

# Psocoptera

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## Ergebnisse der Bhutan-Expedition 1972 des Naturhistorischen Museums in Basel

### Psocoptera

By T.R. New

**Abstract:** Twentyone species of Psocoptera are recorded from Bhutan, 3 of which are recorded (together with a fourth species not found in Bhutan) also from India. Nine species are described as new and figured: *Epipsocus thimphuensis*, (?) *Pseudoseopsis marginepunctata*, *Stenopsocus signatipennis*, *Kodamaius wittmeri*, *Fuelleborniella bhutanensis*, *Psocidus* (s.str.) *samchiensis*, *Trichadenotecnum sclerotum*, *Metylophorus paranebulosus* and *M.fuscatus*. Several of the other species were earlier known from Nepal, and the psocid faunas of the two countries appear to be closely related.

This paper is an account of the Psocoptera collected by members of the Naturhistorischen Museums Basel Bhutan Expedition in 1972. A few specimens collected in 1975 and 1976 in India by Dr. W. Wittmer are also included. A general account of the Bhutan Expedition is given by BARONI-URBANI et al. (1973), and vegetational characteristics and locality details of all collecting sites are given in that paper. Types, and other specimens on which this paper is based are deposited in the Naturhistorisches Museum, Basel, Switzerland. I am very grateful to Dr. W. Wittmer for the opportunity to study this material.

The psocopteran fauna of the Himalayan region is poorly known. No Psocoptera have hitherto been recorded from Bhutan, but 25 species are known from Nepal (NEW 1971, 1973) and a number of others only from Assam (BANKS 1914) or other parts of northern India. Twenty one species are recorded from Bhutan: 9 are here described as new and 6 had earlier been described or recorded from Nepal and/or the Darjeeling region (THORNTON and WONG 1966, LEE and THORNTON 1967). The remainder (together with a Pachytroctid recorded below from India) fall into two overlapping categories: (1) species which are apparently undescribed but are represented by damaged specimens or material otherwise inadequate for detailed diagnosis and (2) representatives of species or of complex species groups which are widely distributed in the Oriental region. Most species represented have affinities with other Oriental forms. Not surprisingly, the greatest affinities appear to be with Nepal-

ese and Darjeeling distinct Psocoptera, but it is not clear to what extent this impression is due to inadequate collecting elsewhere.

Colouration given is of alcohol-preserved material. Measurements are in mm and, except for body length, are from slide-mounted specimens. The following abbreviations are used: body length (B); fore wing length (FW); hindwing length (HW); length first, second and third flagellar segments ( $f_1$ ,  $f_2$ ,  $f_3$ ), hind femur length (F), hind tibia length (T), hind tarsal segment lengths ( $t_1$ ,  $t_2$ ,  $t_3$ ).

### Pachytroctidae

#### 1. *Pachytroctes* sp.

Material examined: 1 ♀, apterous, INDIA, U.P., Dimli Pass, Sivalik Hills, 26.6.1976, W. Wittmer.

This individual is referred to *Pachytroctes* Enderlein on lacinial characters and because the subgenital plate lacks an inner 'T-sclerite'. The lacinia and subgenital plate resemble those of *P. (Psacadium) georgi* MENON (1938-India: Cochin State), but the body differs in colouration; in particular, the abdomen is wholly dark, and the maxillary palpi white. The species is probably undescribed, but I consider it unwise to describe a new taxon of these variable polymorphic psocids from a single apterous specimen.

