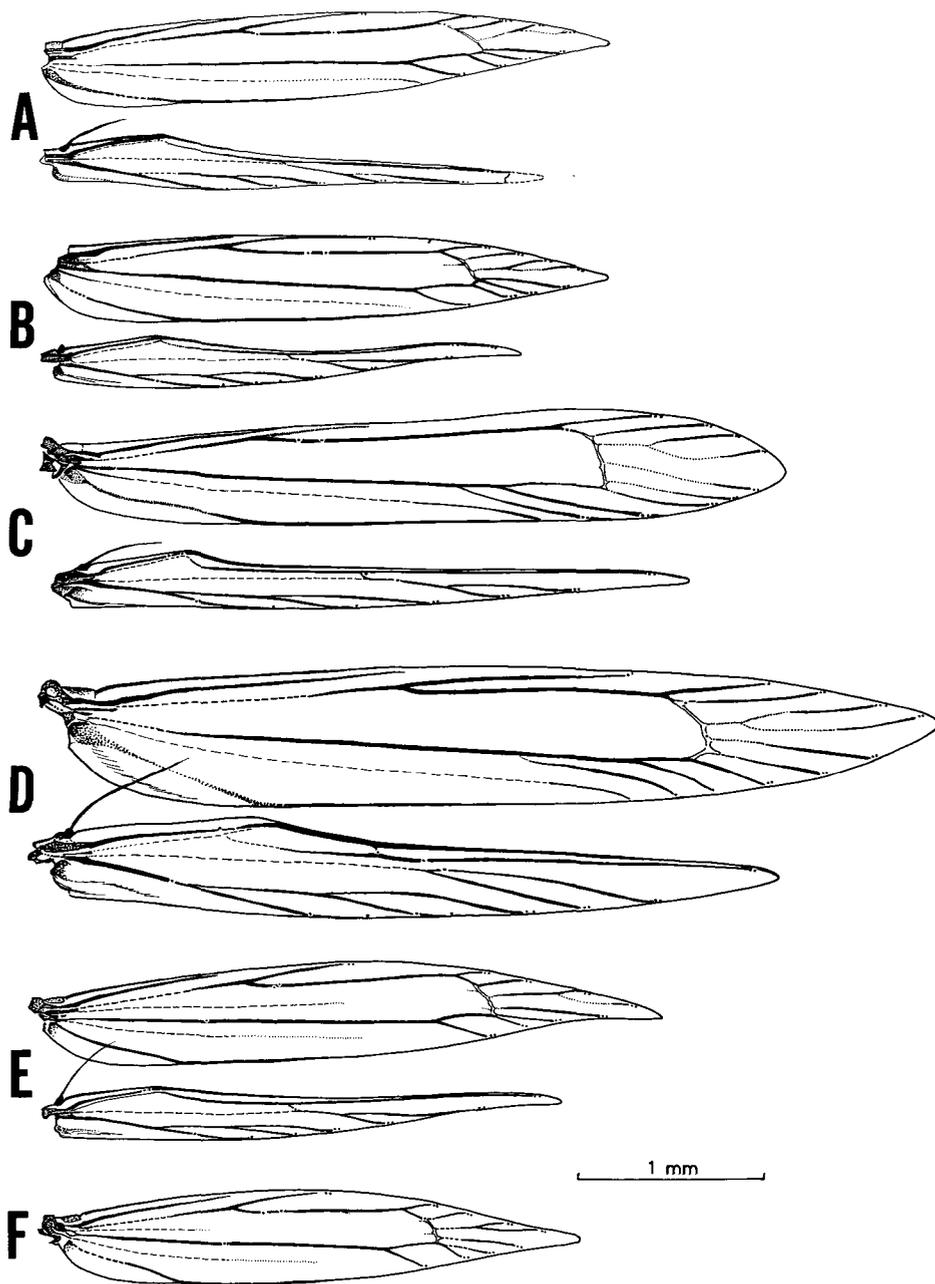
Pl. VII: Fig. 40. Adult specimen. A: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov. [♂, paratype, Sapporo, Hokkaidō, em. 27/vii/1967, ex *Parthenocissus tricuspidata* (879)] — B: *Spulerina dissotoma* (Meyrick) [♂, Ino, Kōti-ken, em. 12/v/1981, ex *Lespedeza cyrtobotrya* (2185)] — C: Ditto [♀, Kisohukusima, Nagano-ken, em. 24/v/1976, ex *L. bicolor* (1508)] — D: Ditto [♂, Mettuppalayam, Nilgiri Hills, Tamil Nadu, India, em. 21/ii/1978, ex an undetermined leguminose (Ind-18)] — E: *Dendrorhycter marmaroides* Kumata [♂, paratype, Misumai, Sapporo, Hokkaidō, em. 9/vi/1975, ex *Alnus hirsuta* (1401)] — F: Ditto [♀, paratype, ditto, em. 16/vi/1975].



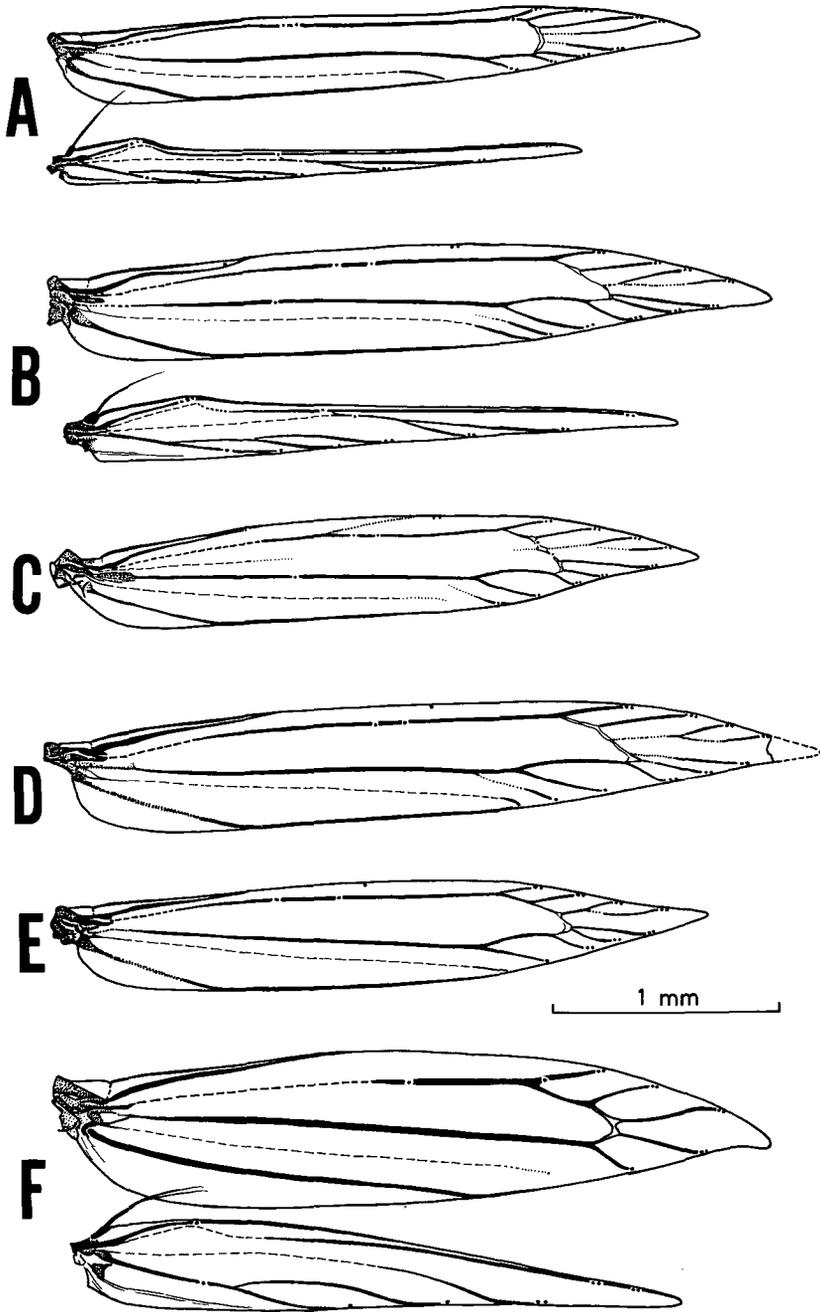
Pl. VIII : Fig. 41. Head of adult in frontal view, showing antennal scape. A : *Gibbovalva quadrifasciata* (Stainton)—B : *Gibbovalva urbana* (Meyrick)—C : *Melanocercops ficuvorella* (Yazaki)—D : *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov.—E : *Borboryctis euryae* Kumata et Kuroko, sp. nov.—F : *Leucospilapteryx omisella* (Stainton)—G : *Telamoptilia cathedraea* (Meyrick)—H : *Spulerina astaurota* (Meyrick)—I : *Dendrorhycter marmaroides* Kumata.



