

Oriental Agromyzidae (Diptera) in Bishop Museum, Part 2

MITSUHIRO SASAKAWA

Abstract: This paper is based on the collection in the Bishop Museum: fifteen species of Agromyzidae are recorded from Nepal, five of which are described as new to science; twelve species (seven new species) of the genus *Phytobia* are recorded from the Oriental Region and Papua New Guinea, and three new species of the genera *Japanagromyza* (from Philippines), *Calycomyza* (Taiwan) and *Cerodontha* (China) are also described. Two new synonyms are established.

Key words: Diptera, Agromyzidae; Oriental Region, Papua New Guinea; new species.

The material examined here is from Nepal, Southern China, Taiwan, Laos, Philippines, Malaysia (North Borneo), Indonesia and Papua New Guinea, collected mainly by the entomologists of the Bishop Museum. It includes thirty-three species, of which fifteen species are described below as new to science, and two new synonyms are also established. All the type specimens of new species are deposited in the Bishop Museum, Honolulu.

1. Agromyzidae of Nepal

Only twenty-three species of the Agromyzidae have been recorded from Nepal: seven species (two new) in the genera *Melanagromyza*, *Japanagromyza*, *Cerodontha* (*Icteromyza*), *Phytoliriomyza* (= *Lemurimyza*) and *Phytomyza* were identified by Spencer (1965b) for the first time, and fifteen species (four new) in six additional genera, *Tropicomyia*, *Phytobia*, *Praspedomyza*, *Liriomyza*, *Pseudonapomyza* and *Chromatomyia*, were added to the catalog (Sasakawa, 1977) by myself (1979).

The present paper is based on thirty specimens collected by L. W. Quate in 1965. Fifteen species is represented, among which five species of *Melanagromyza*, *Cerodontha* (subgenera *Icteromyza* and *Dizygomyza*), *Metopomyza* and *Phytoliriomyza* are new to science, and seven species are recorded newly for the agromyzid fauna.

Although *Melanagromyza* is the dominant genus throughout the Oriental Region, only four species, *M. cuscatae* Hering, *metallica* (Thomson), *pubescens* Hendel and *libratifera* n. sp. described below, are known to occur in Nepal at present, and more species might have been expected. Other known species in the Agromyzinae, *Ophiomyia phaseoli* (Tryon) occurs throughout the Old World tropics, and *Tropicomyia atomella* (Malloch), *Japanagromyza tristella* (Thomson) and *delecta* Spencer are common in the Orient. The genus *Agromyza* has not hitherto been represented in Nepal.

In the Phytomyzinae, now twenty-eight species are known to occur in Nepal. The high number of species in three genera: *Phytoliriomyza*, *Chromatomyia* and *Phytomyza*, are of particular interest. Ten endemic species are present in five genera: *Cerodontha* (*Icteromyza*) *bispinulosa* n. sp. and *C. (Dizygomyza) quatei* n. sp., *Metopomyza nepalensis* n. sp., *Phytoliriomyza admirabilis* (Spencer) and

curtifistula n. sp., *Chromatomyia acinoposthia* Sasakawa and *vitricornuata* Sasak., *Phytomyza fusicarinata* Sasak., *kumatai* Sasak. and *nepalensis* Spencer. Twelve species in seven genera are distributed in the Palaearctic/Holarctic Regions: *Calycomyza artemisiae* Kaltenbach, *Cerodontha* (*Cer.*) *denticornis* (Panzer), *Liriomyza bryoniae* (Kalt.) and *congesta* (Becker), *Pseudonapomyza hispanica* Spencer, *Phytoliriomyza arctica* (Lundbeck) and *perpusilla* (Meigen), *Chromatomyia horticola* (Goureau), *milii* (Kalt.) and *nigra* (Mg.), *Phytomyza homogynae* Hendel and *vitalbae* Kalt.; and six species occur in the Oriental/Australian Regions: *Phytobia magna* (Sasak.), *Cer. (Ict.) duplicata* (Spenc.), *Praspedomyza brunneifrons* (Malloch), *Liriomyza pusilla* (Mg.), *Pseudonap. spicata* (Mall.) and *Phytoliriomyza australensis* Spenc. The genus *Metopomyza* are recorded in the Oriental Region for the first time. On the other hand, four of twelve Oriental genera, *Nemorimyza*, *Amauromyza*, *Pseudoliriomyza* and *Ptochomyza*, are not represented in Nepal.

***Melanagromyza libratifera* n. sp.** (Fig. 1)

Male. Black; ocellar triangle strongly shining; parafrontalia subshiny; mesonotum greenish shining; abdomen with a distinct metallic, somewhat reddish sheen; calypter whitish, with margin ochreous, fringe yellowish white.

Frons about one and one-third times width of eye, slightly converging ventrally; ocellar triangle large, with ventral apex more or less blunt and extending beyond level of second *ors*; *oc* two-thirds length of first *ors*; parafrontalia not projecting above eye in profile; *ors* and *ori* each two, distance between *vti* and first *ors* twice as long as that between first and second *ors*; *oh* in a dense row dorsally but in two rows below first *ori*, all reclinate; lunule higher than semicircle, almost as high as ventral width, with a median furrow on ventral two-thirds; eye with a distinct patch of white hairs on a dorsal quarter; gena narrow, rounded, nearly one-eighth height of eye at middle; third antennal segment shorter than wide, minutely pilose; arista pubescent.

Mesonotum with two *dc* and ten rows of *acr*; scutellum with apical *sc* shorter than basal *sc*. Costa extending to M_{1+2} ; *r-m* slightly beyond middle of discal cell; ultimate section of M_{3+4} about two-thirds of penultimate. Mid tibia with one or two *pd*.

Genitalia: Epandrium with 29-31 spines in three irregular rows ventrally in addition to five stout dorsal spines; cercus with a row of six anteroventral setae; hypandrium V-shaped, without basal apodeme but side pieces united broadly on a basal quarter, three-fifths length of phallapodeme (640 μ m long); phallus slightly shorter than half of phallapodeme, distiphallus distinctly darkened at middle of ventrolateral sides; ejaculatory apodeme ovoid in outline, 230 μ m long, 120 μ m in greatest width.

Length of body 2.3 mm, of wing 2.2 mm.

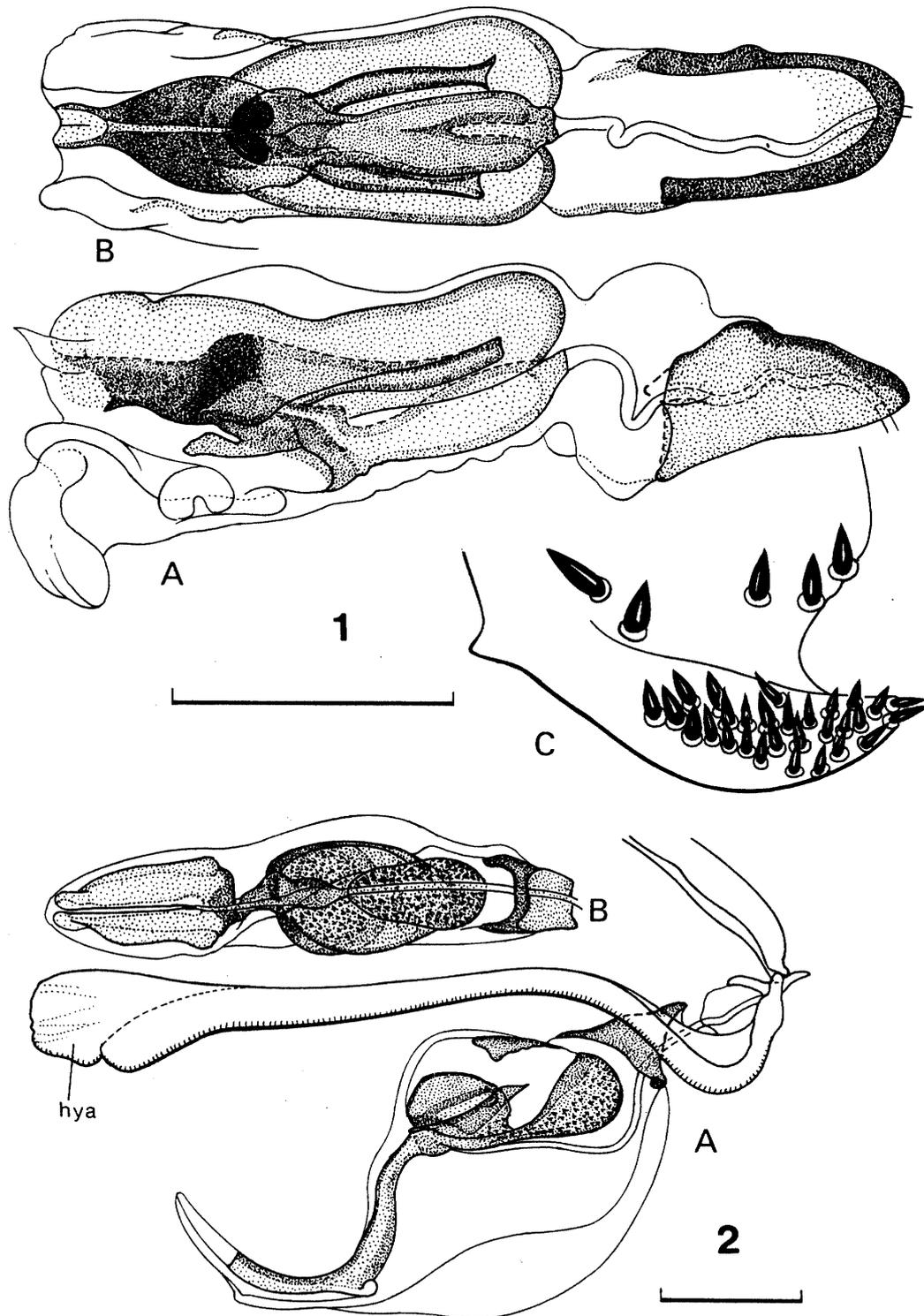
Female and host plant unknown.

Holotype male (BISHOP 15785), Pokhara (910 m), 18-27. IX. 1965, Quate; genitalia in a glycerol tubule.

Distribution. Nepal.

Remarks. This species resembles *M. cunctans* (Meigen) and *sojiae* (Zehntner) in the coloration of calypteres and size of the ocellar triangle, but is distinguishable from them by its hairy eye, greenish-shining mesonotum and densely setose surstylus. The meso- and distiphallic structures of this species show more similarity to those of European *M. albocilia* Hendel than those of the above-mentioned related species, but in *libratifera* the side-sclerites of basiphallus are quite separated distally.

Etymology. The specific name refers to the same level of both the mesophallus and distiphallus at base.



Figs. 1-2. Male genitalia of *Melanagromyza libratifera* n. sp. (1) and *M. pubescens* Hendel (2). A, phallus, lateral view ; B, phallus, ventral view ; C, surstylus, inner view ;hya, hypandrial apodeme. Scale 0.1 mm.

***Melanagromyza pubescens* Hendel (Fig. 2)**

Melanagromyza pubescens Hendel, 1923, Konowia 2: 144.

Melanagromyza luthulii Spencer, 1964, Dt. Ent. Z., N. F. 11 (1/2): 26. n. syn.

This shiny black (without metallic luster on the mesonotum and abdomen) species is recognizable by the dark fringe on the calypter, a dense row of reclinate orbital hairs, a flat vertical plane of hypandrial apodeme (about two-fifths length of phallapodeme) and a pair of semitransparent tubules of the distiphallus.

A male specimen from Nepal is small (2.5 mm in wing length), without the projection of parafrontalia, and has narrow gena (about 1/7 height of eye). Spencer (1964) described a new species, *M. luthulii*, from South Africa, by its peculiar male genitalia (Fig. 23). However, the phallic structures and the shape of hypandrium in *pubescens* and *luthulii* are quite similar to each other. Also, the characters of parafrontalia and gena given in the description of *luthulii* are not significant of the differences between them.

Specimen examined. One male, Dunche (1,950 m), 28 km N. of Trisuli (Nawakot), 7-12. XI. 1965, Quate.

Distribution. Europe; South Africa; Mongolia, Nepal. New to Nepal.

***Tropicomyia atomella* (Malloch)**

Agromyza atomella Malloch, 1914, Annales hist.-nat. Mus. Hung. **12**: 331.

Tropicomyia atomella: Spencer, 1973, 181; Sasakawa, 1979, 2.

Specimens examined. Two males, Pokhara (910 m), 18-27. IX. 1965, Quate.

Distribution. Taiwan, India, Ceylon, Nepal.

***Japanagromyza delecta* Spencer (Fig. 3)**

Japanagromyza delecta Spencer, 1962, 665.

The characteristic features of this species are the bifurcated surstyli, long V-shaped hypandrium, and white tip on the knob of halter.

Following essential characters are added to the original description: *oh* minute, in a sparse row; gena 1/11 height of eye; lunule low, 1/4 as high as ventral width; arista minutely pubescent (*not* bare); mesonotum brownish-grey dusted, subshining; abdomen shiny; phallus about 2/3 length of phallapodeme (285 μ m in length), basiphallus almost as long as phallophore, distiphallus weakly sclerotized; ejaculatory apodeme 170 μ m long, rod-like, 50 μ m in greatest width.

Nepalese male specimen is small (2.4 mm in wing length) and more densely spinose on anterior process of the surstylus (Fig. 3C).

Specimen examined. One male, Langtang Valley (2,700-3,400 m), ca. 60 km N. of Kathmandu, 13-25. X. 1965, Quate.

Distribution. Burma, Nepal. New to Nepal.

***Cerodontha (Cerodontha) denticornis* (Panzer)**

Chlorops denticornis Panzer, 1806, Faun. Insect. German. Initia, No. 104, fig. 22.

Cerodontha denticornis: Hendel, 1920, Arch. Naturgesch. A **84** (7): 169.