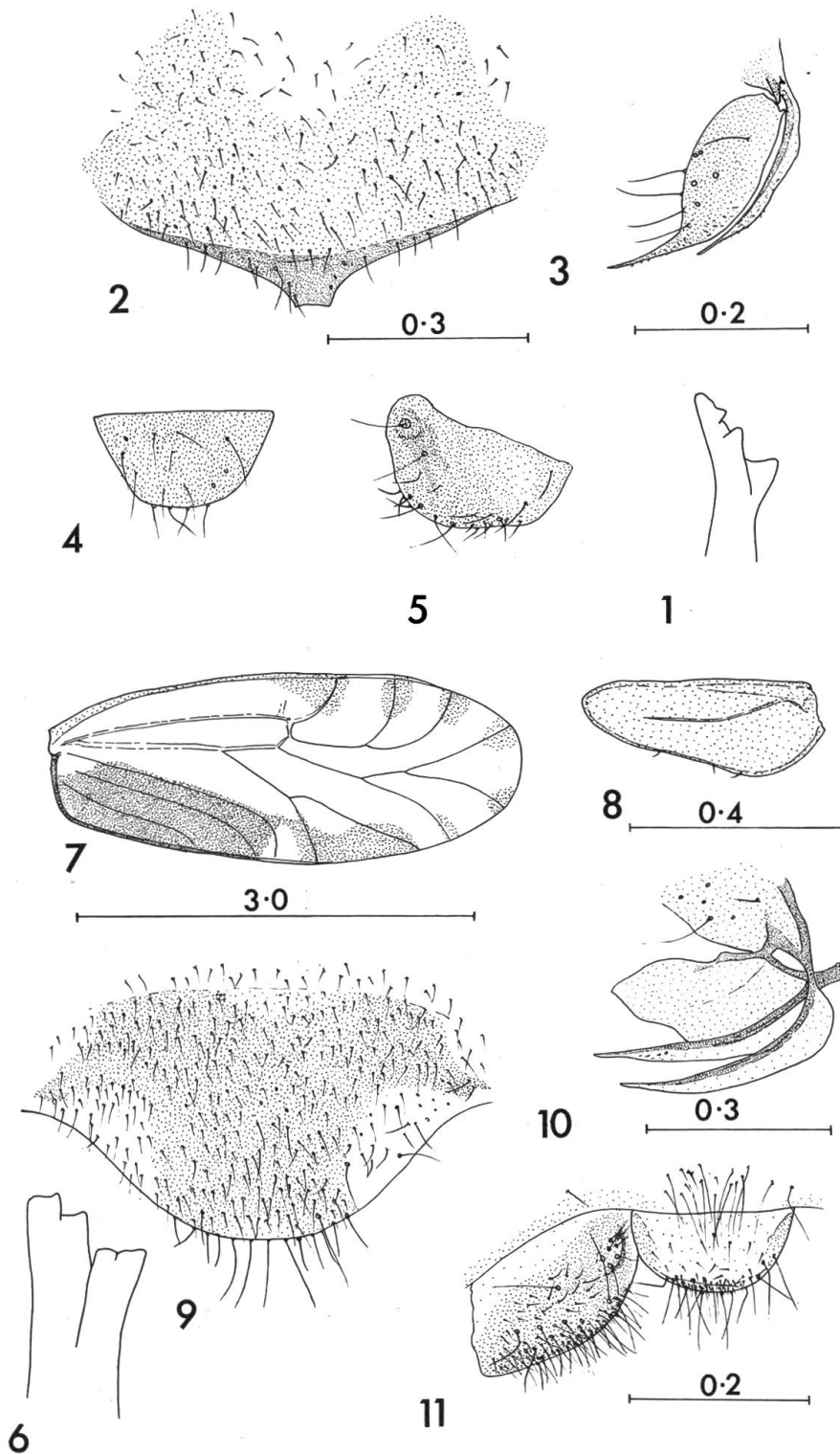
### Epipsocidae

#### 2. *Epipsocus thimphuensis* n. sp. Figs. 1–5.

♀ (Apterous)

Colouration: Buff. Eyes black. Vertex with pale brown patch across posterior mid-region. A mid brown band across frons and posterior half of postclypeus, extending to eyes. Postclypeus with very faint grey traces of about 6 broad striae each side of mid line. Anteclypeus pale. Labrum slightly darkened. Maxillary palpi pale. Antennae mid brown. Thorax pale except for dark, broken, pleural stripe continued from lower part of genae. Legs pale; tibiae and tarsi slightly browned. Abdomen with granular dark brown pigmentation on all terga.

Morphology: Apterous: forewing represented by minute veinless projection, hindwing absent. Ocelli absent. Head moderately elongate. Lacinial apex as in Fig. 1. Subgenital plate (Fig. 2) with truncate median extension. Gonapophyses (Fig. 3): both valves attenuated and spiculate;



Figs. 1-11. 1-5. *Epipsocus thimphuensis* n.sp., ♀: 1, lacinial apex; 2, subgenital plate; 3, gonapophyses; 4, epiproct; 5, paraproct. 6-11, *Pseudoseopsis marginepunctata* n.sp., ♀: 6, lacinial apex; 7, forewing; 8, hindwing; 9, subgenital plate; 10, gonapophyses; 11, epiproct and paraproct.  
 (Scales in mm; 3-5 to same scale; 9, 11 to same scale)

body of dorsal valve with about 10 setae. Epiproct (Fig. 4) trapezoidal. Paraproct (Fig. 5) simple, with single trichobothrium.

Dimensions: B 1.65,  $f_1$  0.300,  $f_2$  0.240,  $f_1/f_2$  1.250, F 0.630, T 0.870,  $t_1$  0.315,  $t_2$  0.135,  $t_1/t_2$  2.333.

♂ Unkown.

Holotype, apterous ♀, BHUTAN, Thimphu, 20 km S., 18.5.1972.

The generic placement of this species is tentative, as with other Epipsocidae recently described from the Oriental region. The form of the subgenital plate and lacinial apex readily distinguish *thimphuensis* from all described species of Epipsocidae and similar families. Separation of families in the Epipsocetae is based largely on forewing characteristics (Eertmoed, 1973). The form of the pulvillus (which is straight rather than bent at an angle), and the presence of two pairs of gonapophyses strongly suggests that the species is a member of the Epipsocidae and not of the Dolabellopsocidae. The subgenus *Bertkauia* of *Epipsocus* typically has apterous females, and all known species of this group differ markedly in genitalic features from the present species. Two species of '*Epipsocus*' (generic identity not confirmed) have been described from Assam by BANKS (1914). Both are macropterous and their genitalia have not been described.

### Amphientomidae

#### 3. (?) *Pseudoseopsis marginepunctata* n. sp. Figs. 6–11.

♀, Colouration: Head glossy castaneous brown, midline darker. Vertex with 2 rows of rectangular brown spots dorsal to each eye. Eyes black. Ocelli black. Maxillary palpi and antennae mid brown. Thorax dorsally dark brown, pleura paler. Legs dark brown. Forewing with dark chocolate brown spots around perimeter, as in Fig. 7. Hindwing pale brown. Abdomen creamy buff, with dark dorsal bands across all tergites.