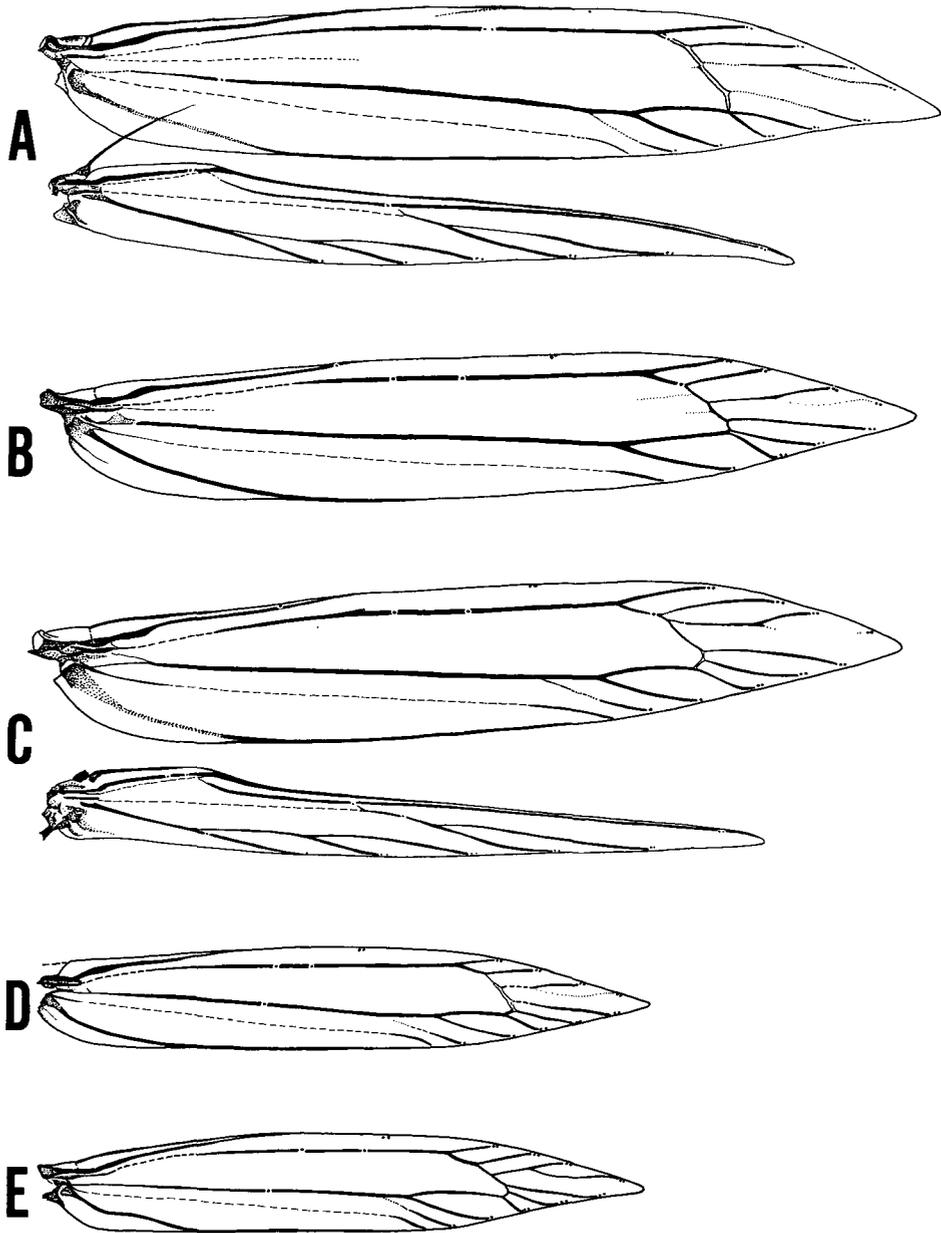
Pl. IX: Fig. 42. Wing venation. A: *Gibbovalva quadrifasciata* (Stainton), fore and hind wings [Grc-832] — B: *Gibbovalva civica* (Meyrick), fore wing [Grc-1674] — C: *Gibbovalva urbana* (Meyrick), fore and hind wings [Grc-1969] — D: *Gibbovalva kobusi* Kumata et Kuroko, sp. nov., fore and hind wings [Grc-1909] — E: *Melanocercops ficuvorella* (Yazaki), fore and hind wings [Grc-1966] — F: *Melanocercops phractopa* (Meyrick), fore wing [Grc-803].



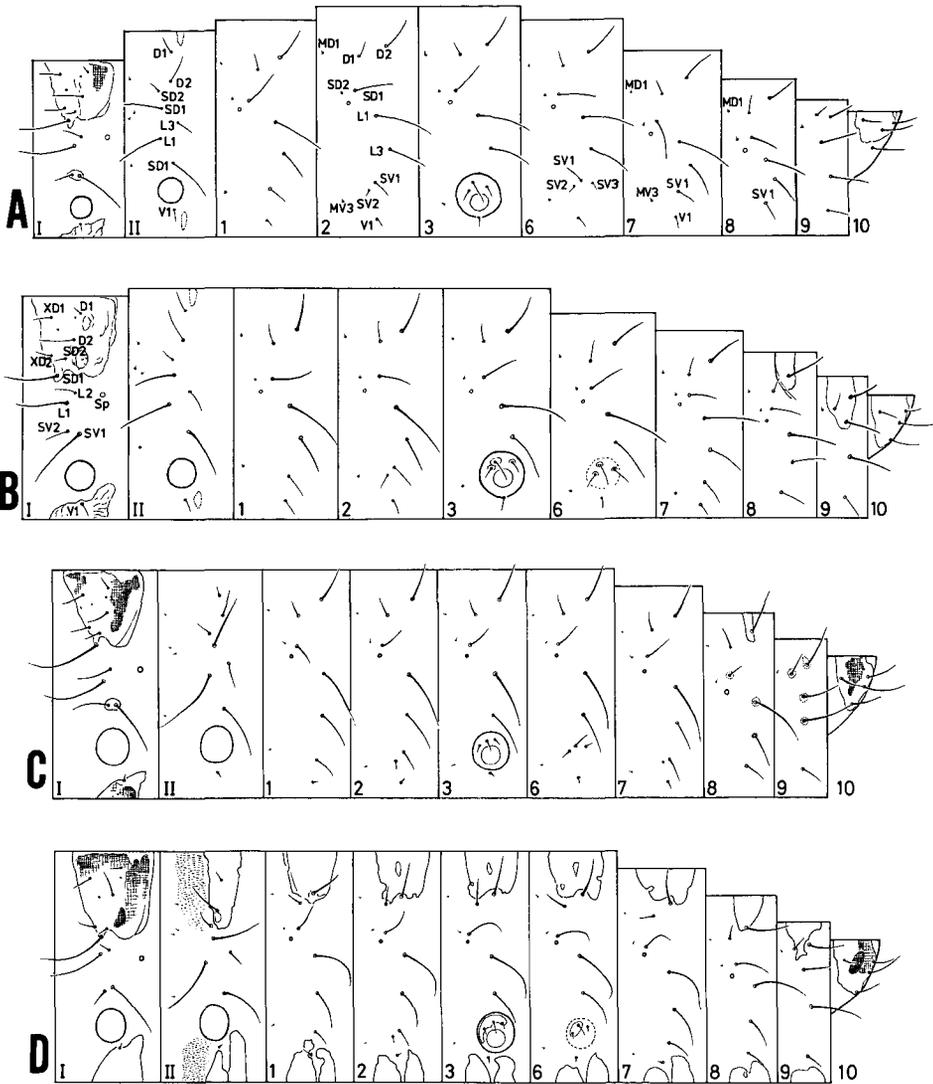
Pl. X: Fig. 43. Wing venation. A: *Phodoryctis caerulea* (Meyrick), fore and hind wings [Grc-3928] — B: *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov., fore and hind wings [Grc-863] — C: *Borboryctis euryae* Kumata et Kuroko, sp. nov., fore and hind wings [Grc-2008] — D: *Borboryctis triplaca* (Meyrick), fore and hind wings [Grc-816] — E: *Leucospilapteryx omissella* (Stainton), fore and hind wings [Grc-565] — F: *Leucospilapteryx anaphalidis* Kumata, fore wing [Grc-756].