The larvae are the miners in the leaf-blade to leaf-sheath of the gramineous grasses.

Specimen examined. One female, Bokaihunde (2,100 m), 20 km N. of Trisuli (Nawakot), 13-17. XI. 1965, Quate.

Distribution. Europe; Nepal; Japan. New to Nepal.

***Cerodontha (Icteromyza) bispinulosa* n. sp.** (Fig. 4)

Male. Head with frons testaceous, distinctly darkened above level of anterior ocellus; parafrontalia yellow but pale brown above level of second *ors*; occiput and postgena black; lunule, face and gena yellow; antenna with first segment entirely and second segment basally (distal margin yellow) pale yellowish brown, third segment pale testaceous, brownish dorsoproximally at base of arista which is pale brown; palpus yellow. Thorax and abdomen black, greyish dusted, weakly shining. Wing with veins yellow at bases; calypter yellow, with margin and fringe pale brown; halter yellow. Legs brownish black, all knees distinctly yellow (distal one-third to one-fourth of femora in length).

Frons nearly one and a half times width of eye; parafrontalia not projecting above eye in profile; *ors* two, reclinate; *ori* two, incurved, second short; *oh* minute, reclinate, in a sparse row; lunule scarcely higher than semicircle; eye bare; gena one-sixth height of eye; antennae narrowly separated at bases, third segment small, slightly shorter than broad, minutely pilose; arista as long as eye height, pubescent.

Mesonotum with 1 + 3 *dc* and four rows of *acr*. Costa extending to M_{1+2} in proportion of sections 2-4 as 30 : 10 : 8; r-m slightly before middle of discal cell; ultimate section of M_{1+2} about four times as long as penultimate; ultimate section of M_{3+4} slightly longer than penultimate (16 : 14).

Genitalia: Epandrium with two spinules on each posteroventral corner; cercus high, about three-fourths height of epandrium; surstylus small, with ten to thirteen short or long setae; processus longus with a minute serration apically; hypandrium with side piece narrow, a little less than half of phallapodeme; phallus five-sixths length of phallapodeme, basiphallus short, distal tubules of distiphallus distinctly curved at bases; ejaculatory apodeme 140 μ m long, 95 μ m wide.

Length of body 1.4 mm, of wing 1.5 mm.

Female and host plant unknown.

Holotype male (BISHOP 15786), Pokhara (910 m), 18-27. IX. 1965, Quate; genitalia in a glycerol tubule.

Distribution. Nepal.

Remarks. This is the second *Icteromyza*-species of genus *Cerodontha* from Nepal. The new species is small and provided with the phallus typical in structures, but may be easily distinguished from Oriental *C. duplicata* (Spencer) and *floresensis* (Spencer) by its pale parafrontalia and antennal segments, the absence of projection of parafrontalia in profile, and the presence of two spinules on each posteroventral corner of the epandrium, and also from the Holarctic *churchillensis* Spencer by its small size, pale third antennal segment and long tubules of the distiphallus.

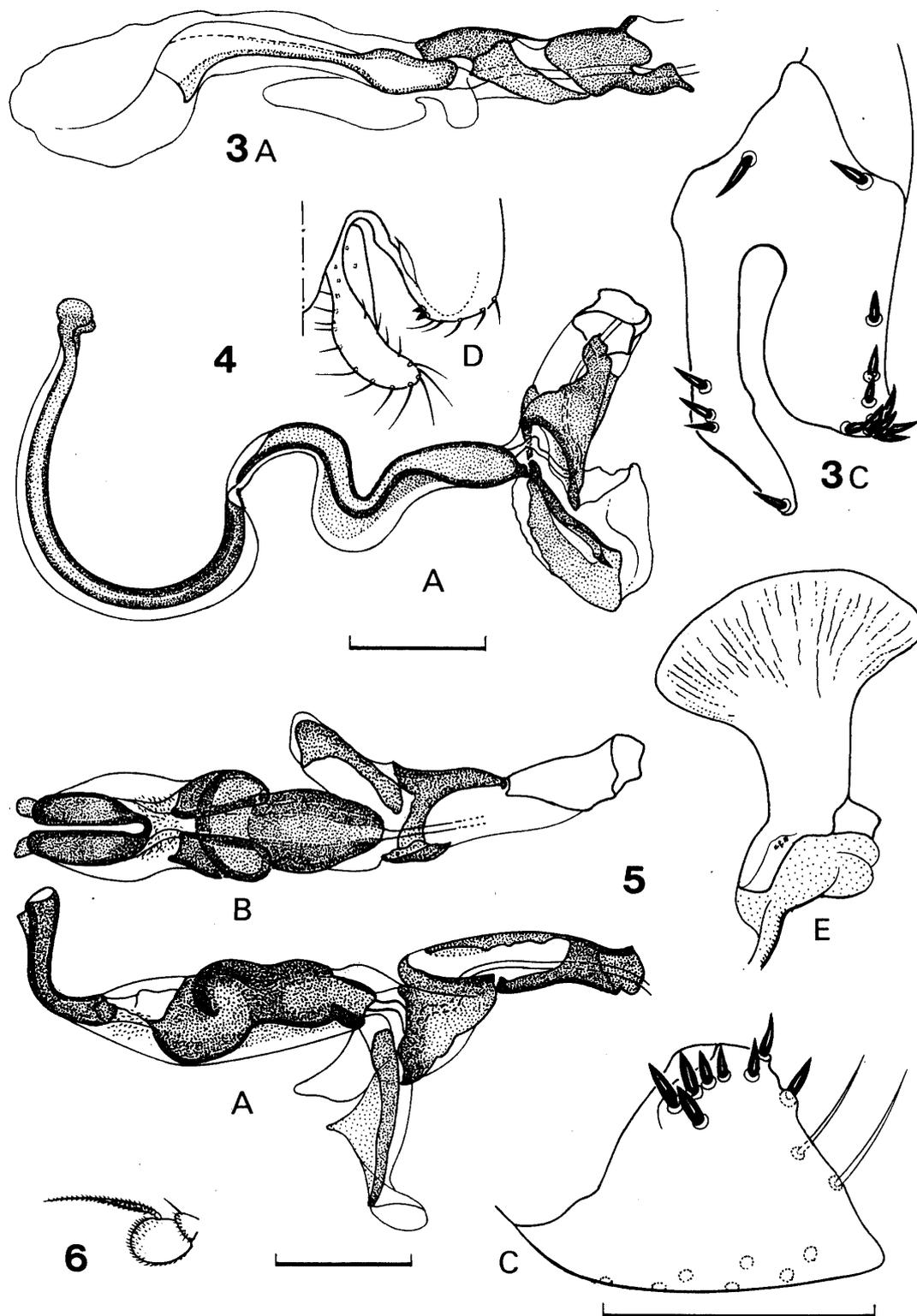
Etymology. The specific name refers to the character of bispinulose epandrium.

***Cerodontha (Dizygomiza) quatei* n. sp.** (Figs. 5 & 6)

Male. Black; frontalia dark brown; parafrontalia, lunule and gena brown; parafrontalia and lunule weakly shining; antenna and palpus black; thorax densely pollinose, mesonotum weakly shining, dorsal margin of mesopleuron yellow; veins yellow at bases; calypter yellow, with margin and fringe pale brown; only fore knee testaceous yellow; abdomen shiny, T1-2 and 6 with posterior margins yellow linearly.

Frons broad, about two and two-thirds times width of eye; parafrontalia about one-fifth width of frons, distinctly projecting above eye from level of first *ori* to that of antennal base but not so on dorsal side; parafacialia linearly projecting beyond eye; *ors* and *ori* each two; *oh* minute, in a sparse row; lunule lower than semicircle, about one-third as high as ventral width, dorsally not reaching

level of second *ors*; gena about one-fourth height of eye, broadened posteriorly; third antennal segment one and a half times as wide as genal height, longer than wide, distinctly pilose; arista about twice as long as third segment, distinctly thickened in basal half, pubescent microscopically.



Figs. 3-5. Male genitalia of *Japanagromyza delecta* Spencer (3A, C), *Cerodontha (Icteromyza) bispinulosa* n. sp. (4A, D) and *C. (Dizygomyza) quatei* n. sp. (5A-C & E). D, epandrium and cercus, inner view; E, ejaculatory apodeme. Fig. 6. Male antenna of *C. (Diz.) quatei* n. sp.

See Figs. 1-2; only 5C differs from other figs. in scale.

Mesonotum with 1 + 3 *dc*, four rows of *acr*, three rows of *ia*-setulae and short *prsc* (about 1/4 length of fourth *dc*). Wing with r-m before middle of discal cell; ultimate section of M_{1+2} nearly two and a half times length of penultimate; ultimate section of M_{3+4} about three-fourths of penultimate. Mid tibia with one *pd*.

Genitalia: Epandrium with surstylus triangular in inner side, bearing seven or eight spines on tip; cercus less than half as high as epandrium and with a long seta (about 3/4 as long as height of cercus) ventrally; paraphallus absent; mesophallus almost thrice as long as wide but globular at distal end; distiphallus short, somewhat L-shaped in lateral view and each tubule without distal trumpet; ejaculatory apodeme spatulate, 200 μ m in length or broadest width.

Length of body 2.0 mm, of wing 2.6 mm.

Female and host plant unknown.

Holotype male (BISHOP 15787), Dunche (1,950m), 28 km N. of Trisuli (Nawakot), 7-12. XI. 1965, Quate; genitalia in a glycerol tubule.

Distribution. Nepal.

Remarks. This species is somewhat similar to the species of *crassiseta*-group in the projection of parafrontalia in profile, large third antennal segment and absence of the paraphallus, but is distinctly characteristic in the following points: arista thickened in basal half (as in *bulbiseta* Hendel), third antennal segment longer than broad (as in *crassiseta* Strobl), mesophallus about thrice as long as high (as in *elbergi* Nowakowski), and distiphallus L-shaped and without distal trumpet. This species differs also from Indian *flavohalterata* Ipe in the thickness of arista, the relative length of vein M_{3+4} sections and the shape of distiphallus. Moreover, this species resembles *C. vietnamensis* Sasakawa in the shape of distiphallus, wing venation and number of the mid-tibial *pd* bristles, but shows the following definite points: the gena is broad, the arista is thickened in basal half, the acrostichals are arranged in four rows, the surstylus is spinose sparsely, and the phallus is not provided with the paraphallus and spinules.

Etymology. I have pleasure in naming the species after Dr. L. W. Quate, who has collected the interesting agromyzids in Nepal.

Liriomyza bryoniae (Kaltenbach)

Agromyza bryoniae Kaltenbach, 1858, Verh. naturh. Ver. preuss. Rheinl. **15**: 158.

This is a polyphagous leaf miner of economic importance on tomato, melon, lettuce, etc.

Specimen examined. Male, Syabrubens (1,450 m), 35 km N. of Trisuli (Nawakot), 30.X. - 5. XI.1965, Quate.

Distribution. Europe, Russia, Ukraine, Caucasus; Nepal, Japan. New to Nepal.

Metopomyza nepalensis n. sp. (Fig. 7)

Male. Head with frontalia lemon-yellow but pale testaceous on ventral third part semicircularly along dorsal margin of lunule; parafrontalia shiny black; lunule, gena, parafacialia and postgena dark brown; occiput black; antenna with first and second segments black, third segment yellow but testaceous at base, arista brown; palpus black. Thorax and abdomen shiny black; mesonotum very sparsely pollinose, with lateral sides brown tinged; scutellum yellow, with black lateral triangles; basal *sc* on black area and apical *sc* on yellow. Wing hyaline, veins pale yellow at bases; calypter whitish, with fringe pale brown; halter yellow. Legs black, fore knee very narrowly and indistinctly yellowish brown.

Frons twice as wide as width of eye, converging ventrally; parafrontalia broad, a fourth as wide

as frons, parallel-sided, projecting linearly above eye in profile; *ors* and *ori* each two, reclinate excepting incurved second *ori*; *oh* in a sparse row; lunule small; gena nearly a fourth of eye height; third antennal segment bluntly angulated at dorsoapical corner, rounded below; arista minutely pubescent.

Mesonotum with 1 + 3 *dc* and four rows of *acr*. Wing with costa extending to M_{1+2} ; r-m at middle of discal cell which is large; ultimate section of M_{1+2} five times length of penultimate; ultimate section of M_{3+4} about one and four-fifths times length of penultimate. Hind femur without scraper for stridulation on inner side, only with a row of four setae distally.

Genitalia: Epandrium with nineteen or twenty spines in five irregular rows ventrally; surstylus with four spines and five to seven setae along distal margin; hypandrium with side piece narrow, slightly longer than half of phallapodeme; phallus about half of phallapodeme ($44 \mu\text{m}$) in length (phallophore $1/5$ of phallic length); basiphallus narrow; ventral processes long, slightly shorter than basiphallic sclerite; mesophallus weakly sclerotized, distal tubules of distiphallus also weakly sclerotized; ejaculatory apodeme about $100 \mu\text{m}$ long, $75 \mu\text{m}$ in greatest width.

Length of body 1.5 mm, of wing 1.3 mm.

Female and host plant unknown.