Morphology: 3 closely grouped ocelli. Antenna 13-segmented. Apex of lacinia as in Fig. 6. Forewing (Fig. 7): trace of distal part of Sc present, crossvein from Rs to M sited well basal to  $M_3$ , fork of Cula and Culb well anterior to hind margin of wing, 2 anal veins present. Hindwing (Fig. 8) greatly reduced, venation represented only by 2 incomplete longitudinal veins. Femur I thickened, with row of 21 unarticulated pegs; tibia I without pegs, one apical spine. Tibia III with 9 thickened spines along ventral edge.

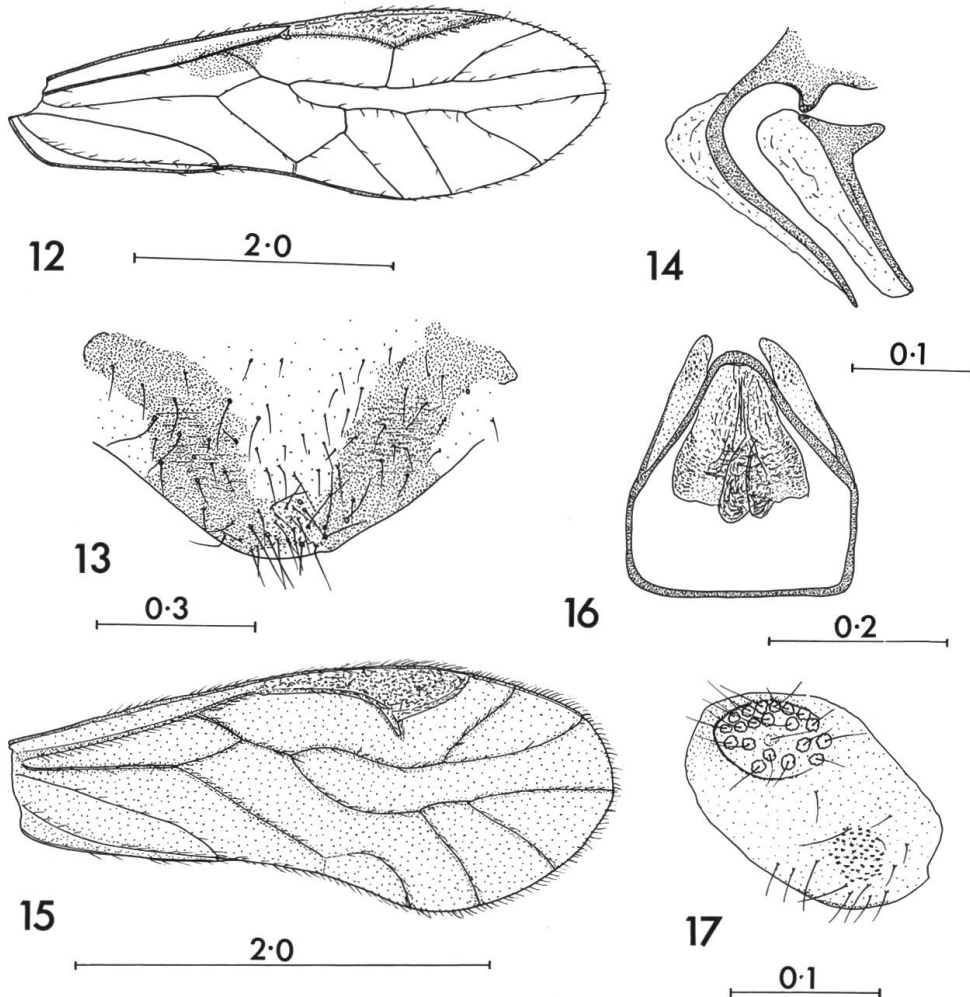
Tarsal claw elongate, with 1 subapical tooth. Subgenital plate

(Fig.9) rounded, with long marginal setae at apex. Gonapophyses (Fig.10): external valve extended to tapered membranous apex, lacking setae. Epiproct (Fig.11) broad, rounded. Paraproct (Fig.11) elongate, with field of 7 setae lacking basal rosettes. Basal hind tarsal segment with 22 ctenidia.

Dimensions: B 2.80, FW 2.395, HW 0.431,  $f_1$  0.150,  $f_2$  0.165,  $f_3$  0.210,  $f_1/f_2$  0.909, F 0.735, T 1.185,  $t_1$  0.675,  $t_2$  0.090,  $t_3$  0.195,  $t_1/t_2$  7.500,  $t_2/t_3$  0.462.

♂: Unknown.

Holotype, ♀, BHUTAN, Changra, 18 km S.Tongsa, 1900 m, 22.6.1972.