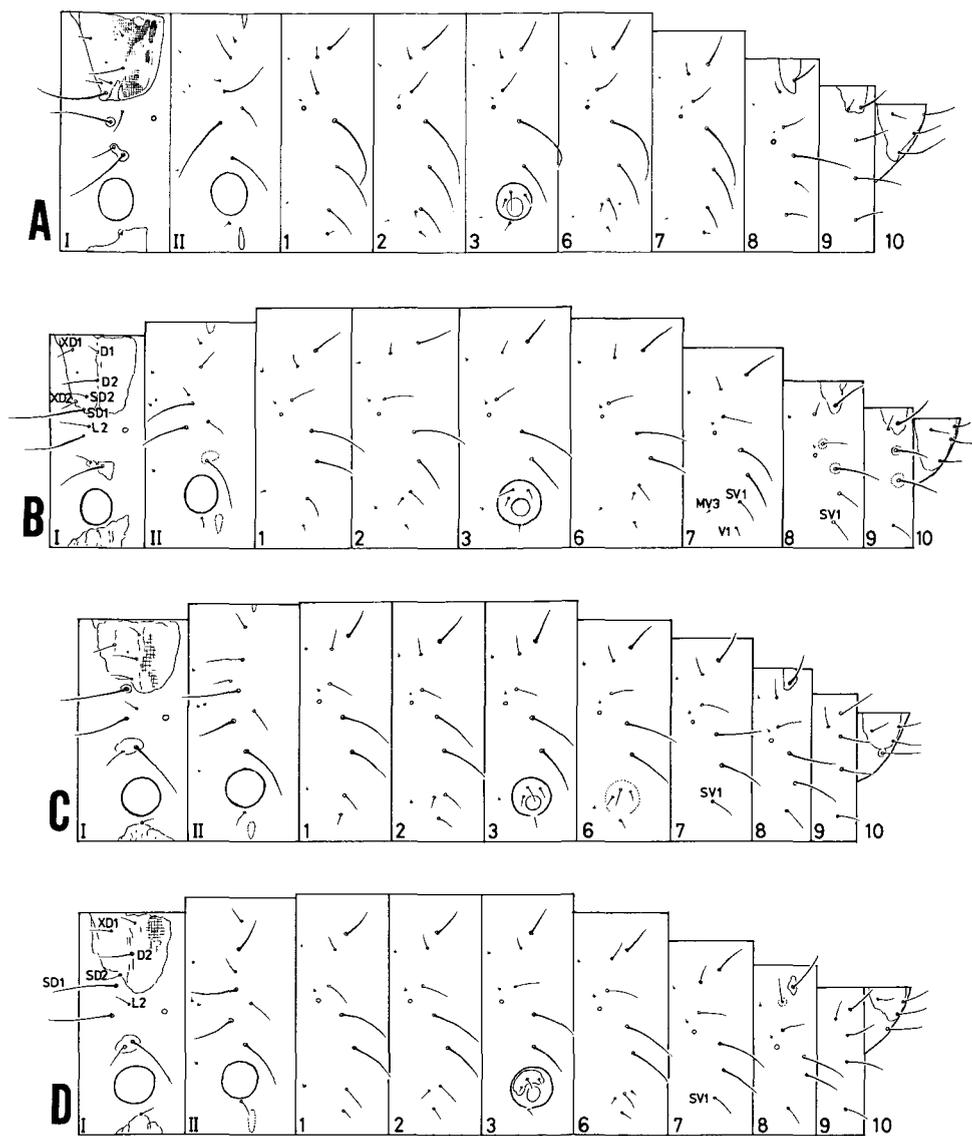
Pl. XI: Fig. 44. Wing venation. A: *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov., fore and hind wings [Grc-1979] — B: *Telamoptilia cathedraea* (Meyrick), fore and hind wings [Grc-1978] — C: *Telamoptilia hemistacta* (Meyrick), fore wing [Grc-2070] — D: *Telamoptilia prosacta* (Meyrick), fore wing [Grc-1669] — E: *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov., fore wing [Grc-1530] — F: *Dendrorhycter marmoroides* Kumata, fore and hind wings [Grc-1694].



Pl. XII: Fig. 45. Wing venation. A: *Spulerina simploniella* (F.R.), fore and hind wings [Grc-531] — B: *Spulerina corticicola* Kumata, fore wing [Grc-894] — C: *Spulerina astaurota* (Meyrick), fore and hind wings [Grc-1535] — D: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov., fore wing [Grc-1976] — E: *Spulerina dissotoma* (Meyrick), fore wing [Grc-1975].



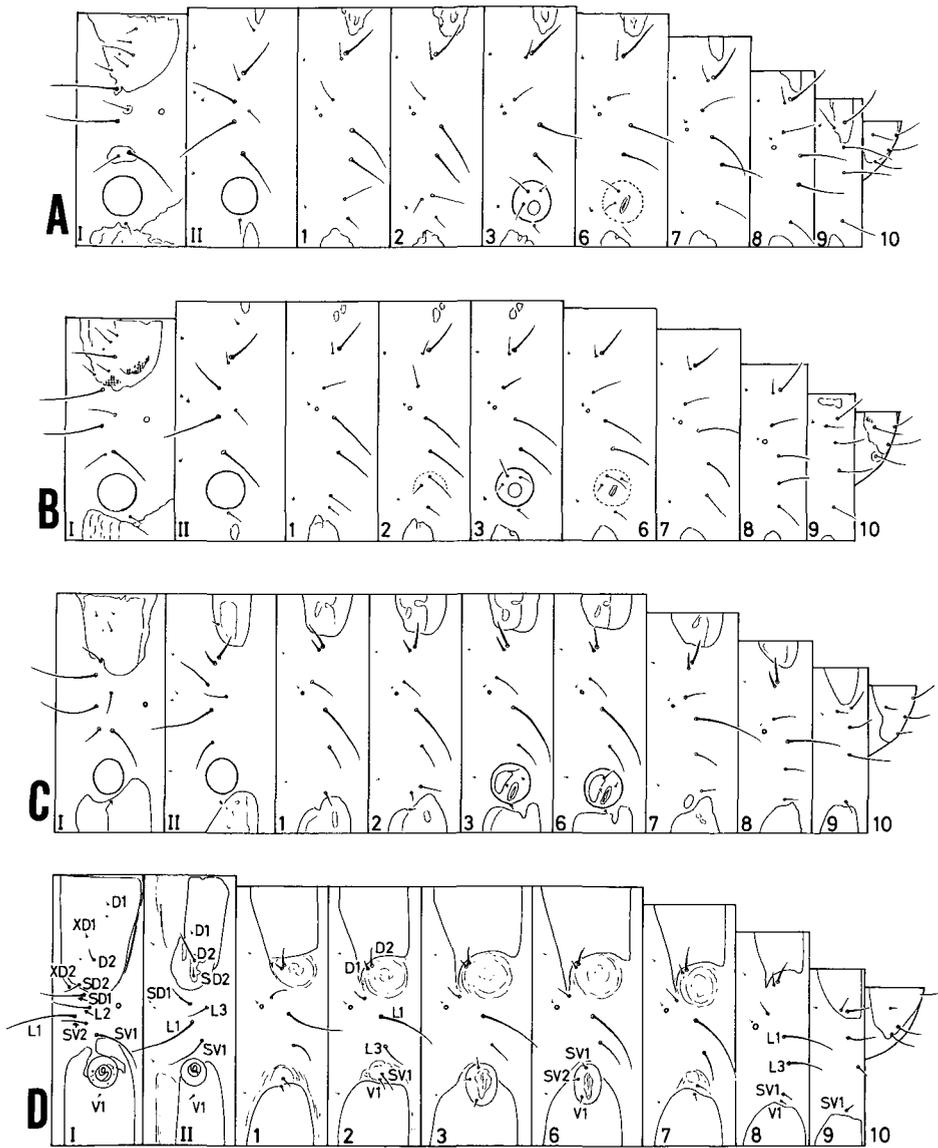
Pl. XIII: Fig. 46. Body chaetotaxy of larva. A: *Gibbovalva quadrifasciata* (Stainton), last instar [Tatukusi, Kôti-ken, 20/x/1980, on *Persea thunbergii* (2271)] — B: *Gibbovalva urbana* (Meyrick), last instar [Kii-Ôsima, Wakayama-ken, 24/ix/1974, on *Michelia compressa* (1340)] — C: *Gibbovalva kobusi* Kumata et Kuroko, sp. nov., last instar [Moiwa, Sapporo, Hokkaidô, 15/ix/1969, ex *Magnolia kobus* (930)] — D: Ditto, penultimate instar [ditto].