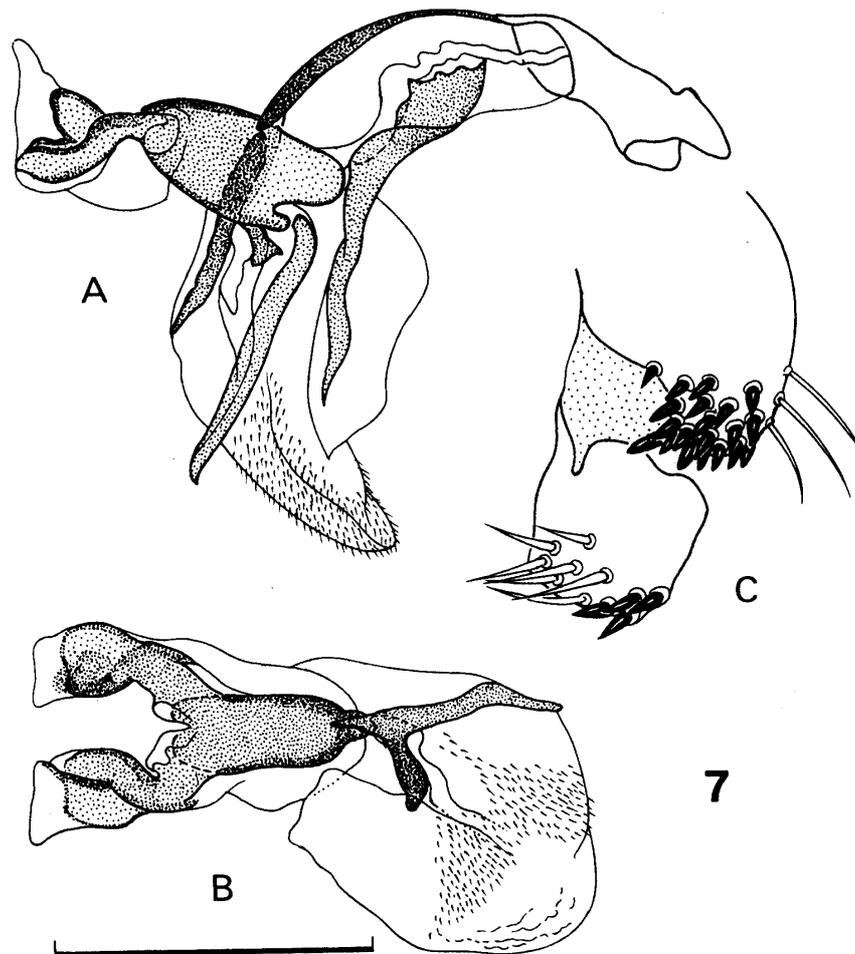


Fig. 7. Male genitalia of *Metopomyza nepalensis* n. sp. See Figs. 1-2.

Holotype male (BISHOP 15788), Bokaihunde (2,100 m), 20 km N. of Trisuli (Nawakot), 13-17.XI.1965, Quate; genitalia in a glycerol tubule.

Distribution. Nepal.

Remarks. This is the first record of the distribution of the genus *Metopomyza* in the Oriental Region. The species is characterized by the bicolored frons (yellow frontalia and black parafrontalia), dark lateral sides of mesonotum with 1 + 3 dorsocentrals, bluntly angulated dorsoapical corner of the third antennal segment, large discal cell, spinose and setose surstylus and weakly sclerotized distiphallus. It is similar to European *M. xanthaspida* (Hendel) in having the large discal cell and apically membranous tubules of the distiphallus, but it belongs to the different *xanthaspis*-group with the dark knees of legs.

***Pseudonapomyza hispanica* Spencer (Fig. 8)**

Pseudonapomyza hispanica Spencer, 1973, 270.

This species is known as a leaf miner of *Sorghum halepense* (L.) Pers. in Israel. It will be re-described in detail.

Male. Black; frons, gena and antenna brown-tinged; thorax and abdomen grey dusted, weakly shining; wing hyaline, calypter whitish and with fringe white; halter yellow but stalk brownish yellow; legs entirely yellow.

Frons almost one and a half times width of eye, almost parallel-sided; parafrontalia not projecting above eye in profile; *ors* and *ori* each two; *oh* minute, reclinate, in a sparse row; lunule pruinose, semicircular; gena one-sixth height of eye; third antennal segment distinctly projected dorsoapically, with rather long pile; arista shorter than eye height (12 : 15), microscopically pubescent (appearing bare).

Mesonotum with 0 + 3 *dc*, four rows of *acr* and six setulae in *ia*-row. Wing 1.5 mm long (up to 1.7 mm in original description); costa extending to R_{4+5} , with sections in proportion of 21 : 9 : 16.

Genitalia: Surstylus densely setulose; hypandrium with side piece narrow, a little more than half length of phallapodeme (50 μ m); phallus two-thirds of phallapodeme in length, spinulose on proximal ventral membrane, mesophallus short, ventral processes very short, distiphallus with ventral lobe minutely spinulose internally; ejaculatory apodeme 195 μ m long, with stem broad, 150 μ m in greatest width.

Specimen examined. Male, Syabrubens (1,450 m), 35 km N. of Trisuli (Nawakot), 30.X.-5. XI.1965, Quate.

Distribution. Spain, Israel, Nepal. New to Nepal.

***Phytoliriomyza arctica* (Lundbeck)**

Agromyza arctica Lundbeck, 1900, Vidensk. Meddr dansk naturh. Foren. **5**: 304.

Phytoliriomyza arctica: Shewell, 1953, Can. Ent. **85**: 469.

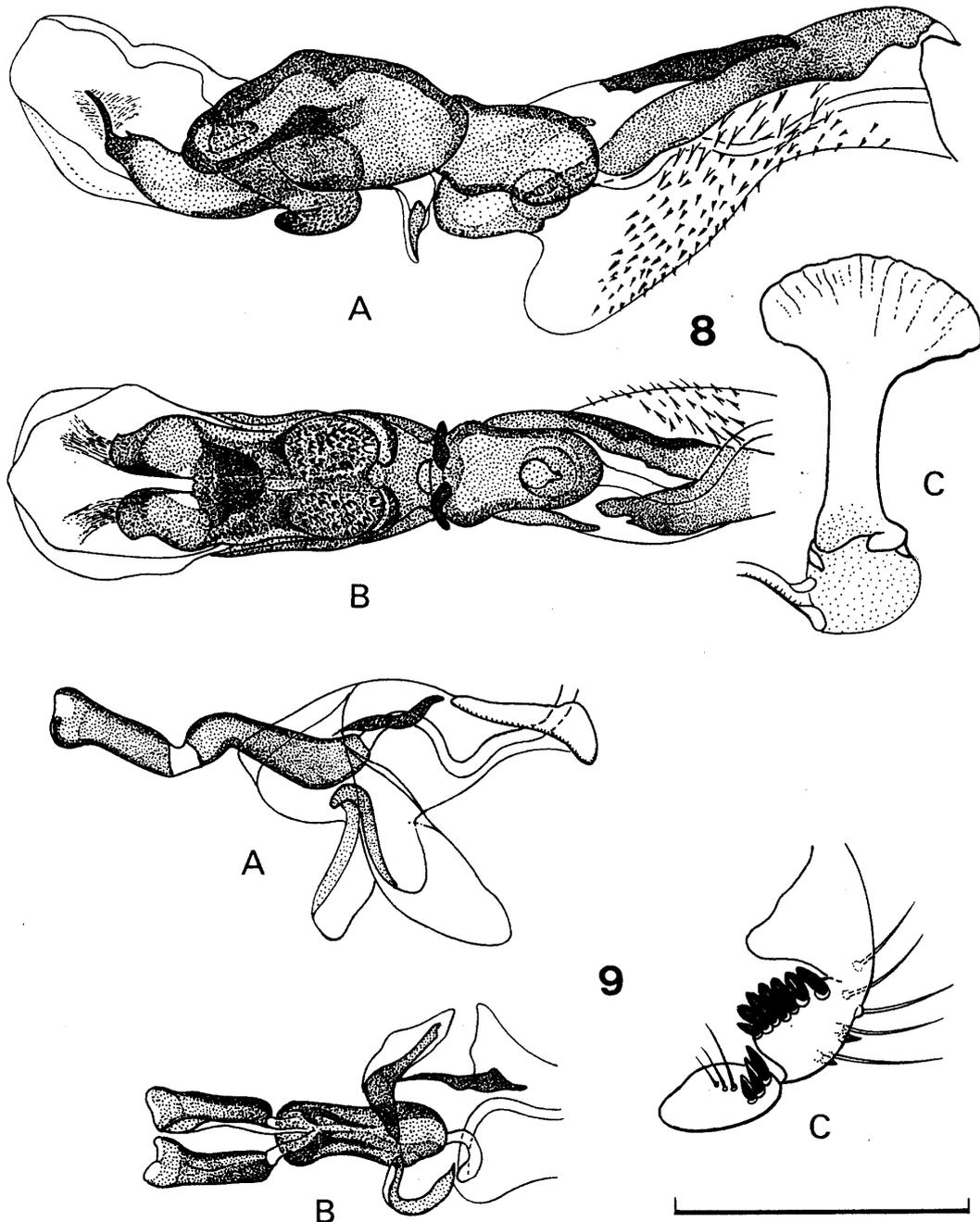
The distinctive characters of this species are the proclinate orbital hairs, the yellow third antennal segment with brown area on the outer base, and the short ultimate section of M_{3+4} (ca. 1.5 times as long as the penultimate). The larvae are known as the stem miner of the Lactuceae.

Specimens examined. Four females, Pokbara (910 m), 18-27. IX. 1965, Quate; 2 males, 1 female, Langtang Valley (2,700-3,400 m), ca. 60km N. of Kathmandu, 13-25. X. 1965, Quate; 1 male, Syabrubens (1,450 m), 35km N. of Trisuli (Nawakot), 30.X.-5. XI. 1965, Quate.

Distribution. Europe; Canada, U. S. A., Brazil, Chile; Nepal; Ceylon; Taiwan.

Phytoliriomyza curtifistula n. sp. (Fig. 9)

Male. Head yellow but frontalia testaceous, ocellar triangle yellowish brown; occiput blackish brown, but not extending to vertex and postorbis; antenna with first and second segments yellow, third segment brown, arista pale brown; palpus yellow. Thorax with mesonotum shiny dark brown except for yellow lateral sides, sparsely pollinose; humerus yellow, with a brown spot; pleura yellow, sternopleuron and hypopleuron each with small pale brown triangle; scutellum yellow,



Figs. 8-9. Male genitalia of *Pseudonapomyza hispanica* Spencer (8A-C) and *Phytoliriomyza curtifistula* n. sp. (9A-C).

slightly brownish on anterolateral sides; abdomen subshiny, dark brown; wing hyaline, calypter yellowish, with margin pale brown and fringe pale brownish yellow; halter yellow; legs yellow, dorsodistal 1/3-1/4 of all tibiae and tarsi entirely tinged with brown.

Frons twice width of eye; parafrontalia slightly projecting above eye margin at level of antennal base in profile; *ors* two, reclinate; *ori* one, incurved; *oh* minute, sparse and erect; gena about one-fifth height of eye; antenna of normal shape.

Mesonotum with 1+3 *dc* (detectable by pits), two sparse rows of *acr*. Wing with costa extending to M_{1+2} , in proportion of sections as 5 : 2 : 1.5 ; r-m at middle of discal cell; ultimate section of M_{3+4} slightly longer than the penultimate (5 : 4).

Genitalia: Epanthrium with two spinules at posteroventral margin and a comb of six or seven long spines on inner part above surstylus which is ovoid in outline and provided with three spines and several setae; hypandrium with side piece very narrow, nearly three-fifths length of phallopodeme (36 μm); phallus about half length of phallopodeme, basiphallus very short, mesophallus longest, distiphallus consists of a pair of short tubules; ejaculatory apodeme broad at base, as long as broadest width, 20 μm long.

Length of body and wing 0.9 mm, respectively.

Female. Similar to male, but abdomen shiny brown and distinctly blackened posteriorly; length of wing 1.1 mm.

Host plant unknown.

Holotype male (BISHOP 15789), Pokhara (910 m), 18-27. IX. 1965, Quate. Paratypes: two males, one female, same data as holotype.

Distribution. Nepal.

Remarks. The color of head including antennae and the shape of distiphallus of this species show the similarity to European *P. miki* (Strobl), but the color of thorax, the length of wing and the shape of surstylus are quite different from each other. The known Nepalese species, *P. admirabilis* (Spencer) has the black halteres; *P. australensis* Spencer has the entirely yellow antennae, long ultimate section of M_{3+4} , and a long and membranous tube of the distiphallus.

Etymology. The specific name refers to the character of distiphallus tubules.

Chromatomyia horticola (Goureau)

Phytomyza horticola Goureau, 1851, Ann. Soc. ent. Fr. **9**: 148.

Chromatomyia horticola: Sasakawa, 1979, 4.

Specimen examined. One male, Langtang Valley, ca. 60 km N. of Kathmandu, 13-25. X. 1965, Quate.

Distribution. Palearctic; Taiwan, Thailand, India, Nepal.

Chromatomyia nigra (Meigen)

Phytomyza nigra Meigen, 1830, Syst. Besch. bekann. europ. zweifl. Insekt. **6**: 191.

Chromatomyia nigra: Griffiths, 1974, Quaest. ent. **10**: 40.

This is a leaf miner of the Gramineae (many genera).

Specimen examined. One female, Dunche (1,950 m), 28 km N. of Trisuli (Nawakot), 7-12. XI. 1965, Quate.

Distribution. Europe; India, Nepal, Taiwan; Japan; Canada, U. S. A. New to Nepal.

***Phytomyza vitalbae* Kaltenbach**

Phytomyza vitalbae Kaltenbach, 1874, Pflanz. Feinde, p. 4.

This is a leaf miner of *Clematis* spp. in Europe (Spencer, 1976) and Taiwan (Sasakawa, 1972).

Specimens examined. One male, Langtang Valley, ca. 60 km N. of Kathmandu, 13-25. X. 1965, Quate; one male, two females, Dunche, 28 km N. of Trisuli (Nawakot), 7-12. XI. 1965, Quate.

Distribution. Palaearctic; Taiwan, Nepal; S. Africa. New to Nepal.

***Phytomyza* sp.**

A female specimen may be identical with *P. nigroorbitalis* Ryden (1956), known from Sweden, in the general coloration and external structures, except for short dark stripe of parafrontalia (from vertical angle to level of first *ors*). Confirmation of its exact status should be awaited until the male genitalia can be examined.