Figs.12-17. 12-14, *Stenopsocus signatipennis* n.sp., ♀ : 12, forewing; 13, subgenital plate; 14, gonapophyses. 15-17, *Fuelleborniella bhutanensis* n.sp., ♂; 15, forewing; 16, phallosome; 17, paraproct. (Scales in mm)

The generic placement of this species is uncertain. It is clearly a member of the Amphientominae, and apparently of the group of genera allied to *Hemiseopsis* Enderlein and *Seopsis* Enderlein which are separated partially on features of hind wing venation. In having strongly reduced hindwings, *marginepunctata* resembles species of *Nephax* Pearman, the forewings of which are typically pointed. *Stimulopalpus* Enderlein, known from Africa and Japan, typically has only 2 ocelli, and lacks a comb on the fore femur. This species differs from described species of all these genera, and from *Pseudoseopsis* Badonnel, in lacking subsidiary processes on the tarsal claw. Rather than erect a new genus for a single female it is preferable to provisionally refer *marginepunctata* to an existing genus. On balance of characters it is most similar to *Pseudoseopsis*, and differs from it in claw characters and in lacking a sclerotised central thickening on the subgenital plate.

No Amphientomidae have hitherto been recorded from the Himalayan region, and this species is of considerable zoogeographical interest in demonstrating a large extension to the known range of the family.

### Stenopsocidae

#### 4. *Stenopsocus nepalensis* New

*Stenopsocus nepalensis*: NEW, 1971, *Canad. Ent.* 103: 207, figs. 48–54, ♂, ♀, Nepal.

Material examined: 1 ♂, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m, 15.6.1972.

This species was described from specimens captured in Malaise traps in Nepal. The present specimen closely resembles the Nepalese specimens in the position of the forewing stigmal vein, in lacking pterostigmal margin colouration, and in the form of the genitalia.

#### 5. *Stenopsocus signatipennis* n. sp. Figs. 12–14.

♀, Colouration: Dorsally dark brown, ventrally white. Eyes black. Head mainly dark brown except for broad white spot on much of vertex. Ocelli on small black tubercle. Maxillary palpi, anteclypeus and labrum white. Antennae dark brown. Thorax dorsally dark brown. Forewing with brown posterior margin to pterostigma and broad spot over junction of  $R_1$  and  $R_s$  (Fig. 12). Hindwing hyaline. Legs and abdomen white, unmarked.

Morphology: Forewing as in Fig. 12. Subgenital plate (Fig. 13)

broadly rounded, with setae most numerous near posterior mid line. Gonapophyses (Fig.14): remnant of external valve tapered, lacking setae. Epiproct rounded. Paraproct with field of 22 trichobothria. Basal hind tarsal segment with 21 ctenidia.

Dimensions: B 4.65, FW 4.50, HW 3.11,  $f_1$  1.260,  $f_2$  1.005,  $f_1/f_2$  1.254, F 0.930, T 1.455,  $t_1$  0.420,  $t_2$  0.150,  $t_1/t_2$  2.800.

♂: Unkown.

Holotype, ♀, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m, 15.6.1972.

This species differs clearly from other species of *Stenopsocus* in the brown forewing mark basal to the pterostigma. Other Oriental species of the genus have this region of the forewing unmarked, although *S. niger* ENDERLEIN (1906-Japan) has a brown streak along the whole length of the radius.

#### 6. *Kodamaius wittmeri* n. sp. Figs. 18–23.

♀, Colouration: Brown. Eyes black. Midline of vertex brown, paler towards eyes. Ventral region of genae pale. Apical segment of maxillary palpi dark brown. Antennae dark brown beyond  $f_1$ ;  $f_1$  rather paler. Thorax glossy dark brown, almost black on dorsal lobes. Legs: basal half of F pale, remainder dark brown. Forewing shaded with mid brown as in Fig. 18; a darker patch behind apex of pterostigma. Hindwing very pale brown. Abdomen with narrow darker band across each tergite, genital region dark brown.