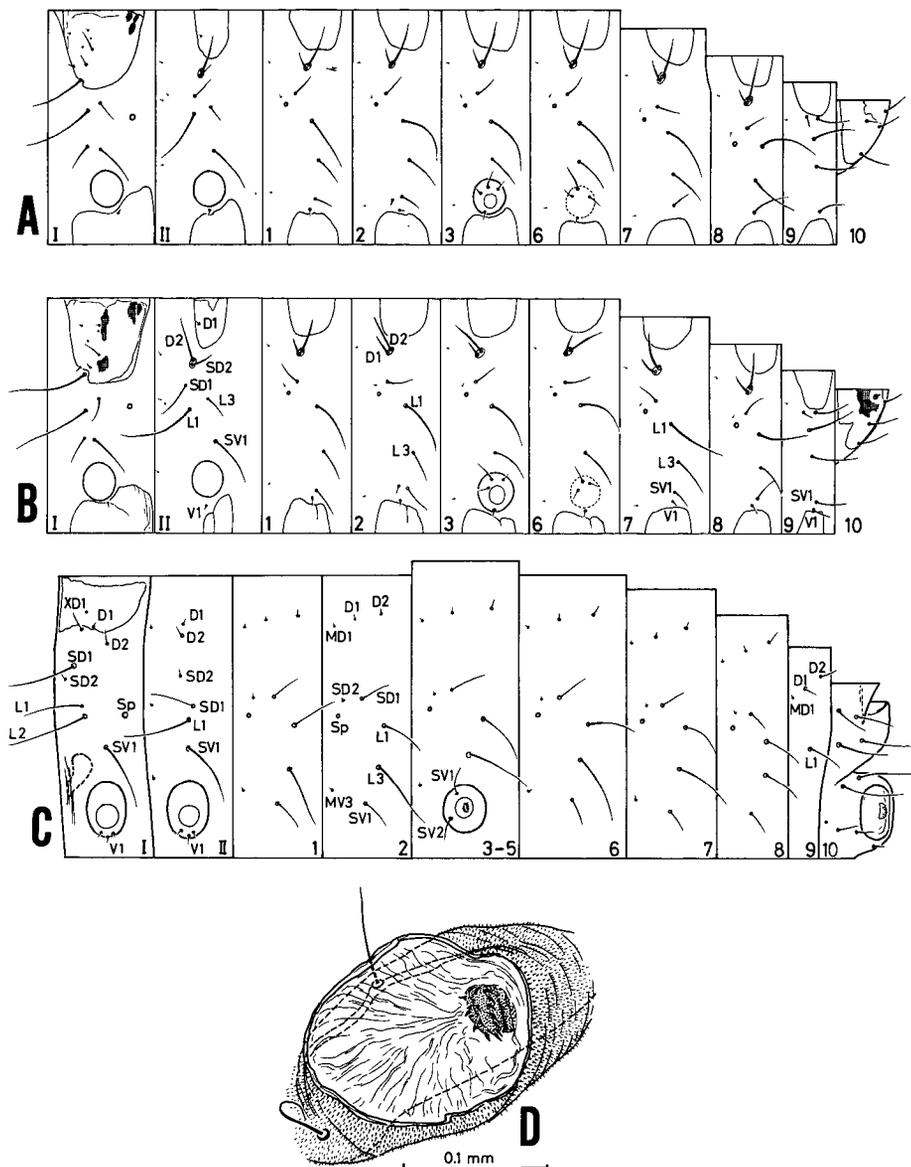
Pl. XIV : Fig. 47. Body chaetotaxy of last instar larva. A: *Melanocercops ficuorella* (Yazaki) [Kii-Ōsima, Wakayama-ken, 24/v/1964, on *Ficus erecta* (664)] — B: *Melanocercops phractopa* (Meyrick) [Onoaida, Yaku-sima, Nansei Is., 15/x/1973, on *Ficus microcarpa* (1200)] — C: *Phodoryctis caerulea* (Meyrick) [Onoaida, Yaku-sima, 17/x/1973, on *Vigna marina* (1221)] — D: *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov. [Anbō, Yaku-sima, 18/x/1973, on *Stephania japonica* (1232)].



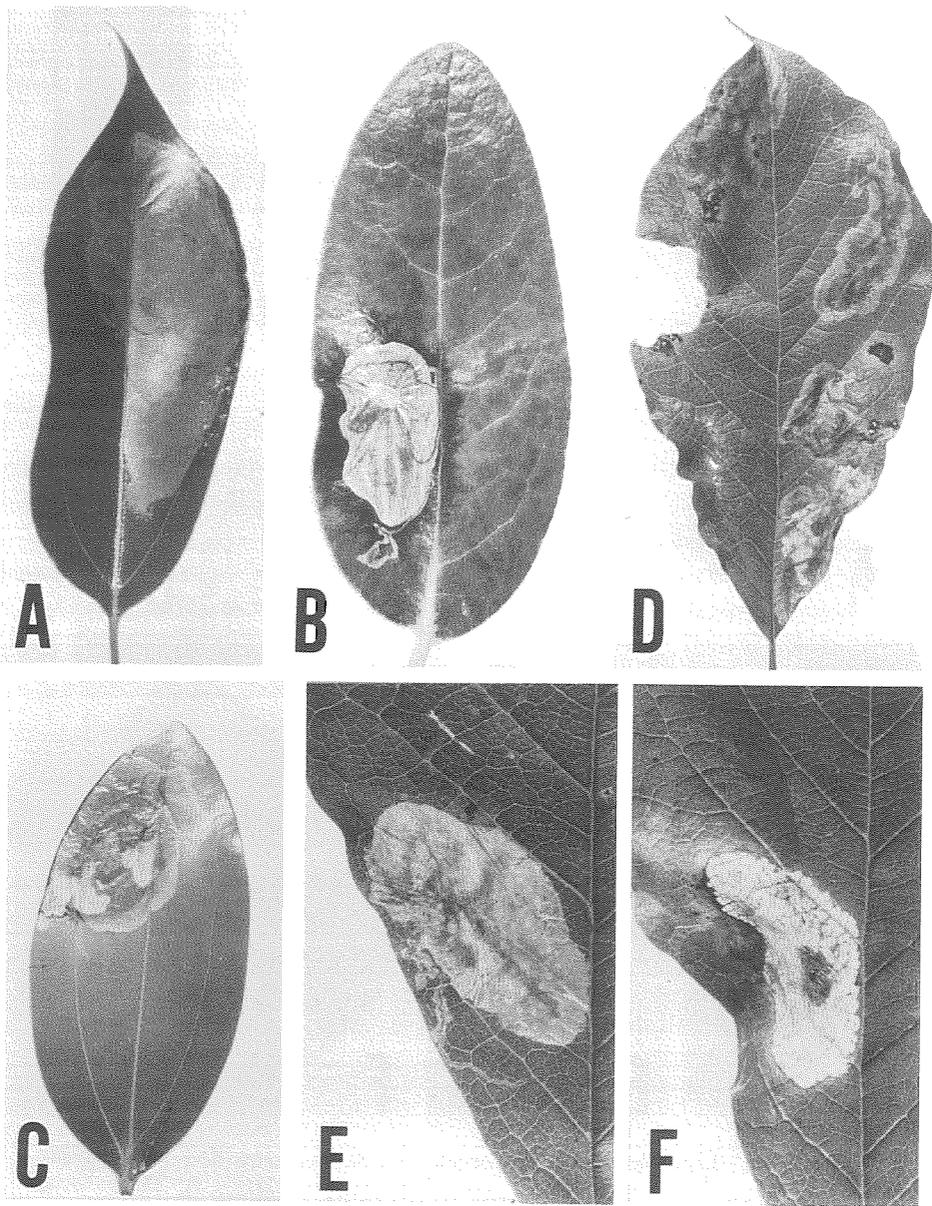
Pl. XV : Fig. 48. Body chaetotaxy of last instar larva. A : *Borboryctis euryae* Kumata et Kuroko, sp. nov. [Kozagawa, Wakayama-ken, 21/v/1970, on *Eurya japonica* (1038)] — B : *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov. [Ino, Kōti-ken, 15/x/1980, on *Pasania glabra* (2200)] — C : *Leucospilapteryx omissella* (Stainton) [Sapporo, Hokkaidō, 10/viii/1964, on *Artemisia montana* (706)] — D : *Leucospilapteryx anaphalidis* Kumata [Moiwa, Sapporo, Hokkaidō, 6/x/1967, on *Anaphalis margaritacea* (901)].