Specimen examined. One female, Langtang Valley, ca. 60 km N. of Kathmandu, 13-25. X. 1965, Quate.

2. Species of the genus *Phytobia*

Eleven species of *Phytobia* have hitherto been known in the Oriental Region and six species have been recorded from Papua New Guinea. Although the larvae of this genus are known as the pith fleck causers, there is no information on their host plants.

A key is provided to the twenty-two species, including seven new species, found in the Region. In the key, two Indian species, *Phytobia grandissima* Singh and Ipe (1973 ; Assam) and *P. ipeii* Singh and Tandon (1966 ; Kerala), were not included, because some characters, such as the chaetation of fore and mid tibiae, wing length, etc., were not noted in the original descriptions. However, it seems likely that *grandissima* is somewhat related to *nigrita* (Malloch, 1914 ; Taiwan, Philippines, Java) in having the narrow frons, but differs from it in the size of lunule and a proportional ratio of M_{3+4} section; *ipeii* is closely related to *propincua* Sasakawa (1963 ; Viet Nam) in the presence of prescutellar bristles and in having the short ultimate section of M_{3+4} , but is recognized by the broad gena and sparse rows of acrostichal setae.

Key to the Oriental species of *Phytobia* (incl. Papua New Guinea)

1. Mesonotum and scutellum entirely black, greyish pollinose and moderately shining or matt, with lateral side (humerus to notopleuron) rarely brownish 2
 Mesonotum largely black, with lateral sides and posterolateral corners yellow; scutellum largely yellow .. 20
2. Large species, with wing length 6.5 mm (Burma) *gigas* Spencer
 Smaller species, less than 4.5 mm in wing length 3
3. Ultimate section of vein M_{3+4} subequal to one and a half times length of penultimate 4
 Ultimate section of M_{3+4} three times length of penultimate (Java) *albohalterata* (de Meijere)
4. Fore tibia with an external bristle at middle 5
 For tibia without external bristle 7
5. Mid tibia with one posterodorsal bristle; frons one and a half times as wide as eye; gena one-eighth of eye height 6
 Mid tibia with three posterodorsals; frons one and two-thirds times width of eye; gena one-tenth of eye height (Borneo, Philippines) *seticopia* (Sasakawa)

6. Wing 2.6 mm long; ultimate section of M_{3+4} subequal to the penultimate; mesonotum with six rows of acrostichal setae (China) *alocomentula* n. sp.
 Wing 3.2 mm long; ultimate section of M_{3+4} one and a half times length of penultimate; acrostichals in eight rows (Papua New Guinea) *prolata* (Sasakawa)
7. Wing fuscous (Papua New Guinea) *fusca* n. sp.
 Wing clearly hyaline or slightly brown tinged 8
8. Large species, with wing length 3.8-4.4 mm; gena one-fifth to one-eighth height of eye (Taiwan, Papua New Guinea, Nepal) *magna* (Sasakawa)
 Smaller species, wing length 1.9-3.7 mm; gena narrower, less than one-ninth of eye height 9
9. Parafrontalia and parafacialia, or only parafrontalia projecting above eye margin in profile 10
 Parafrontalia not projecting above eye 11
10. Mesonotum with prescutellar bristles; gena one-fifteenth height of eye; ultimate section of M_{3+4} a little shorter than the penultimate (Viet Nam) *propincua* (Sasakawa)
 Mesonotum without prescutellars; gena one-ninth height of eye; ultimate section of M_{3+4} one and a half times length of penultimate (Papua New Guinea, New Britain) *furcata* (Sasakawa)
11. Mesonotum with six to eight rows of acrostichal setae 12
 Mesonotum with ten rows of acrostichals 18
12. Distiphallus without additional processes 13
 Distiphallus with additional processes before end 15
13. Wing 2.8 - 3.2 mm in length; gena one-eleventh to one-twelfth height of eye; phallic ventral process shorter than distiphallus 14
 Wing 2.2 mm long; gena one-eighteenth to twentieth height of eye; phallus with extremely long tubular ventral process (Malaya) *longipes* Sasakawa
14. Distiphallus with basal globular part shorter than distal tubules (Thailand, Papua New Guinea)
 *maai* (Spencer)
 Distiphallus with globular part longer than tubules (Taiwan, Philippines, Java) *nigrita* (Malloch)
15. Gena one-tenth height of eye; distiphallus merely tubular, with a pair of lobate processes before ventral end (Philippines) *luzonensis* n. sp.
 Gena one-twelfth to one-eighteenth height of eye; distiphallus consists of a pair of tubules 16
16. Distiphallus with processes on dorsal or lateral sides of tubules 17
 Distiphallus with a shield-like process on ventromesal part of tubules (Borneo) *clypeolata* n. sp.
17. Distiphallus with a pair of hooky processes (Papua New Guinea) *inusitata* Spencer
 Distiphallus with a pair of spiriferous processes (Papua New Guinea, Philippines) ... *hirticula* (Sasakawa)
18. Parafrontalia distinctly and parafacialia linearly projecting above eye margin in profile; r-m distinctly beyond middle of discal cell (Papua New Guinea) *terminalis* (Sasakawa)
 Parafrontalia and parafacialia not projecting above eye; r-m almost at middle of discal cell 19
19. Wing 2.7 mm in length; head largely black; phallus with a long and curved ventral process and a single, weakly sclerotized tube of distiphallus (Celebes) *pansa* n. sp.
 Wing 3.5 mm long; head largely brown; phallus with a slender ventral process; distiphallus with bushy processes before both ventrolateral ends of tubules (Papua New Guinea) *frutescens* n. sp.
20. Head and antennae entirely black 21
 Head with lunule and face yellow, gena and antennae testaceous; inner post-alar bristle present (Laos).....
 *subdiversata* n. sp.
21. Scutellum black, slightly yellowish between apical scutellar bristles (Papua New Guinea)
 *millerae* Spencer
 Scutellum entirely yellow (Taiwan) *diversata* Spencer

***Phytobia alocomentula* n. sp.** (Fig. 10)

Male. Black; lunule pale brown, pruinose; gena and antenna slightly tinged with brown, arista brown; parafrontalia weakly shining; mesonotum densely brownish grey dusted, weakly shining; thoracic pleura subshiny; wing hyaline, calypter brownish white, with margin and fringe brownish black; halter with stalk brown and knob yellow; abdomen shiny; epandrium brown.

Frons one and a half times width of eye, slightly converging ventrally; parafrontalia not projecting above eye in profile; *ors* two, *ori* two; *oh* in a row; lunule slightly lower than semicircle; gena one-eighth height of eye; third antennal segment slightly shorter than broad, with minute pile; arista slightly shorter than eye height, microscopically pubescent.

Mesonotum with 1 + 3 *dc*, six rows of *acr*, *prsc* distinctly longer than inner *pa*; sternopleuron with four setae and several setulae before *stpl*. Wing with costa extending to M_{1+2} in proportion of sections 2-4 as 38 : 10 : 9; r-m at or slightly beyond middle of discal cell; ultimate section of M_{1+2} nearly four times length of penultimate; ultimate section of M_{3+4} subequal to the penultimate (19-21: 20). Fore tibia with an external bristle, mid tibia with one *pd*.

Genitalia: Surstylus about half height of epandrium, with ventral part incurved in a form of labrum and bearing about thirty setae; hypandrium approximately one-third length of phallapodeme, praegonite with two setae and several sensory hairs, postgonite very sparsely hairy on dorsobasal part; phallapodeme long (103 μm); phallus almost as long as hypandrium, basiphallus narrow but bifurcated at end, distiphallus with paired distal lobes not separated entirely and distinctly striated on outer membranous part; ejaculatory apodeme 235 μm long, 180 μm in greatest width.

Length of body 2.7 mm, of wing 2.6 mm.

Female and host plant unknown.

Holotype male (BISHOP 15775), Bohea Hills, Chung An, Fujian (Fukien) Prov., S. China, 28.IV.1940, T. C. Maa; genitalia in a glycerol tubule.

Distribution. China.

Remarks. This species is similar to *P. prolata* (Sasakawa) and *seticopia* (Sasak.) in having an external bristle at middle of the fore tibia, but differs from them in the presence of a striation on the distal membranous part of distiphallus. In this specific feature the new species shows the similarity to *P. gigas* Spencer, but it is much smaller than *gigas* in the wing length and is provided with the united lobes of distiphallus. The distiphallus of *seticopia* is composed of a pair of typical tubules.

Etymology. The specific name refers to the striated distiphallus of male genitalia.

***Phytobia clypeolata* n. sp.** (Fig. 11)

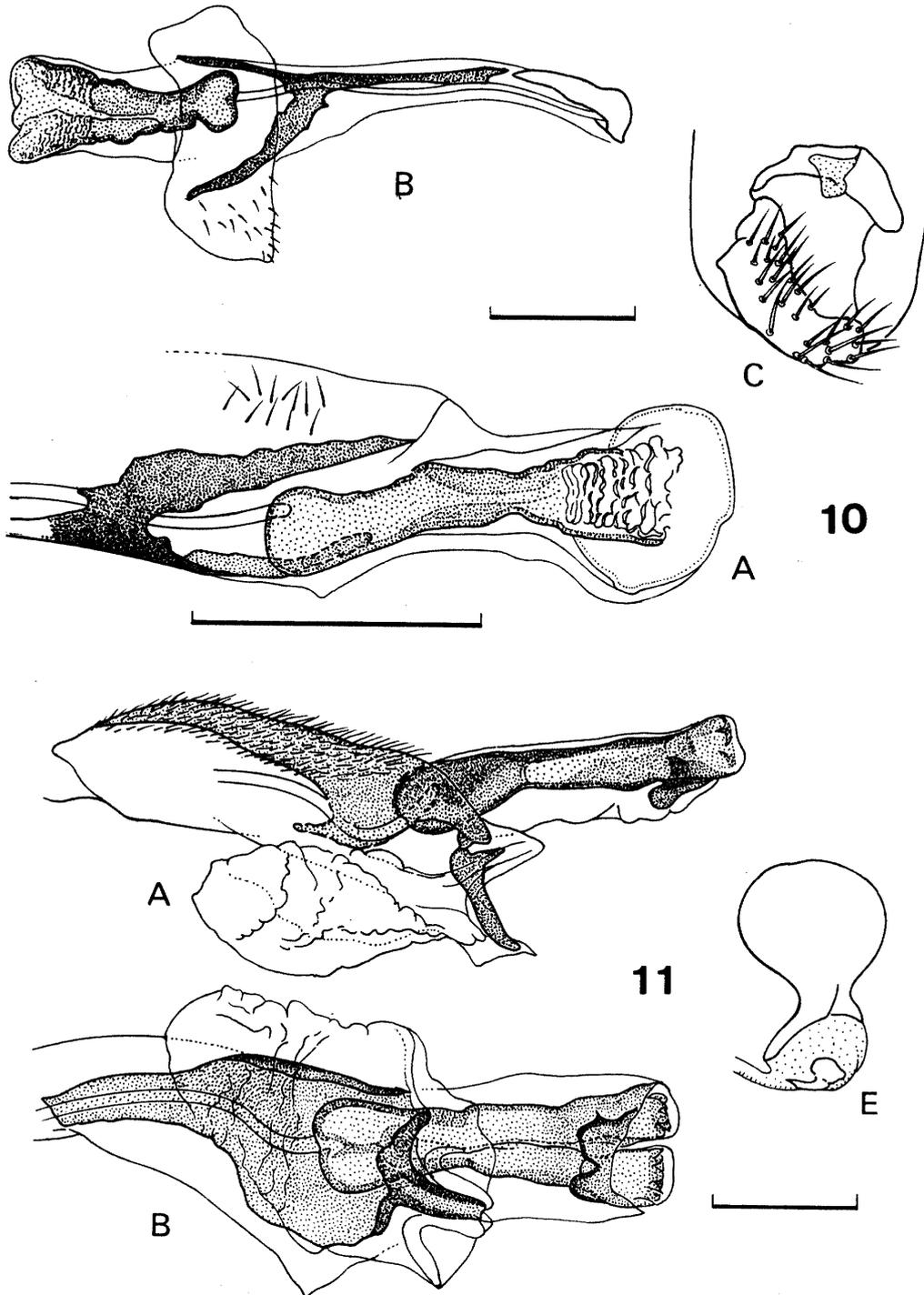
Male. Black; frons greyish pollinose; parafrontalia weakly shining; lunule pale testaceous, silvery pruinose; face, parafacialia and gena brown; antenna brown, third segment sometimes darkened on dorsal side; palpus black; thorax densely grey dusted, mesonotum very weakly shining; posterior corner of humerus narrowly brownish; wing hyaline, with veins brownish yellow at bases; calypter grey, with margin and fringe black; halter yellow; abdomen shiny, epandrium brown.

Frons about one and a half times width of eye; parafrontalia not or linearly projecting above eye in profile; *ors* and *ori* each two; *oh* in a dense row; lunule distinctly lower than semicircle, almost one-seventh height of frons; gena narrow, one-twelfth to one-fifteenth height of eye; antennae separated by a distinct carina at bases, third segment rounded, with short pile; arista shorter than eye height, microscopically pubescent.

Mesonotum with 1 + 3 *dc*, eight rows of *acr*, *ipa* more than half of *opa* in length, *ia* shorter than *ipa*, *prsc* detectable by sockets. Wing with costa extending to M_{1+2} and costal sections in proportion of 39 : 10 : 9; r-m almost at middle of discal cell; ultimate section of M_{1+2} about 4.6 times length of

penultimate; ultimate section of M_{3+4} subequal to the penultimate. Mid tibia with two *pd*.