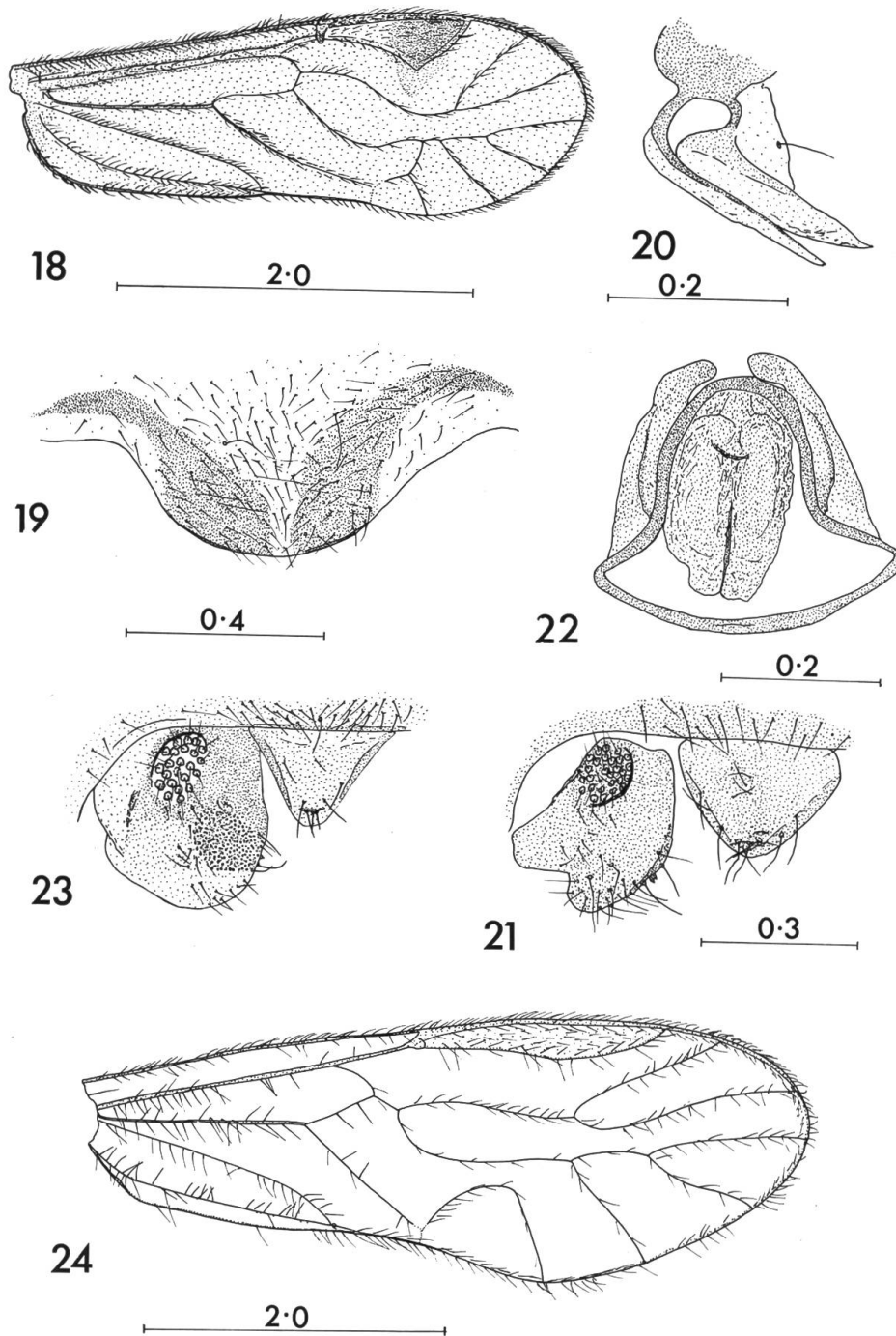
Morphology: Forewing (Fig. 18); Rs and M linked by crossvein, AP small, linked to M by crossvein;  $Cu_2$  setose. Subgenital plate (Fig. 19) broadly rounded; sclerotised region divided into two parts. Gonapophyses (Fig. 20): dorsal valve relatively broad; remnant of external valve membranous, with one seta. Epiproct (Fig. 21) tapered, with preapical arc of setae and small central group of short setae. Paraproct (Fig. 21) with divided hyaline cone on inner apical margin and a field of about 27 small trichobothria. Basal hind tarsal segment with 24 ctenidia.

Dimensions: B 4.25, FW 4.17, HW 3.26,  $f_1$  0.630,  $f_2$  0.405,  $f_1/f_2$  1.556, F 1.035, T 1.710,  $t_1$  0.570,  $t_2$  0.195,  $t_1/t_2$  2.923.

♂, Colouration: as female, but vertex with very faint traces of darker pattern over posterior region.

Morphology: Forewing as female. Hypandrium transverse, with lateral marginal groups of setae. Phallosome (Fig. 22) broad; frame transverse anteriorly and broadly rounded posteriorly. Epiproct (Fig. 23) triangular, with few preapical setae. Paraproct (Fig. 23)





Figs. 18–24. 18–23, *Kodamaius wittmeri* n.sp.: 18, forewing; 19, subgenital plate; 20, gonapophyses; 21, female epiproct and paraproct; 22, phallosome; 23, male epiproct and paraproct. 24, *Dasypsocus* sp.: forewing. (Scales in mm; 21, 23 to same scale)

rounded with large papillate field and a field of about 23 trichobothria. Basal hind tarsal segment with 22 ctenidia, apical hind tarsal segment with 3 weak ctenidia.

Dimensions: B 3.80, FW 3.31, HW 2.54,  $f_1$  0.570, F 0.825, T 1.230,  $t_1$  0.435,  $t_2$  0.165,  $t_1/t_2$  2.636.

Holotype, ♀, BHUTAN, Thimphu 31.5.1972. Paratype, ♂, BHUTAN, Phuntsholing, 2/400 m 15.4.1972.

The crossvein from  $Cu_1$  to M is present in both specimens and appears to be 'normal': this feature enables placement of the species in the Stenopsocidae. Setation of forewing veins indicates placement in *Kodamaius* Okamoto, a small genus found in the Oriental and Ethiopian regions. It differs from all described species on details of forewing colouration and venation.

#### 7. *Taeniosigma* (?) *ingens* Enderlein.

*Taeniosigma ingens*: ENDERLEIN, 1903, Annl. hist-nat. mus. hungarici, 1: 238. Fig. 18, ♀, Tonkin.

Material examined: 1 ♂, 2 ♀♀, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m, 15.6.1972; 1 ♂, same locality but 25.6.1972; 2 ex. INDIA, Distr. Darjeeling, Lebong, 1600–1800 m, 8.5.1975, W. Wittmer.