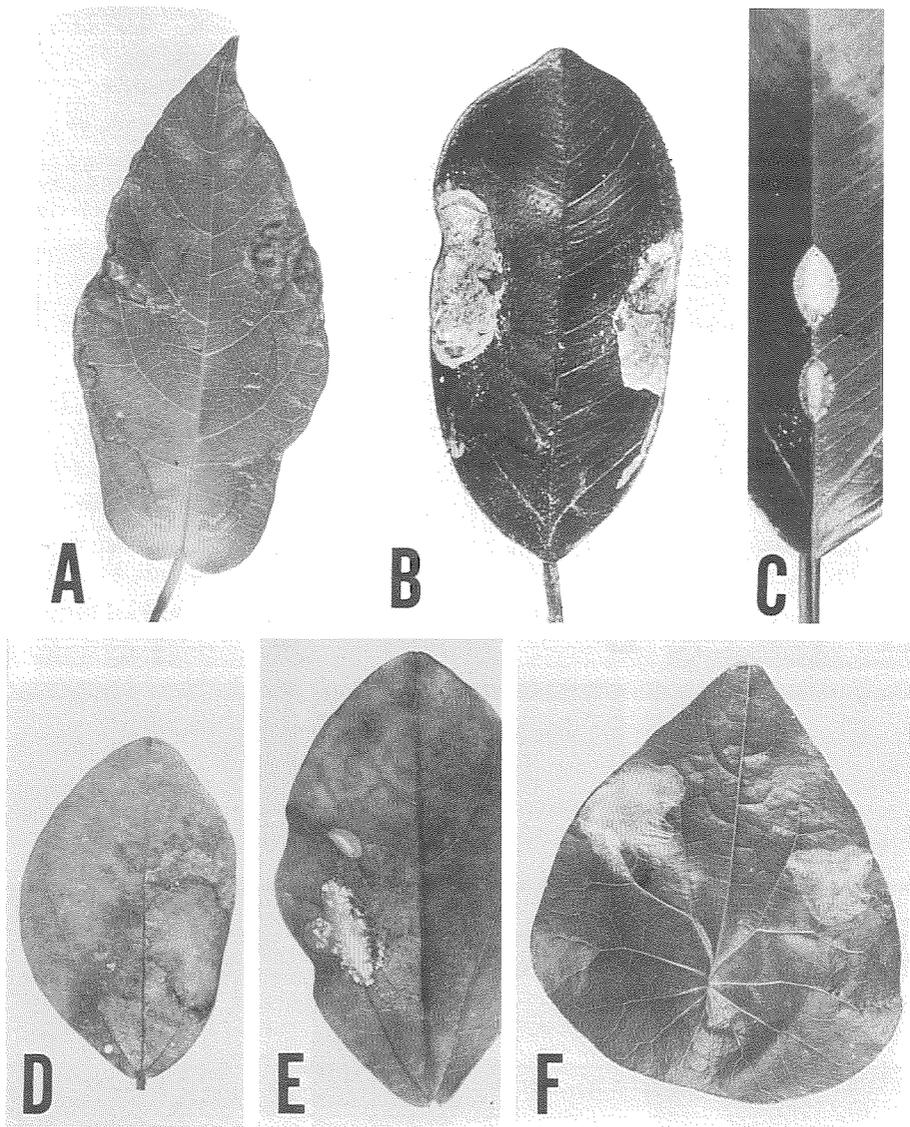
Pl. XVI: Fig. 49. Body chaetotaxy of last instar larva. A: *Telamoptilia cathedraea* (Meyrick) [Anbō, Yaku-sima, Nansei Is., 18/x/1973, on *Urena lobata* (1261)] — B: *Telamoptilia prosacta* (Meyrick) [Miyanoura, Yaku-sima, 19/x/1973, on *Ipomoea batatas* (1243)] — C: *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov. [Moiwa, Sapporo, Hokkaidō, 15/ix/1969, on *Tilia maximowicziana* (919)] — D: *Spulerina corticola* Kumata [Tomakomai, Hokkaidō, vi/1963, on *Pinus strobus* (624)].



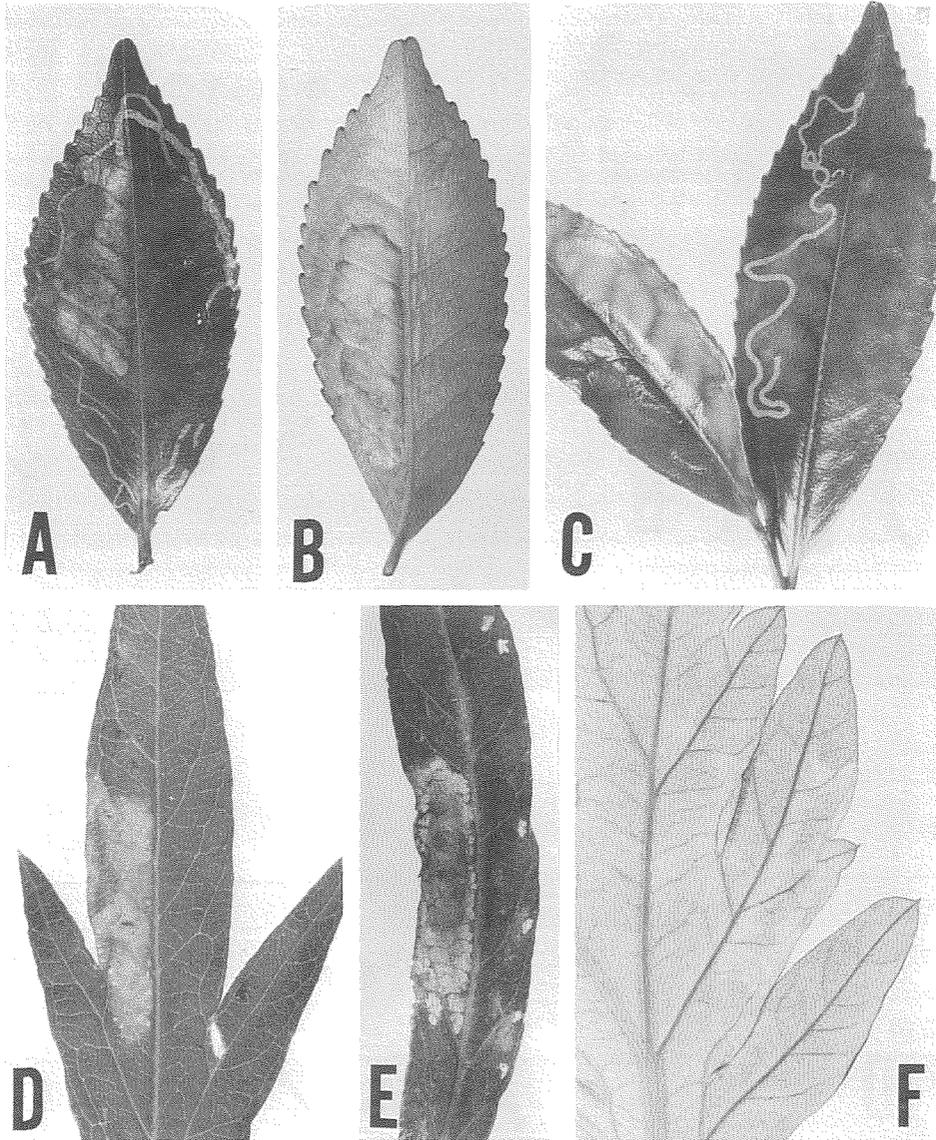
Pl. XVII: Fig. 50. Body chaetotaxy and ventral proleg of last instar larva. A: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov., body chaetotaxy [Sapporo, Hokkaidō, 10/viii/1964, on *Parthenocissus tricuspidata* (707)] — B: *Spulerina dissotoma* (Meyrick), body chaetotaxy [Tunagi, Morioka, Iwate-ken, 8/x/1969, on *Lespedeza bicolor* (996)] — C: *Dendrorhycter marmoroides* Kumata, body chaetotaxy [Misumai, Sapporo, Hokkaidō, 16/v/1973, on *Alnus hirsuta* (1165)] — D: Ditto, 5th abdominal proleg [ditto].