Genitalia: Surstylus with an anterior projection which is as high as surstylus, bearing about ten stout and ten slender setae along ventral margin; cercus with a long ventral seta (3/5 as long as



Figs. 10-11. Male genitalia of *Phytobia alocomentula* n. sp. (10A-C) and *P. clypeolata* n. sp. (11A, B & E). See Figs. 1-6.

height of cercus); hypandrium with side piece narrow, about half length of phallapodeme (82 μm in length); praegonite with one seta and several setulae; postgonite with a few sensory setulae and several sensory pores; phallus a little longer than hypandrium, hairy on dorsal side of basiphallic membrane; distiphallus slightly longer than mesophallus and with a shield-like process, when viewed from the behind, on ventral side before end of tubules; ejaculatory apodeme with stem short, 235 μm long, 210 μm broad.

Length of body 2.6 (holotype) - 3.2 mm, of wing 2.8 (holotype) - 3.3 mm.

Female and host plant unknown.

Holotype male (BISHOP 15776), Sungei Menjuau, nr. Sungei Tekalit, Sarawak, N. Borneo, VIII-IX. 1971, K. J. Frogner; most of the bristles missing. Paratype male, same data as holotype; genitalia in a glycerol tubule.

Distribution. Borneo (Sarawak).

Remarks. This species is easily recognizable by the low lunule, narrow gena and the presence of an additional ventral process on the tubules of distiphallus which is extremely different from the processes of *P. hirticula* (Sasakawa), *inuitata* Spencer and *luzonensis* n. sp. in the shape.

Etymology. The specific name refers to the character of distiphallic process which is a small shield in the form.

***Phytobia frutescens* n. sp.** (Fig. 12)

Male. Black, but frons, lunule, face and gena brown; antennal grooves darkened, first and second antennal segments brown; palpus black; thorax sparsely pollinose, subshining; humerus to notopleural area slightly brown tinged; abdomen strongly shiny; epandrium testaceous. Wing hyaline; calypter whitish grey, with margin and fringe black; halter yellow but stalk pale brown basally.

Frons one and a half times width of eye, slightly converging ventrally; parafrontalia not projecting above eye in profile; *ors* and *ori* each two; *oh* minute, in a row; lunule semicircular; gena narrow, one-eleventh height of eye (third antennal segment and arista missing).

Mesonotum with 1 + 3 *dc*, first and second *dc* only a little longer than half length of the fourth; *acr* in ten rows; *prsc* slightly longer than first *dc*. Costa extending to M_{1+2} , with sections in proportion of 33 : 10 : 8 ; r-m at middle of discal cell; ultimate section of M_{1+2} two and four-fifths times length of penultimate; ultimate section of M_{3+4} five-eighths of the penultimate. Mid tibia with two *pd*.

Genitalia: Surstylus subtriangular, incurved, bearing eight or nine rows of about fifty setae (distal setae black and twice or more length of the basal ones); hypandrium less than half of phallapodeme in length; phallus as long as hypandrium, basiphallus longest, ventral process slender; distiphallus separated into two tubules on dorsodistal half and with a pair of bushy fan-like processes before ventrolateral end; ejaculatory apodeme large, 425 μm long, 300 μm in greatest width.

Length of body 3.3 mm, of wing 3.5 mm.

Female and host plant unknown.

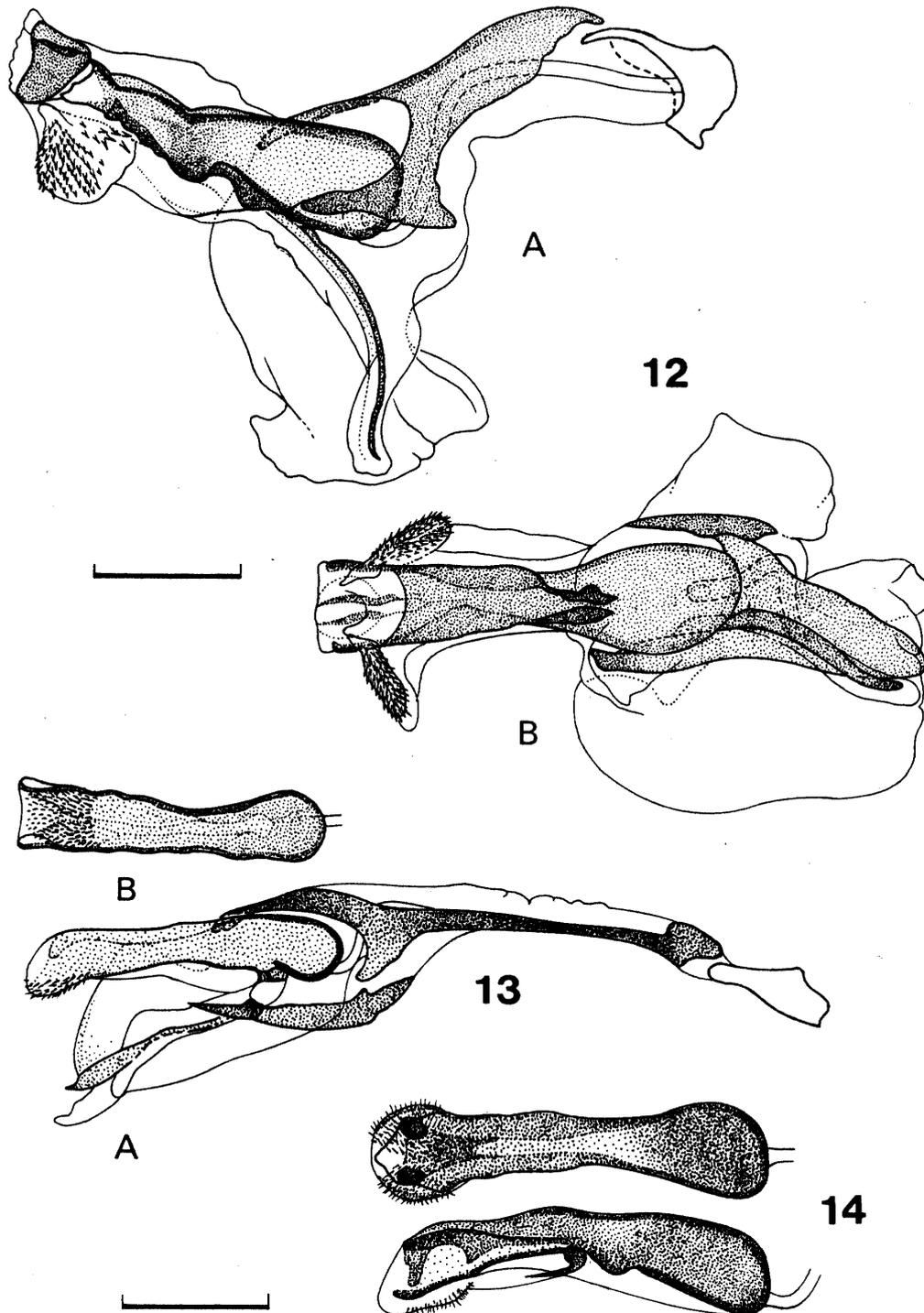
Holotype male (BISHOP 15777), Wau (1,200 m), Morobe Distr., New Guinea (NE), 15.VII.1961, J. & M. Sedlacek, by Malaise trap; genitalia in a glycerol tubule.

Distribution. Papua New Guinea.

Remarks. In general appearance this species is closely related to *P. terminalis* (Sasakawa) and *pansa* n. sp., but differs distinctly from the former in the absence of projection of both parafrontalia and parafacialia above eye margin in profile, and from the latter in the presence of bushy ventral processes on the distiphallus of male genitalia.

***Phytobia fusca* n. sp.** (Figs. 13 & 14)

Male. Black; parafrontalia weakly shining; lunule brown, pruinose; antenna brown or faintly brown-tinged, arista dark brown; thorax densely brownish grey pollinose; mesonotum mat or weakly shining; abdomen shiny except for pollinose T1-2; epandrium brown tinged; cercus brown but blackish ventrally; wing tinged distinctly or faintly with brown; calypter brownish grey, with margin and fringe black; halter with stalk brown, knob yellow; legs tinged with brown.



Figs. 12-14. Male genitalia of *Phytobia frutescens* n. sp. (12A, B) and *P. fusca* n. sp. (13A, B, holotype; 14, distiphallus, paratype).

Frons one and a half to one and two-thirds times width of eye, slightly converging ventrally; parafrofrontalia not projecting above eye in profile; *ors* and *ori* each two; *oh* minute, in a sparse row; lunule distinctly lower than semicircle; gena one-sixth to one-ninth height of eye; antenna with third segment small, round; arista subequal to eye height in length and minutely pubescent.

Mesonotum with 1 + 3 *dc*, eight irregular rows of *acr*, and *prsc* subequal to first *dc* or inner *pa*; sternopleuron with a row of five setae before *stpl*. Costa extending to M_{1+2} , with sections in proportion of 31-33 : 10 : 7 ; r-m slightly beyond middle of discal cell; ultimate section of M_{1+2} three to four times length of penultimate; ultimate section of M_{3+4} three-to four-fifths of penultimate. Mid tibia with two *pd*.

Genitalia: Surstylus subquadrate but distinctly narrowed posteriorly, incurved, with forty to fifty-three setae; cercus slightly higher than one-third of epandrial height, with two or three long ventrodiscal setae; hypandrium two-fifths length of phallapodeme (130 μ m), circular, with basal broadened part twice as wide as side piece; praegonite with two or three setae and several sensory hairs; postgonite with a seta before tip and densely hairy on dorsobasal part; phallus almost one-half length of phallapodeme, with basiphallus very narrow but forked at end; distiphallus simple, not divided into tubules distally and densely setulose on membrane at end; ejaculatory apodeme spatulate, 260 μ m long, 170-210 μ m in greatest width.

Length of body 2.7 (holotype) - 3.5 mm, of wing 3.0 (holotype) - 3.5 mm.

Female and host plant unknown.

Holotype male (BISHOP 15778), Wau (1,200 m), Morobe Distr., New Guinea (NE), 15.VII.1961, J. & M. Sedlacek; genitalia in a glycerol tubule. Paratype male, same locality as holotype, 28.XII.1965, J. & M. Sedlacek, by Malaise trap.

Distribution. Papua New Guinea.

Remarks. This is the only species known to me having the fuscous wings, and can be immediately recognized by the combination with the distiphallic character: a single and distally setulose tube.

Etymology. The specific name refers to the fuscous wings.

***Phytobia hirticula* (Sasakawa)**

Shizukoa hirticula Sasakawa, 1963, 822.

Phytobia hirticula: Spencer, 1966, 507.

This species is characteristic in the presence of dense hairs on basal membrane of the phallus and a pair of spiriferous processes on the lateral sides of distiphallic tubules.

The specimens examined differs from the holotype in the coloration, wing length, venation, etc. as follows: antenna pale brown to brown, yellow posterior margins on T4-5 linear or entirely absent, wing hyaline to slightly brown-tinged except for posterior marginal cells; *ori* two to four; gena one-fifth to one-sixth height of eye; r-m slightly or distinctly beyond middle of discal cell (25 : 10-20); ultimate section of M_{1+2} four to six and a half times length of penultimate; ultimate section of M_{3+4} six- to seven-eighths of penultimate; wing length 2.6-4.1 mm.

Specimens examined. Papua New Guinea: two males, Wau, 7. & 14. VI. 1965, J. & M. Sedlacek, by Malaise trap; one male, Mt. Kaindi (1,230 m), Wau, 5.X.1964, J. Sedlacek, by Malaise trap. Philippines: one male, Dalton Pass, Nueva Vizeaya, Luzon, 9-10. IV. 1968, M. D. Delfinado.

Distribution. Papua New Guinea, Philippines. New to Philippines.

***Phytobia inusitata* Spencer (Fig. 15)**

Phytobia inusitata Spencer, 1966, 504.

This is smallest among the Oriental *Phytobia* species. The specimens examined are a little larger than the type specimen (2.2-2.3 mm in wing length), and exhibit variations in the coloration and structures as described below. The phallus illustrated by Spencer (figs. 17-18) is not complete because of the absence of distiphallus.

Lunule brown, greyish white pruinose; antenna brown, third segment distinctly paler (dark testaceous); mesonotum weakly shining, grey dusted; frons one and two-thirds to two times width of eye; *acr* in six rows; r-m at or slightly beyond middle of discal cell; ultimate section of M_{3+4} slightly shorter than the penultimate (19-22 : 25); mid tibia with two *pd*.

Male genitalia are distinctive in the structure of distiphallus which is accompanied by a pair of hooky narrow processes dorsad of tubules. Cercus half of epandrial height, with a ventral seta longer than others; surstylus with thirty-one to thirty-six setae; hypandrium slightly longer than one-third of phallapodeme (90 μm in length), rounded at base; praegonite with five or six setae; postgonite with one setula before apex; phallic hood slightly longer than hypandrium; phallus nearly one-half of phallapodeme, median one of ventral processes tubular and left one spinulose, tubules of distiphallus internally with two to three rows of minute spinulae before end and accompanied by a pair of hooky processes; ejaculatory apodeme 290 μm long, spatulate, slightly expanded apically, 120 μm in greatest width.

Specimens examined. One male, East Highlands, Kundiawa, New Guinea, 5-6.I.1965, J. & M. Sedlacek; one male, Wau, Morobe Distr., New Guinea, 13.II.1965, J. & M. Sedlacek, by Malaise trap.

Distribution. Papua New Guinea.

Phytobia lnzonensis n. sp. (Fig. 16)

Male. Black; parafrontalia scarcely shining dorsally; lunule testaceous, pruinose; face and gena brown tinged; antenna pale brown, third segment slightly darkened along dorsal margin; palpus black; thorax densely brownish grey dusted; mesonotum mat, barely shining, with lateral side faintly brown tinged; mesopleural suture and wing base testaceous; calypter grey, with margin and fringe black; halter yellow, stalk testaceous at base; abdomen weakly shining.