These specimens are tentatively referred to *T. ingens* on possession of a pronounced pterostigmal stripe (except in one Bhutan ♂, which is somewhat teneral). They closely resemble Singapore specimens referred to this species by NEW and THORNTON (1975), but the species has not been recorded from the Himalayan region. There are several very similar species of *Taeniosigma* in the Oriental region, and the above identification can be confirmed only after a full revision.

### Caeciliidae

#### 8. *Fuelleborniella bhutanensis* n. sp. Figs. 15–17.

♀, Unkown.

♂, Colouration: Pale tawny brown. Eyes black. Head glossy, unmarked. Antennae and maxillary palpi brown. Thorax darker brown dorsally, paler laterally. Legs pale, tibiae slightly darkened. Forewing pale tawny. Hindwing hyaline. Abdomen pale creamy buff.

Morphology: Forewing as Fig. 15. Hypandrium transverse. Phallosome (Fig. 16) broad, with anterior border transverse. Epiproct simple,

unornamented. Paraproct (Fig. 17) with small denticulate field of about 17 trichobothria. Basal hind tarsal segment with 28 ctenidia.

Dimensions: B 3.20, FW 2.78, HW 2.11,  $f_1$  0.495,  $f_2$  0.330,  $f_1/f_2$  1.500, F 0.570, T 0.945,  $t_1$  0.375,  $t_2$  0.120,  $t_1/t_2$  3.125.

Holotype, ♂, BHUTAN, km 87 from Phuntsholing, 22.5.1972.

The well-defined pterostigmal spurvein is diagnostic of *Fuelleborniella*, which is not well-represented in the Oriental region. *F. bhutanensis* differs in wing colouration from *F. persimilis* Thornton and Wong (1966, Darjeeling), and more resembles *F. singaporensis* ENDERLEIN (1903, Singapore), from which it is also distinct on the less heavily patterned wing. Details of the forewing also appear to separate *bhutanensis* from all of the more numerous African species of *Fuelleborniella*.

### 9. *Caecilius* ? *himalayanus* Enderlein

*Caecilius himalayanus*: ENDERLEIN, 1903, Anns. hist-nat. Mus natn. hungarici, 1: 268, Fig. 79.

*C. ? himalayanus* Enderlein. NEW, 1971, Canad. Ent. 103: 209.

Material examined: 1 ♂, BHUTAN, Nobding, 41 km O Wangdi Phodrang. 2800 m, 17.6.1972.

The forewing of this specimen is very similar to that of a Nepalese specimen referred to *C. ? himalayanus* by NEW (1971), although it is rather smaller (FW 2.97 cf 3.51, and 4.5 mm in Enderlein's [1903] description). Type material of *himalayanus* has not been traced and it is preferable not to describe the present specimen as a new species until more himalayan *Caecilius* material becomes available for detailed study.

## Amphipsocidae

### 10. *Amphipsocus heterothrix* Thornton and Wong.

*Amphipsocus heterothrix*: THORNTON and WONG, 1966, Trans. R. ent. Soc. Lond. 118 (1): 13, Figs. 34–41, ♀ ♂, Darjeeling.

*A. heterothrix* Thornton and Wong. NEW, 1973, Oriental Insects, 7 (1), ♀, Nepal.

Material examined: 1 ♀, BHUTAN, Chimakothi, 1900/2300 m, 22.5.1972; 1 ♀, INDIA, U.P. Mussooree, 1300–2000 m, 27.6.1976, W. Wittmer.

THORNTON and WONG (1966) commented that their species apparently differed from *A. pilosus* MCLACHLAN (1872-N. India) in forewing pigmentation. I have recently seen (but not dissected) 'cotypes' of *A. pilosus*, and the forewings of these are closely similar to some speci-

mens of *heterothrix*: it appears likely that *heterothrix* may eventually be synonymised with *pilosus*.

### 11. *Dasypsocus chillcotti* New

*Dasypsocus chillcotti*: NEW, 1971. Canad. Ent. 103, 204, Figs. 44–47, ♀, Nepal.

Material examined: 1 ♀, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m, 25.6.1972.

This specimen is closely similar to *D. chillcotti*, and differs mainly in its slightly larger size (FW 4.74 cf 4.38, 4.41), and in the subgenital plate being more lightly sclerotised than in the type specimens. It is clearly referable to the same species.

### 12. *Dasypsocus* sp. Fig. 24.

Material examined: 1 ex., BHUTAN, Wangdi Phodrang, 1300 m, 7.6.1972.

The forewing of this specimen is shown in Fig. 24. The specimen lacks an abdomen, and consequently cannot be fully characterised. It differs clearly in forewing characters from *D. chillcotti* and is noted here as evidence of a second *Dasypsocus* species in the Himalayan region. The species appears to be undescribed.

## Pseudocaeciliidae

### 13. *Scytosocopsis hirtipenna* Lee and Thornton

*Scytosocopsis hirtipenna*: LEE and THORNTON, 1967, Pacif. Ins. Monogr., 16: 20, Figs. 11–13, ♂, Nepal.

*Scytosocopsis hirtipenna* Lee and Thornton, NEW, 1971, Canad. Ent., 103: 201, Figs. 36–38, ♂, ♀ Nepal.

*Scytosocopsis hirtipenna* Lee and Thornton, NEW, 1973, Oriental Insects. 7 (1): 6, ♂, Nepal.