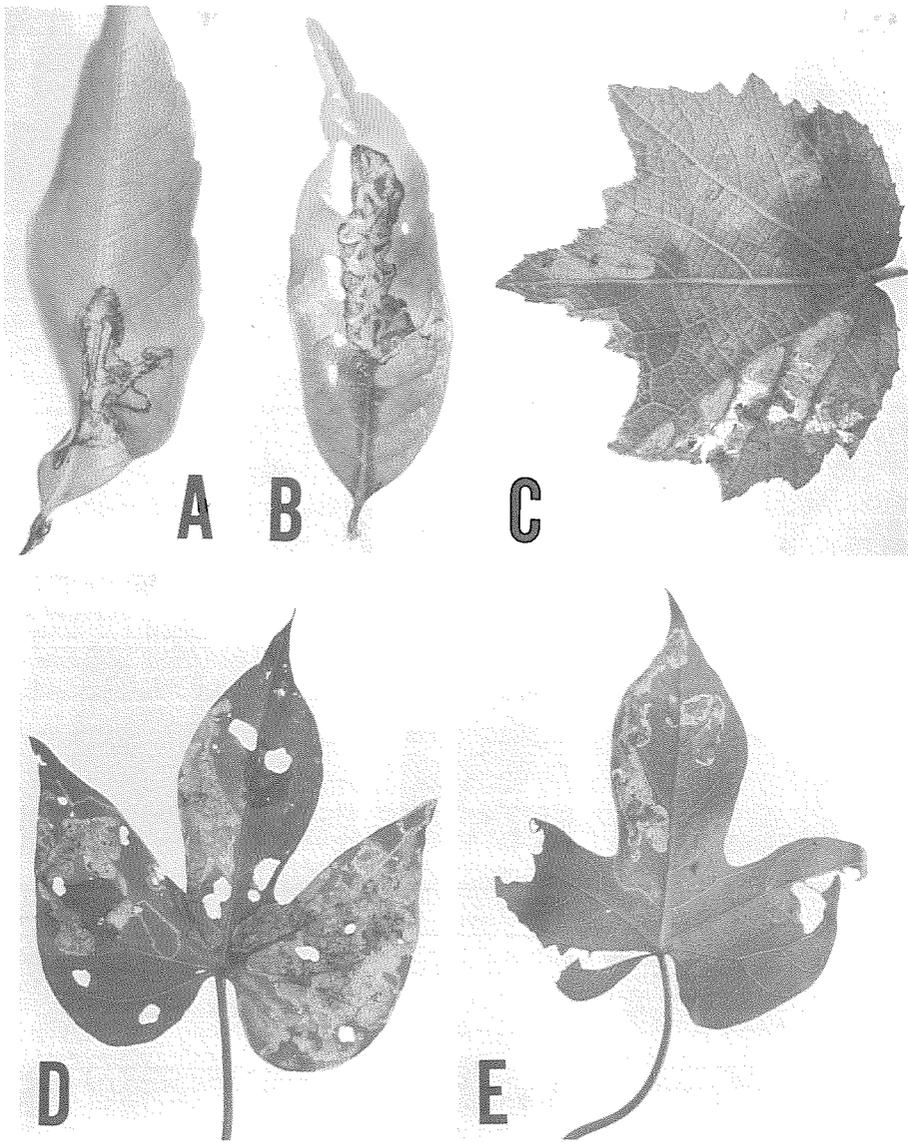
Pl. XVIII: Fig. 51. Larval leaf-mine. A: *Gibbovalva quadrifasciata* (Stainton) on *Cinnamomum camphora* (upper side) [Breeding no. 1179] — B: Ditto on *Litsea japonica* (upper side) [breeding no. 1222] — C: *Gibbovalva civica* (Meyrick) on *Cinnamomum daphnoides* (upper side) [breeding no. 1217] — D-F: *Gibbovalva kobusi* Kumata et Kuroko, sp. nov., on *Magnolia kobus* (upper side) [Moiwa, Sapporo, Hokkaidô, ix/1969].



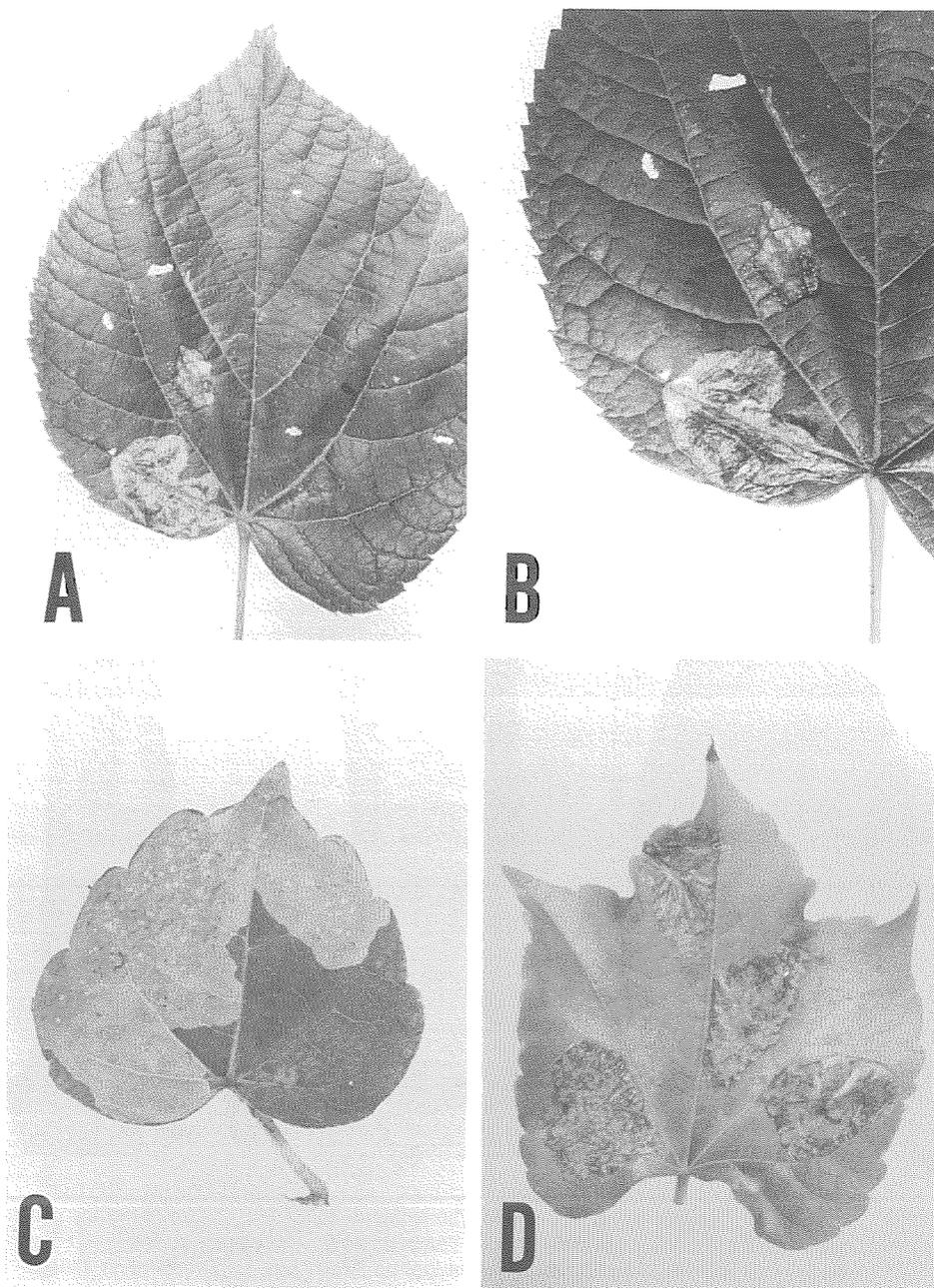
Pl. XIX : Fig. 52. Larval leaf-mine and cocoon. A : *Melanocercops ficuvorella* (Yazaki), leaf-mine on *Ficus erecta* (upper side) [Breeding no. 1192] — B : *Melanocercops phractopa* (Meyrick), leaf-mine on *Ficus microcarpa* (upper side) [breeding no. 1200] — C : Ditto, cocoons on leaf of *F. microcarpa* (upper side) [ditto] — D-E : *Phodoryctis caerulea* (Meyrick), leaf-mines on *Vigna marina* (upper side) [breeding no. 1221] — F : *Phodoryctis stephaniae* Kumata et Kuroko, sp. nov., leaf-mines on *Stephania japonica* (upper side) [breeding no. 1232].