Frons one and two-thirds times width of eye, converging ventrally; parafrontalia not projecting above eye in profile; *ors* and *ori* each two, *oh* in a row; lunule semicircular; gena about one-tenth height of eye; antenna with third segment only a little longer than broad and with distinct pile, arista subequal to eye height in length and minutely pubescent.

Mesonotum with 1+3 *dc*, eight rows of *acr*, *prsc* as long as third *dc*, *ipa* less than two-fifths of *opa*; sternopleuron with a row of four short setae before *stpl*. Costa extending to M_{1+2} , with sections in proportion of 35 : 10 : 8; r-m slightly beyond middle of discal cell; ultimate section of M_{1+2} about four times as long as penultimate; ultimate section of M_{3+4} four-fifths of penultimate. Mid tibia with two *pd*.

Genitalia: Epandrium with surstylus subrectangular, strongly incurved, nearly one-third as high as epandrium, bearing many setae along inner and caudal margins; hypandrium about two-fifths length of phallapodeme, praegonite with six setae; phallapodeme very long (148 μm); phallus slightly shorter than hypandrium (11 : 13), minutely spinulose on membrane near ventral process, basiphallus long; distiphallus ending in a tube, with a pair of lobate processes, which are weakly striated, before ventral end; ejaculatory apodeme expanded asymmetrically, 325 μm long, 300 μm in greatest width.

Length of body and wing 3.7 mm, respectively.

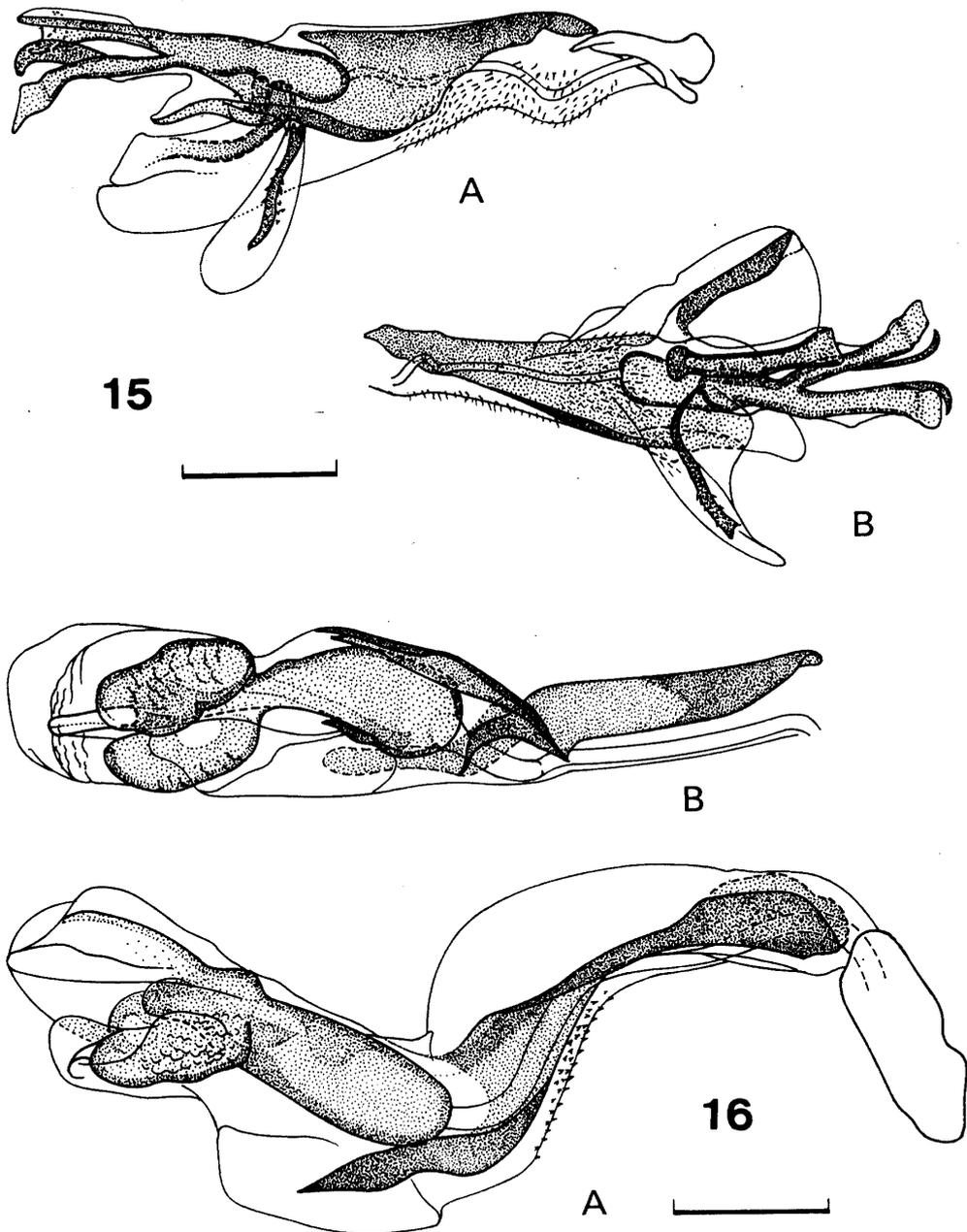
Female and host plant unknown.

Holotype male (BISHOP 15779), Dalton Pass, Nueva Vizcaya, Luzon, Philippines, 9-10. V.

1968, M. D. Delfinado.

Distribution. Philippines.

Remarks. This species belongs to the *hirticula*-group in having the sparse rows of acrostichal setae on the mesonotum and the additional processes on the distiphallus. Its distiphallus is composed of only a single tube and the lobate processes are distinctive.



Figs. 15-16. Male genitalia of *Phytobia inusitata* Spencer (15A, B) and *P. luzonensis* n. sp. (16A, B).

Phytobia magna (Sasakawa) (Fig. 17)

Shizukoa magna Sasakawa, 1963, 39.

Phytobia magna: Spencer, 1966, 11.

Phytobia yalomensis Spencer, 1966, 507. **n. syn.**

Many male and female specimens collected by Malaise trap in Wau (1, 200 m), Morobe Distr., Papua New Guinea in July-Aug. and November (J. Sedlacek), are agreeable with female holotype from Taiwan except for the following variations: wing length 3.8-4.4 ($\bar{x} = 4.1$) mm, slightly tinged with brown, with ultimate section of M_{3+4} shorter than the penultimate (16-18 : 25, rarely 28 : 25); *ori* highly variable in number, from two to five; gena one-fifth to one-seventh height of eye; third antennal segment testaceous brown, orbicular, as long as wide; arista minutely pubescent.

Male genitalia: Epandrium with a pair of black papilate processes on inner posteroventral sides above surstyli; cercus half of epandrial height; hypandrium of normal form, slightly longer than phallus; phallic hood long, nearly half of phallapodeme in length, pointed distally; phallus nearly one-third length of phallapodeme, distiphallus with distal tubules weakly sclerotized, minutely spinulose before end, ventral process short; ejaculatory apodeme circular, 330 μm long, 210 μm in greatest width.

The male genitalia agree exactly with those of *yalomensis* Spencer (figs. 21-23), known from New Britain, and the synonymy of these two species is, therefore, established herewith. The wing length (3.2 mm) of the male holotype of *yalomensis* is probably aberrant.

Distribution. Taiwan, Papua New Guinea, Nepal.

***Phytobia pansa* n. sp.** (Fig. 18)

Male. Black; parafrontalia subshiny; lunule pale brown, distinctly pruinose; face and gena blackish brown, antennal grooves shining; antenna brown, third segment slightly darkened on dorsal margin; thorax sparsely grey dusted, mesonotum weakly shining, with lateral sides brown; mesopleural suture and base of wing yellow; abdomen shiny; epandrium brown, pale dorsally. Wing hyaline; calypter yellowish white, with margin and fringe black; halter yellow but stalk pale brown at base.

Frons one and a half times width of eye, converging ventrally; parafrontalia not projecting above eye in profile; *ors* and *ori* each two, *oh* in a sparse row; lunule semicircular; gena one-thirteenth height of eye; third antennal segment slightly longer than broad, rounded apically, minutely pilose; arista as long as eye height, minutely pubescent.

Mesonotum with 1 + 3 *dc*, first *dc* about one-half length of the fourth, second *dc* only a little longer than the first; *acr* in ten irregular rows, *prsc* detectable by sockets; sternopleuron with a row of five short setae before *stpl*. Costa extending to M_{1+2} , with sections in proportion of 40 : 10 : 8; *r-m* slightly beyond middle of discal cell; ultimate section of M_{1+2} four times as long as the penultimate; ultimate section of M_{3+4} subequal to the penultimate. Mid tibia with two or three *pd*.

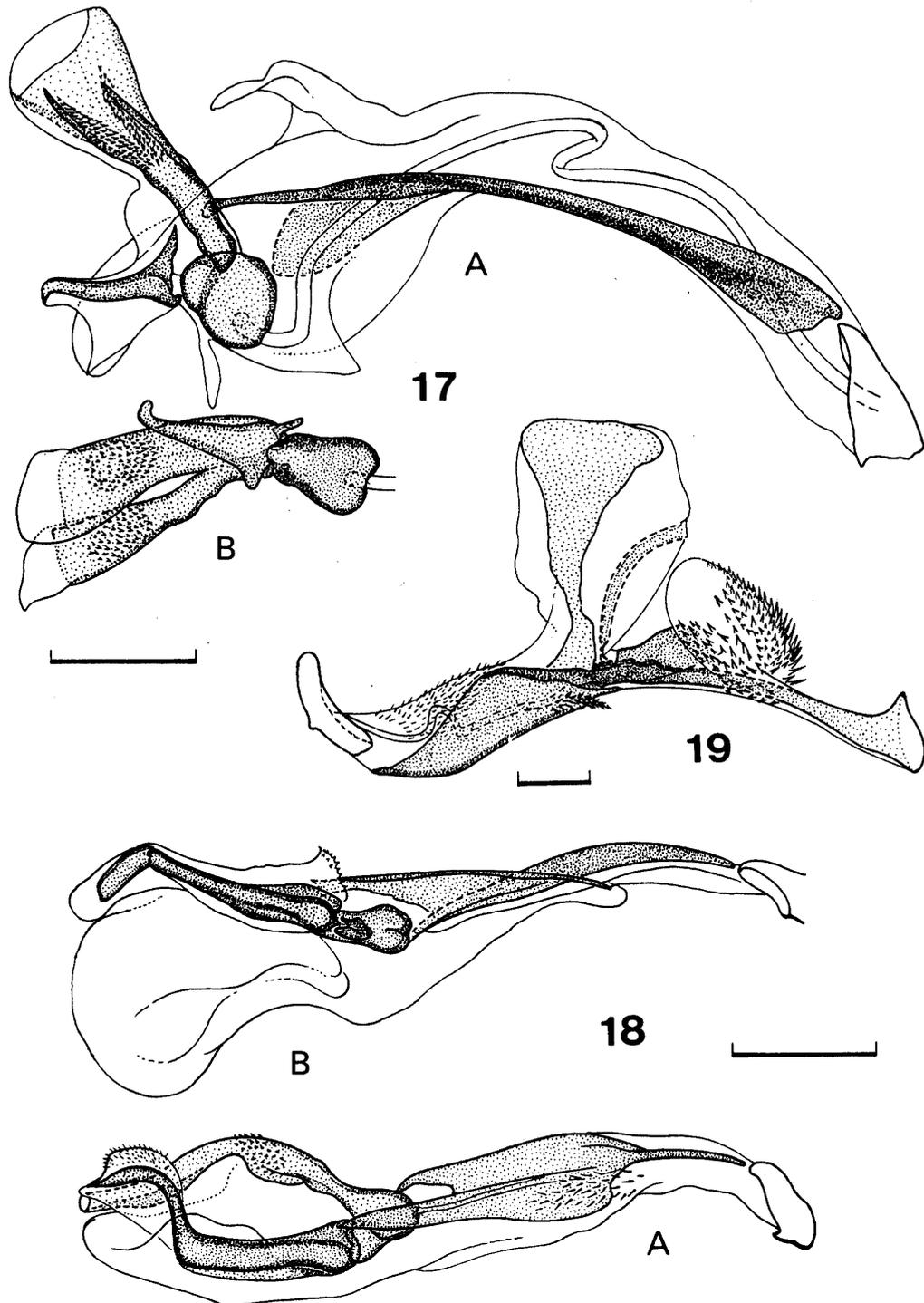
Genitalia: Epandrium with surstylus orbicular, densely setigerous (8-9 rows of 43-45 setae) on inner side; cercus one-half of epandrial height, with a ventral seta (one-third as long as height of cercus) longer than three to four anteroventral setae arranged in a row; hypandrium four-sevenths of phallapodeme in length, praegonite with five or six setae; phallus slightly longer than hypandrium, with a long and distally curved ventral process in a from of L; distiphallus weakly sclerotized, minutely spinulose at middle; ejaculatory apodeme 210 μm long, expanded asymmetrically, 140 μm in greatest width.

Length of body 2.9 mm, of wing 2.7 mm.

Female and host plant unknown.

Holotype male (BISHOP 15780), 34 km SW. of Palu: Kalawaranaputi, Celebes Is., Indonesia, 4-6. XII. 1965, R. Straatman, by Malaise trap.

Distribution. Indonesia (Celebes).



Figs. 17-19. Male genitalia of *Phytobia magna* (Sasakawa, 17A, B), *P. pansa* n. sp. (18A, B) and *P. prolata* Sasakawa (19).

Remarks. This species is quite specific in the simple structure of phallus, that is, the ventral process is a long, distally curved tubulous sclerite and the distiphallus is composed of a weakly sclerotized tube. It is closely allied to *P. frutescens* n. sp., but may be distinguished by having the dark frons and small size.

Etymology. The specific name refers to a long and curved stretch of ventral process on the phallus.

Phytobia prolata (Sasakawa) (Fig. 19)

Shizukoa prolata Sasakawa, 1963, 818.