Material examined: 1 ♂, BHUTAN, Thimphu, 29.4.1972; 1 ♀, INDIA, Distr. Darjeeling, Lebong, 8.5.1975, W. Wittmer.

The female is badly broken but appears to represent this species, which was not hitherto known from outside Nepal. Examination of the female enables me to correct an error of structural interpretation made in NEW (1971): it appears that the 'ventral membranous lobe' on the dorsal valve of the gonapophyses (NEW 1971, Fig. 37) may represent part of the apex of the subgenital plate. The subgenital plate of the Darjeeling female ends in a broad truncated apex, which is divided, and each half of which bears 2 stout setae. The structure depicted in my

description of the female is apparently an adpressed half of the subgenital plate apex.

### Hemipsocidae

#### 14. *Hemipsocus chloroticus* (Hagen)

*Psocus chloroticus*: HAGEN, 1858, Verh. zool.-bot. Ges. Wien 8: 474.

*Hemipsocus chloroticus* (Hagen): SELYS-LONGCHAMPS, 1872, Entomologist's mon. Mag. 9: 146.

*Hemipsocus hyalinus*: ENDERLEIN, 1906, Stettin. ent. Ztg. 67: 311.

Material examined: 1 ♀, BHUTAN, Samchi, 300 m, 7.–11.5. 1972.

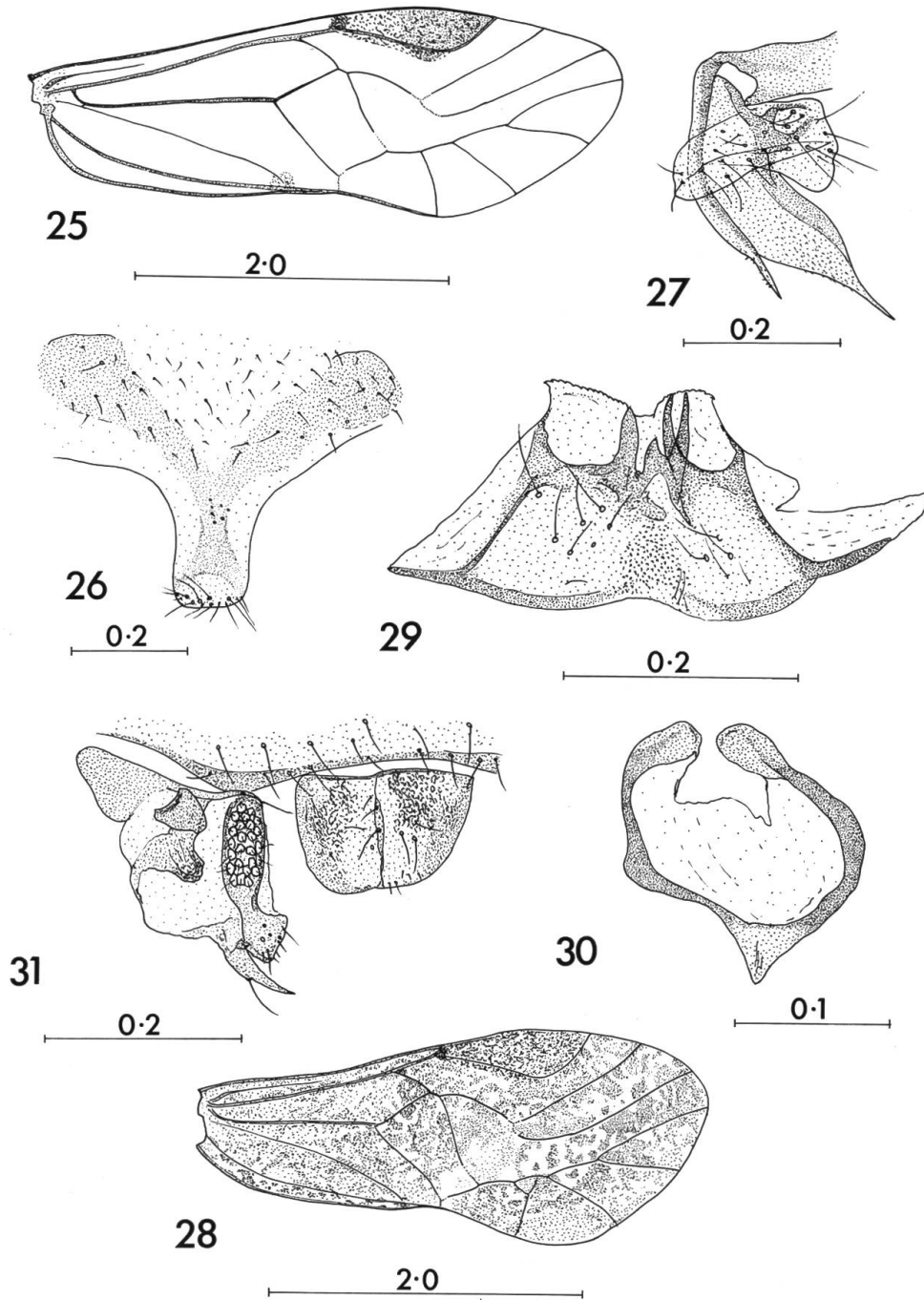
This widely-distributed species has not been recorded from the Himalayan region, and is one of several very similar species of *Hemipsocus*. Females are difficult to identify convincingly: female genitalia of *chloroticus* were figured by BADONNEL (1966), and those of the present specimen correspond in all respects. The external valve of the gonapophyses bears three short setae.