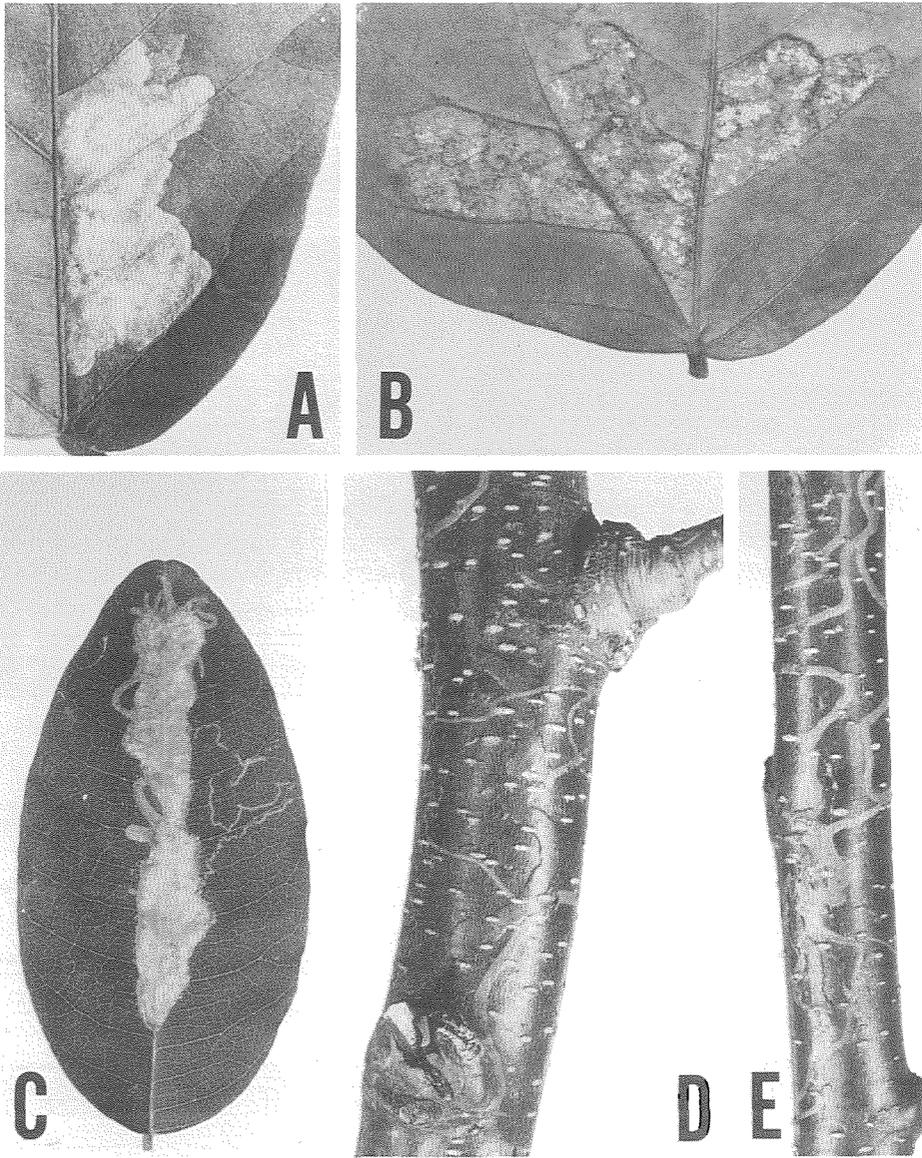
Pl. XX : Fig. 53. Larval leaf-mine. A : *Borboryctis euryae* Kumata et Kuroko, sp. nov., on *Eurya japonica* (upper side) [breeding no. 1038] — B : Ditto (lower side) [ditto] — C : Ditto (lower and upper sides) [breeding no. 1290] — D-E : *Leucospilapteryx omessella* (Stainton) on *Artemisia montana* (upper side) [Misumai, Sapporo, Hokkaido, 7/ix/1970] — F : Ditto (lower side) [ditto].



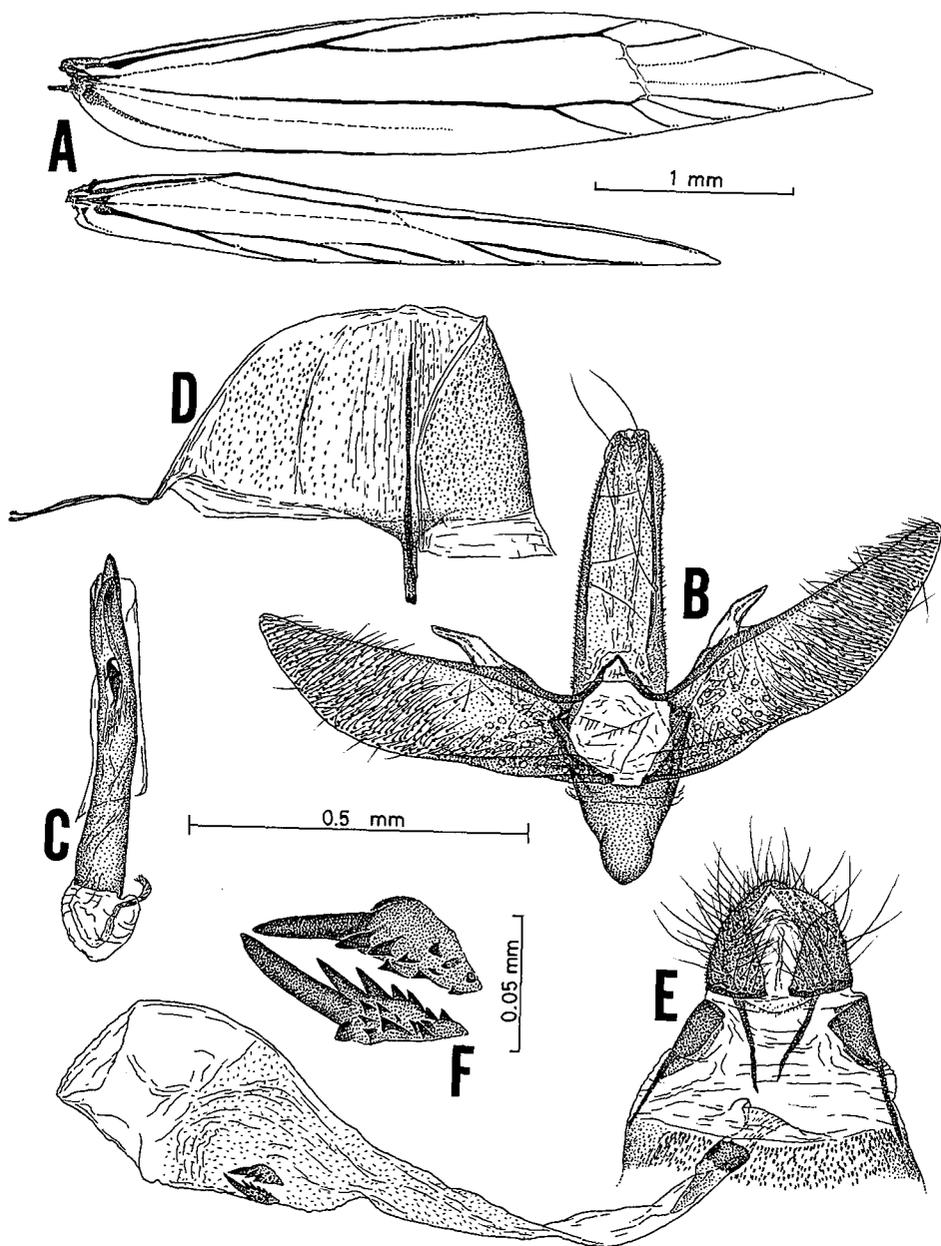
Pl. XXI: Fig. 54. Larval leaf-mine. A-B: *Chrysocercops castanopsidis* Kumata et Kuroko, sp. nov., on *Castanopsis cuspidata* (upper side) [breeding no.1284] — C: *Telamoptilia cathedraea* (Meyrick) on *Urena lobata* (upper side) [breeding no. 1177] — D: *Telamoptilia prosacta* (Meyrick) on *Ipomoea batatas* (upper side) [breeding no. 1243] — E: Ditto (lower side)[ditto].