This species was described by only a single female. The male differs from that in the following points: Third antennal segment testaceous brown; mesonotum scarcely pollinose, subshining; wing slightly brown-tinged except for posterior margin; T4(3) - 5 with posterior margins linearly yellowish. Head with *ori* two or three, two rows of *oh* between first *ors* and first *ori*; gena one-sixth to one-eighth height of eye; antennae separated narrowly at bases by facial carina, arista microscopically pubescent; mesonotum with eight to ten rows of *acr* anteriorly, *prsc* three-fifths length of *ipa* which is five-sevenths of *opa*; mid tibia with one or two *pd*; length of body 4.6 mm, of wing 4.2 mm.

Genitalia: Cercus slightly higher than half of epandrial height, with a ventral seta longer than others; surstylus with about sixty setae, of which posterior forty setae distinctly more stout than the anterior; hypandrium about half of phallapodeme in length; praegonite with four setae; postgonite spinulose on dorsal side and with two setulae before ventral apex; phallic hood and phallus each subequal to hypandrium in length; distiphallus slightly shorter than basiphallus, with a pair of spinulose lobes at middle of ventral side; ejaculatory apodeme 330 μ m long, 210 μ m in greatest width.

Specimens examined. Two males, Wau (1,750 m), Papua New Guinea, 22.X. & 26.VIII. 1965, J. & M. Sedlacek, by Malaise trap.

Distribution. Papua New Guinea.

Phytobia seticopia (Sasakawa)

Shizukoa seticopia Sasakawa, 1963, 41.

Phytobia seticopia: Spencer, 1965, 8.

This species belongs to a species-group with the fore tibial external bristle, and is unique in having three posterodorsal bristles on the mid tibia. It is recorded from Papua New Guinea for the first time.

Specimens examined. Papua New Guinea: one female, Wau (1,250 m), 5.VIII. 1964, J. Sedlacek, by sweeping; one male, Wau (1,190m), 15.IX.1964, J. Sedlacek, by Malaise trap; two males, Wau (1,200 m), 14. & 17.XII.1965, J. & M. Sedlacek, by Malaise trap.

Distribution. Borneo, Philippines, Papua New Guinea.

***Phytobia subdiversata* n. sp.**

Female. Head black but ventral half of frontalia and gena testaceous, and ventral half of parafrontalia, lunule and face yellow; antenna testaceous, third segment more or less darkened along dorsal margin; arista brown; palpus black. Thorax densely grey-dusted black; mesonotum mat, with a pair of yellow patches extending from anterolateral corners of yellow scutellum to line of both *pa* but ending at middle of distance between base of posteriormost *dc* and scuto-scutellar suture, humerus (narrowly brown cephalad of *h*-base) to notopleuron, dorsal margin of mesopleuron linearly,

mesopleural suture and base of wing yellow; scutellum with a brown to black median transverse band narrowly just behind scuto-scutellar suture and brownish lateral spot just ventrad of basal *sc*-base; wing hyaline, with veins yellow at bases; calypter whitish grey, with margin and fringe brownish black; halter with stalk pale brown, knob pale yellow; legs black. Abdomen shiny black, sparsely pollinose; T6 with posterior margin yellowish.

Frons 1.6-1.7 times width of eye; parafrontalia with ventral part linearly projecting above eye margin in profile; *ors* and *ori* each two; *oh* minute, in a sparse row; lunule lower than semicircle, about two-sevenths as high as frontalia between anterior ocellus and its ventral margin; gena one-eighth to one-ninth height of eye; third antennal segment small, rounded, as long as wide, with distinct pile; arista slightly shorter than eye height, microscopically pubescent.

Mesonotum with 1 + 3 *dc*, six to eight rows of *acr*, long *prsc* and *ia* longer than *ipa*; scutellum with apical *sc* three-fourths length of basal *sc*. Wing with costa extending to M_{1+2} in proportion of sections 2-4 as 32 : 10 : 7.5 ; r-m slightly beyond middle of discal cell; ultimate section of M_{1+2} about five to six and two-thirds times length of penultimate; ultimate section of M_{3+4} longer than the penultimate (25-32 : 20). Mid tibia with one or two *pd*.

Sixth abdominal tergite one and a half times as long as the fifth.

Length of body 3.2 mm, of wing 2.7 (holotype) -2.9 mm.

Male and host plant unknown.

Holotype female (BISHOP 15781), Gi Sion Village, de Tha Ngone, Vientiane Prov., Laos, 24-31. X. 1966 (native collector of Bishop Mus.). Paratype female, Ban Van Eue, Vientiane Prov., 15.X.1967 (native collector), at light trap.

Distribution. Laos.

Remarks. The characteristic feature of this new species is the yellow scutellum, as well as in Taiwanese *P. diversata* Spencer (1961), but *subdiversata* differs from the allied species not only in the yellow to testaceous ventral part of head including the antennae but also in having both inner and outer post-alar bristles.

3. Species of the genera *Japanagromyza*, *Calycomyza* and *Cerodontha*

The genus *Japanagromyza* is well represented in the Oriental Region and nineteen species have been recorded. It is divided into two species-groups on account of the phallic structures of male genitalia (Sasakawa, 1972). A new species, *J. philippinensis*, which belongs to the *tristella*-group with a forked distiphallus, is described below; a leaf miner of *Eucalyptus*, *J. eucalypti* Spencer, recorded newly from Papua New Guinea, and also a leaf miner of *Mallotus*, *J. yanoi* (Sasakawa), from Borneo (Sabah).

The records to date of the small genus, *Calycomyza*, in the Oriental Region are of *artemisiae* (Kaltenbach), *humeralis* (v. Roser) and *lantanae* (Frick). The former two are Holarctic in distribution, and the third one is probably introduced into Malaysia by man. The fourth species, *bicolor* n. sp., from Taiwan, will be described below.

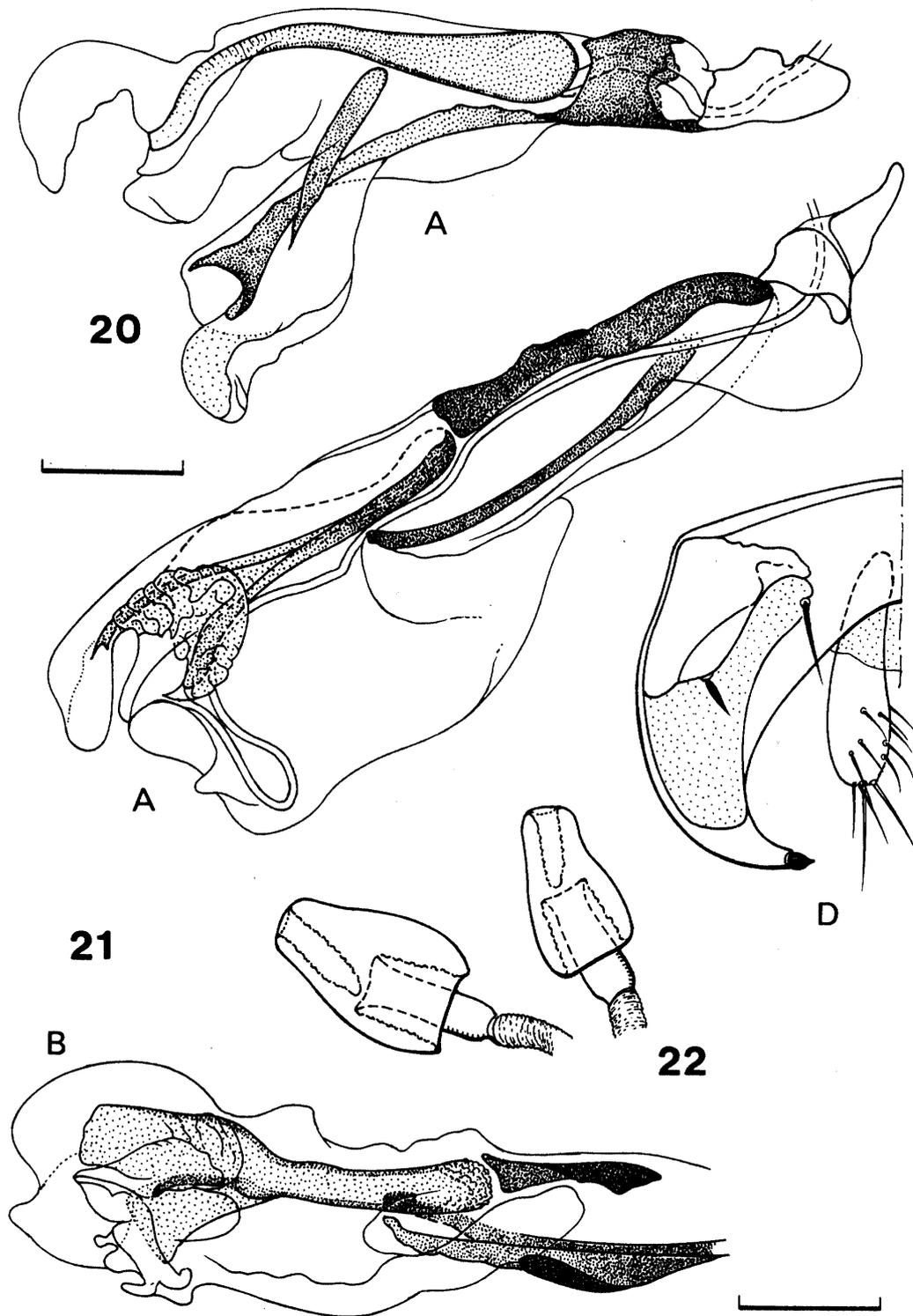
Cerodontha (*Cer.*) *fujianensis* n. sp. with strongly shining blackish mesonotum, from Southern China, has close relatives in Australia and New Zealand. Also, its aberrant phallus indicates a high degree of speciation.

Japanagromyza eucalypti Spencer (Figs. 20 & 22)

Japanagromyza eucalypti Spencer, 1963, Rec. Aust. Mus. **25** : 309.

The following characters of male genitalia are added to the original description: Surstylus

strongly incurved, ending into a stout spine; epandrium with two pairs of spines or setae above middle of inner side; cercus with a ventral seta slightly longer than other setae; hypandrium subequal to phallopodeme in length, with basal apodeme nearly a fourth of side piece.



Figs. 20-21. Male genitalia of *Japanagromyza eucalypti* Spencer (20A, D) and *J. philippinensis* n. sp. (21A, B). Fig. 22. Spermathecae of *J. eucalypti*.

Female differs from male in the following points: Antenna (especially basal two segments and base of the third), lunule, face, gena and fore tibia tinged with brown; all tarsi yellowish brown. Egg guides subtriangular, 55 μm long, densely setulose on outer side; T9 and S9 broad but short, about 110 μm long, the latter with six or seven *nsm*; cercus about 70 μm long, with three *ts* which are half of cercus in length; spermathecae two, elongate-suboval, 110 \times 65 to 140 \times 95 μm , deeply depressed apically and basally.

Specimens examined. Three males and one female, Wau (1,200 m), Papua New Guinea, 15-28. XII. 1965, J. & M. Sedlacek, by Malaise trap.

Distribution. Australia, Papua New Guinea, Belau, Northern Marianas, Java. New to Papua New Guinea.

***Japanagromyza philippinensis* n. sp.** (Fig. 21)

Male. Black; parafrontalia weakly shining; lunule brown tinged; antenna with first and second segments black but third segment and arista brown; thorax sparsely pollinose; mesonotum shiny, with lateral side slightly brown tinged; abdomen strongly shining; wing hyaline except for dark brown costal cells (1st-2nd); calypter brownish grey, with margin dark brown, fringe brown; halter entirely blackish brown.

Frons slightly wider than width of eye (17 : 15), almost parallel-sided; parafrontalia with ventral part distinctly and parafacialia linearly projecting above eye margin in profile; *ors* two, *ori* three or four; *oh* dorsally in a row and reclinate but in two irregular rows ventrad of first *ori* and directed forward; lunule higher than semicircle, three-fourths as high as ventral width; gena about one-fifth height of eye; third antennal segment small, rounded, with minute pile; arista as long as eye height, minutely pubescent.

Mesonotum with 0+2 *dc*, ten rows of *acr* but eight rows behind level of anterior *dc*, and without *prsc*; sternopleuron with three short setae before *stpl*. Costa extending to M_{1+2} , with sections in proportion of 42 : 10 : 11; r-m beyond middle of discal cell; ultimate section of M_{1+2} about two and two-thirds times length of penultimate; ultimate section of M_{3+4} about half of penultimate. Fore tibia with a distinct external bristle at middle; mid tibia with two *pd* which are distinctly longer than tibial width.

Genitalia: Epandrium with cercus long, about two-thirds as high as epandrium; surstylus with only a little projection ventrally and about half as wide as ventral width of epandrium, bearing about fifty short spines; hypandrium a little longer than phallapodeme (23 : 21), with long basal apodeme which is subequal to side piece in length and extending anteriorly to anterior margin of T4; phallapodeme 105 μm in length; phallus about half length of hypandrium, mesophallus weakly sclerotized, distiphallus forked narrowly and with a lobe, which is irregularly striated, on laterodistal side; ejaculatory duct running ventrad of meso- and distiphallus; ejaculatory apodeme small, 190 μm long, 70 μm in greatest width.

Length of body 3.1 mm, of wing 3.0 mm.

Female and host plant unknown.

Holotype male (BISHOP 15782), Mt. Iriga (500-600 m), Camarines Sur., Philippines, 24.IV. 1962, H. M. Torrevillas.

Distribution. Philippines.

Remarks. This species resembles *J. setigera* (Malloch), known from Taiwan, in the presence of the fore tibial bristle and absence of the prescutellar bristles, but differs from it in the genal height, wing venation and the phallic structures. The dark costal cell and the shape of distiphallus of this species are unique among the species of the genus.