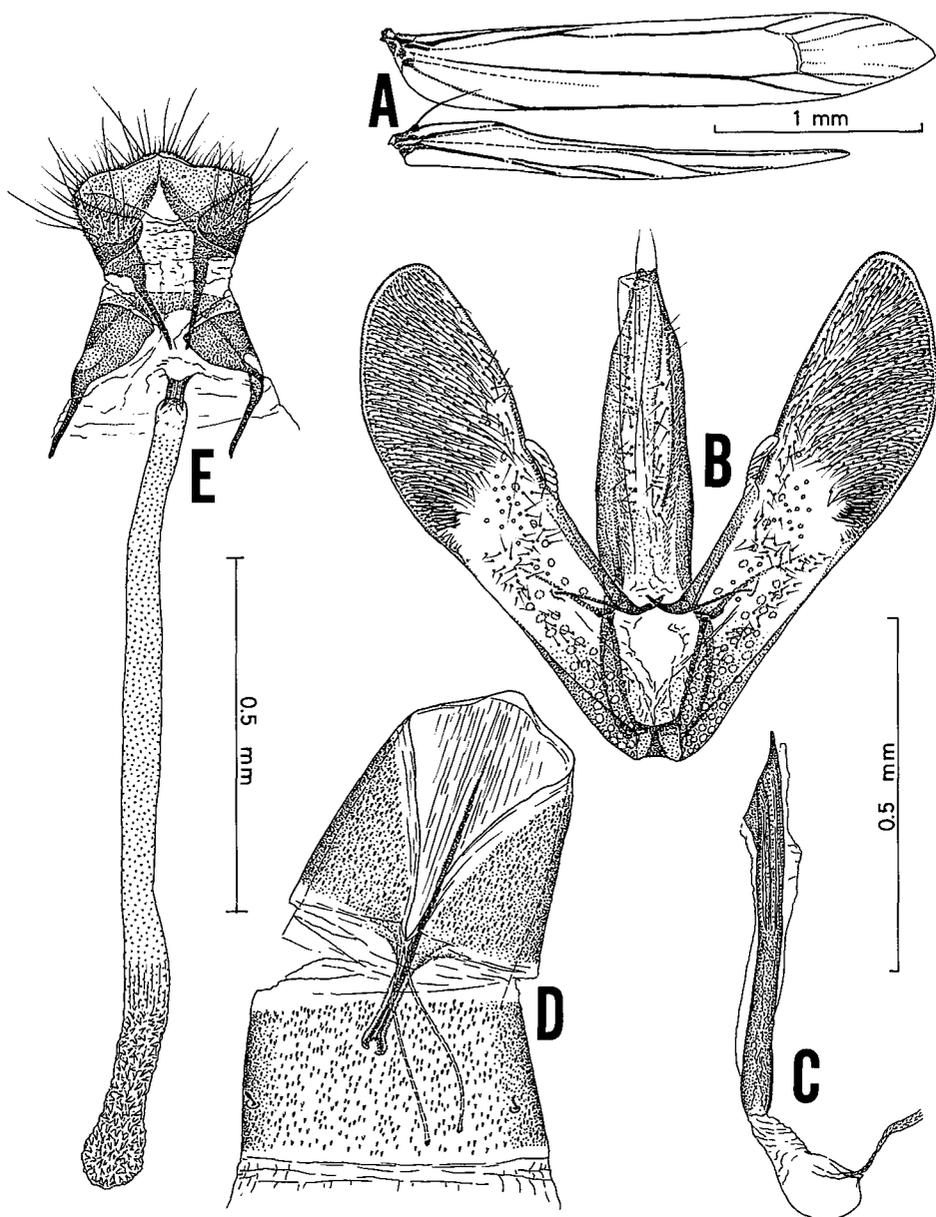
Pl. XXII: Fig. 55. Larval leaf-mine. A-B: *Telamoptilia tiliae* Kumata et Ermolaev, sp. nov., on *Tilia maximowicziana* (upper side) [Moiwa, Sapporo, Hokkaidō, ix/1969] — C: *Spulerina parthenocissi* Kumata et Kuroko, sp. nov., on *Parthenocissus tricuspidata* (upper side) [Kozagawa, Wakayama-ken, 20-24/ix/1974] — D: ditto [breeding no. 1098].



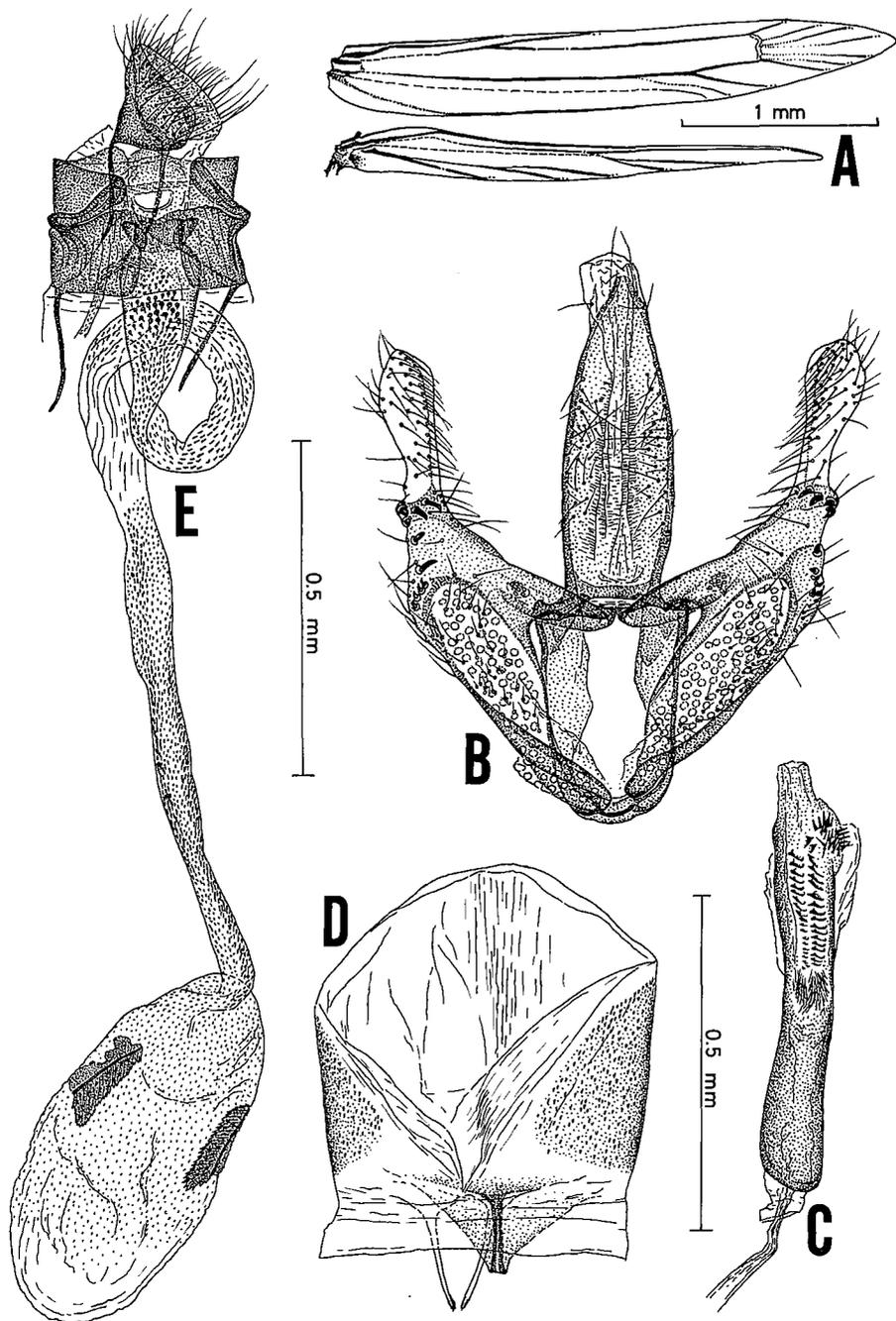
Pl. XXIII : Fig. 56. Larval leaf-mine and stem-mine. A : *Spulerina dissotoma* (Meyrick), leaf-mine on *Pueraria lobata* (upper side) [breeding no. 1328] — B : Ditto [breeding no. 984] — C : Ditto on *Lespedeza bicolor* (upper side) [breeding no. 996] — D-E : *Dendrorhycter marmoroides* Kumata, stem-mines on *Alnus hirsuta* [Breeding no. 1401].



Pl. XXIV: Fig. 57. *Sauterina hofmanniella* (Schleich). A: Wing venation [Grc-1060, Thüringen, Naumburg, 2/v/1936, ex *Lathyrus niger*] — B: Male genitalia in caudal view, aedeagus omitted [Grc-1000, ditto] — C: Aedeagus [ditto] — D: Male 8th abdominal segment in ventral view [ditto] — E: Female genitalia in ventral view [Grc-1001, ditto] — F: Signa enlarged [ditto].



Pl. XXV: Fig. 58. *Amblyptila cynanchi* Vári. A: Wing venation [Grc-1239, Pt. Elizabeth, 21/vi/1956, G.C. Clarke leg.] — B: Male genitalia in caudal view, aedeagus omitted [Grc-1937, ditto] — C: Aedeagus [ditto] — D: Male 7th and 8th abdominal segments in ventral view [ditto] — E: Female genitalia in ventral view [Grc-1238, ditto].



Pl. XXVI: Fig. 59. *Lamprolectica apicistrigata* (Walsingham). A: Wing venation [Grc-1279, Durban, 26/x/1952, C.G.C. Dickson leg.] — B: Male genitalia in caudal view, aedeagus omitted [ditto] — C: Aedeagus [ditto] — D: Male 8th abdominal segment in ventral view [ditto] — E: Female genitalia in ventral view [Grc-1278, Durban, 26/x/1957, C.G.C. Dickson leg.].