Japanagromyza yanoi (Sasakawa)

Melanagromyza yanoi Sasakawa, 1955, Trans. Shikoku ent. Soc. **4** : 87.

Japanagromyza yanoi: Sasakawa, 1961, Pac. Insects **3** : 338.

Japanagromyza angustifrons Spencer, 1961, Trans. R. ent. Soc. Lond. **113** : 64.

This species is characterized by the narrow gena (1/22 as high as eye in male and 1/30 in female), four pairs of reclinate *ors* and *ori*, entirely brown halteres and absence of the fore-tibial external bristle.

Specimens examined. Two males and one female, Sandakan Bay (NW, 1-10 m), Sepilok Forest Reserve, Borneo, 29-31.X.1957, J. L. Gressitt.

Distribution. Japan, Taiwan, Borneo. New to Borneo (Sabah).

Calycomyza bicolor n. sp. (Fig. 23)

Female. Head with frons pale testaceous but parafrontalia subshiny black from vertical angle to level of second *ors* and dark brown between *ori*-line and eye (dark color of orbit extending linearly to ventral side below eye); ocellar triangle, occiput, postorbites and postgenae entirely black; lunule and gena yellow to testaceous; face shiny black excepting oral margin yellow; antenna and palpus black, first antennal segment slightly brown tinged. Thorax densely grey-dusted black; dorsal and caudal margins of humerus to notopleuron, dorsal and caudal margins of mesopleuron and base of wing yellow; abdomen shiny brownish black, both lateral margins of T1-5 and posterior margins of T1-4 and 6 linearly yellow; ovipositor sheath shiny black. Wing faintly tinged with brown; calypter yellowish white, with margin and fringe black; legs entirely black.

Frons one and a half times width of eye, almost parallel-sided; parafrontalia and parafacialia distinctly projecting above eye margin in profile; *ors* two, reclinate; *ori* four, inclinate, ventromost one about half of the third; *oh* erect or reclinate, in two dense rows; lunule semicircular; gena about a fourth height of eye; antennae very narrowly separated from each other at bases; third segment rounded, as long as wide, microscopically pilose; arista as long as eye height, microscopically pubescent.

Mesonotum with 1+4 *dc*, anterior two short and about half of posteriormost one, six rows of *acr* anteriorly but four rows behind level of fourth *dc*. Wing with costa extending to M_{1+2} , in proportion of sections 2-4 as 34.5 : 10 : 7; r-m at middle of discal cell; m-m distinctly oblique to M_{1+2} ; ultimate section of M_{1+2} six to seven times length of penultimate; ultimate section of M_{3+4} about two and one-fifth times length of penultimate.

Male. Similar to female, but T2-5 with posterior margins linearly yellow; epandrium black. Genitalia: Epandrium with nine to ten long spines on each posteroventral margin; cercus without a distinct ventral seta; surstylus subtriangular, with about thirty spines; processus longus short, as long as height of surstylus; hypandrium with side piece narrow, nearly half length of phallapodeme (100 μ m); praegonite with three or four setae and minute sensory setulae; phallus about one-third length of phallapodeme; basiphallus narrow, subequal to mesophallus in length and broadened at distal end; sclerite of ventral process curved dorsally; distiphallus tubulate, broadly separated from mesophallus by membrane; ejaculatory apodeme 275 μ m long, expanded distally, 160 μ m in greatest width.

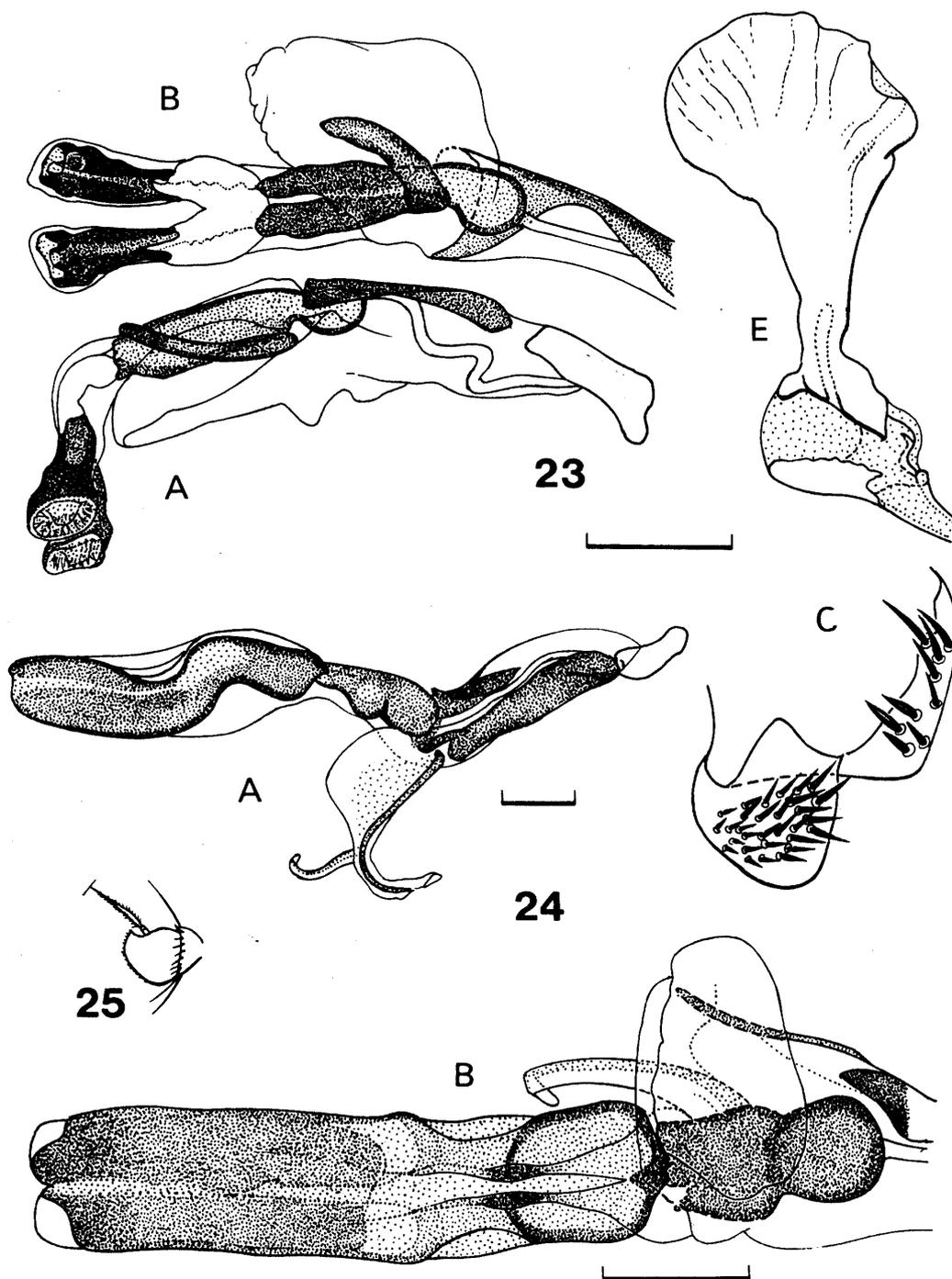
Length of body 3.0 - 3.4 (holotype) mm, of wing 3.2 (holotype)- 3.3 mm.

Holotype female (BISHOP 15783), Wushe (= Musha), secondary forest, Taiwan, 13.III.1961, E. I. Schlinger. Paratype male, same data as holotype; genitalia in a glycerol tubule.

Distribution. Taiwan.

Remarks. This species is immediately recognized by the distinctive colour of the head, the numbers of the lower fronto-orbital bristles and dorso-central bristles, and the isolated mesophallus and distiphallus. This is the second species of the genus from Taiwan (Sasakawa, 1972).

Etymology. The specific name refers to the coloration of head.



Figs. 23-24. Male genitalia of *Calycomyza bicolor* n. sp. (23A-C & E) and *Cerodontha (Cer.) fujianensis* n. sp. (24A, B). Fig. 25. Antenna of *Cerodontha fujianensis*.

***Cerodontha (Cerodontha) fujianensis* n. sp.** (Figs. 24 & 25)

Male. Head including antenna and palpus testaceous yellow; ocellar triangle with central area surrounding ocelli shiny black but *oc* growing on yellow lateral margins; vertical angle and dorsal postorbit pale brown, both *vt* on dark area; back of head blackish brown except for yellow anterior and ventral margins of postgenae; ventral half of frontalia and antennal grooves brown tinged. Thorax blackish brown; mesonotum strongly shining, with a pair of small yellow spots on posterolateral corners before scutellum; dorsal and caudal margins of humerus to notopleuron, dorsal margin of mesopleuron, mesopleural suture and base of wing yellow; wing faintly testaceous on anterior half; calypter yellow, with margin and fringe dark brown; halter yellow; legs testaceous yellow, dorsoproximal parts of fore and mid coxae brown, tibiae and tarsi faintly tinged with brown. Abdomen shiny brown, T2 - 4 with posterior margins indistinctly and linearly yellow; cercus testaceous.

Frons one and a half times width of eye, parallel-sided; parafrontalia distinctly broadened ventrally, each about a fourth width of frons at lateral side of lunule and distinctly projecting above eye in profile; *ors* two, *ori* three, of which ventromost one nearly a half of second *ori*; *oh* reclinate on dorsal part and erect on the ventral, in two sparse and irregular rows; ocellar triangle with three pairs of *oc* laterad and ventrad of anterior ocellus; lunule higher than semicircle, slightly higher than frontal length between anterior ocellus and ventral margin of frontalia; face with very narrow carina dorsally; parafacialia projecting before eye in profile; gena nearly one-tenth height of eye; *pm* twelve to sixteen in an irregular row; third antennal segment small, shorter than wide, with dorsal margin concave in profile and dorsoapical corner minutely pointed, pile white and indistinct; arista as long as eye height, pubescent.

Mesonotum with 1+3 *dc*, eight rows of *acr* but six of them ending just behind level of posterior-most *dc*; scutellum only with apical *sc*. Wing with costa extending to M_{1+2} in proportion of sections 2-4 as 36 : 10 : 8 ; r-m at middle of discal cell; m-m crossing M_{1+2} at an acute angle; ultimate section of M_{1+2} three and two-thirds times of penultimate; ultimate section of M_{3+4} slightly longer than the penultimate (25 : 20).

Genitalia: Epandrium with a papilla on dorsomedian tip, bearing spine-like setae on inner ventrodistal margin; surstylus incurved triangularly, with many setae; cercus with a ventral seta about half height of cercus; processus longus blackish; hypandrium about half of phallapodeme in length, with side piece slightly broadened at base; phallus three-fifths length of phallapodeme; distiphallus longest, not divided clearly into two tubules before distal end; ejaculatory apodeme 400 μ m long, expanded asymmetrically, 350 μ m in greatest width.

Length of body 3.7 mm, of wing 3.5 mm.

Female and host plant unknown.

Holotype male (BISHOP 15784), Tachulan (1,000 m), Shaowu, Fujian (= Fukien) Prov., S. China, 26.IV.1942, T. Maa; right antenna missing, and genitalia in a glycerol tubule.

Distribution. China.

Remarks. Although this new species lacks a distinct spine on the third antennal segment, the coloration is typical of subgenus *Cerodontha*. The shape of segment is more or less similar to those of Australian *robusta* Malloch and New Zealand *angustipennis* Harrison in the outline. Also, it shows a close relationship with *angustipennis* in having the shiny mesonotum and the broadened distiphallus. However, the testaceous yellow third antennal segment, three pairs of ocellar bristles and dense rows of the acrostichal setae are distinctive.

Etymology. The species is named after the type locality.

***Cerodontha (Dizygomyza) morosa* (Meigen)**

Agromyza morosa Meigen, 1830, Syst. Besch. bekant. europ. zweifl. Insekt. **6** : 170.

Cerodontha (Dizygomyza) morosa: Nowakowski, 1967, Polsk. Pismo Ent. **37** : 644.

This is a leaf miner of *Carex* spp., and recorded from the Philippines for the first time.

Specimen examined. One male, Buguias (1,800-2,000 m), 60 km S. of Bontoc, Abatan, Mountain Prov., Philippines, 16.VI.1964, H. M. Torre Villas.

Distribution. Europe, Japan; India, Philippines; Canada, U. S. A.

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ビショップ博物館所蔵の東洋区産ハモグリバエ

(第2報)

笹川 満 廣

ネパール王国産ハモグリバエ科の分布については、これまで23種 (Spencer, 1965による7種と, Sasakawa, 1979による16種) が記録されている。今回, ビショップ博物館昆虫部に所蔵されている標本を調べたところ, 5新種と7未記録種を追加することができた。なかでも既知分布域が全北区に限られていた *Metopomyza* 属 (*M. nepalensis* n. sp.) の分布が知られたことは注目される。しかし, 隣接するインド北部のヒマーチャル・プラデーシュ, ウッタール・プラデーシュ, ビハール諸州から記録されている111種 (Sasakawa, 1979) に対して, その1/3にも満たない種数からみて, 今後の研究によって未知の *Agromyza* 属はじめ, *Melanagromyza*, *Liriomyza* 属の種がさらに追加されることであろう。

ついで広葉樹のピスフレック (pith fleck) 形成害虫である *Phytobia* 属について, 東洋区及びパプアニューギニア産22種の検索表とともに, 7新種 (中国福建省, ラオス, フィリピン, マレーシア (サラワク), インドネシア (スラウェシ島) 及びパプアニューギニア) を含む12種を記載した。

最後に, *Japanagromyza* 属2種の新しい分布国と1新種 (フィリピン), *Calycomyza* 属の1新種 (台湾), *Cerodontha* 属の1新種 (中国福建省) などの記載を行った。なお, 雄交尾器の特異な形態から既知2種がシノニムであることを明らかにした。