### Psocidae

#### 15. *Psocidus* (s. str.) *samchiensis* n. sp. Figs. 25–27.

♀, Colouration: Buff, with dark brown markings. Eyes black. Ocelli hyaline, subtended by inner black arcs. Posterior half of vertex with 3 or 4 rows of dark spots along midline and 1–2 rows of similar spots dorsal to each eye. Frons with brown stripes anterior to ocellar tubercle and a transverse V-mark converging from either side of midline. Postclypeus with 5 or 6 narrow brown striae each side of midline. Anteclypeus brown. Labrum brown ventrally. Apical segment of maxillary palpi dark brown. Antennae dark brown. Genae with a faint brown spot. Thorax marked with brown on dorsal lobes and pleural sutural areas browned. Legs: femora pale except at apex, tibiae slightly darkened, tarsus dark brown. Wings hyaline except for brown forewing marking as in Fig. 25. Abdomen with broad dark brown bands across all tergites.

Morphology: Forewing (Fig. 25). Subgenital plate (Fig. 26) with elongate blunt median lobe bearing group of preapical setae; sclerotised area Y-shaped. Gonapophyses (Fig. 27): dorsal and ventral valves strongly attenuated, spiculate; external valve large, without large apical



Figs. 25–31. 25–27, *Psocidus samchiensis* n. sp., ♀ : 25, forewing; 26, subgenital plate; 27, gonapophyses. 28–31, *Trichadenotecnum sclerotum* n. sp.: ♂ : 28, forewing; 29, hypandrium; 30, phallosome; 31, epiproct and paraproct. (Scales in mm)

lobe. Epiproct trapezoidal. Paraproct with divided field of 11/10 trichobothria. Basal hind tarsal segment with 21 ctenidia; apical hind tarsal segment with 2 ctenidia.

Dimensions: B 3.64, FW 3.59, HW 2.78,  $f_1$  0.750,  $f_2$  0.630,  $f_1/f_2$  1.190, F 0.705, T 1.425,  $t_1$  0.390,  $t_2$  0.150,  $t_1/t_2$  2.600.

♂: Unknown.

Holotype, ♀; BHUTAN, Samchi, 300 m, 7.–11.5.1972.

This specimen is referred, largely on the basis of the divided trichobothrial field of the paraprocts, to *Psocidus* Pearman s.str., (THORNTON 1960). This small group of species is predominantly Oriental, and females resemble some included in the 'Blaste' group of genera except in the above character. *P. samchiensis* is most similar to *P. murphyi* NEW (1975, Singapore), and differs from it in the sclerification pattern of the posterior region of the subgenital plate. The generic placement should be regarded as tentative, pending discovery of males.

#### 16. *Trichadenotecnum sclerotum* n. sp. Figs. 28–31.

♀: Unknown.

♂: Colouration: Dark brown pattern on ivory ground. Eyes black. Antennae pale brown. Ocelli on small black tubercle. Vertex midline with block of dark brown spots posterior to ocelli. Traces of darker spots dorsal to eyes. Borders of frons dark brown; frons with 2 dark brown stripes near midline and a dark spot external to these, linked to anterior border. Postclypeus with 5 dark brown striae each side of midline. Anteclypeus paler. Labrum dark brown. Maxillary palpi wholly dark brown. Thorax dark greyish brown, with sutural areas paler. Forewing with intense greyish brown maculation. Hindwing hyaline. Abdomen with greyish brown annuli, genitalic region very dark.

Morphology: Forewing as in Fig. 28. Hypandrium (Fig. 29) asymmetrical, with 2 strong dorsal spines to right of midline, a short blunt spine near midline, and a single longer spine to the left of this. Phallosome (Fig. 30) rounded, frame incompletely closed posteriorly and with a short tapered anterior projection. Epiproct (Fig. 31) broadly rounded. Paraproct (Fig. 31) complex; a strong anterior external process, a discrete additional sclerite near this, a strong apical spine and an inner quadrangular lobe closely associated with elongate field of about 30 trichobothria. Basal hind tarsal segment with 19 ctenidia, apical hind tarsal segment with 3 ctenidia.

Dimensions: B 3.65, FW 3.26, HW 2.44,  $f_1$  0.525,  $f_2$  0.510,  $f_1/f_2$  1.029, F 0.540, T 1.125,  $t_1$  0.330,  $t_2$  0.135,  $t_1/t_2$  2.444.

Holotype, ♂, BHUTAN, Thimphu, 29.4.1972.

This species differs clearly in genitalic features from all described species of *Trichadenotecnum* s.l. The shape of the paraproct is somewhat similar to that of *T. apertum* THORNTON (1961-Hong Kong) but *apertum* lacks the pronounced external flange and accessory sclerite, and differs markedly in hypandrial and phallosome characters. Several other Oriental *Trichadenotecnum* species have the phallosome frame open and an asymmetrical hypandrium. *T. sclerotum* may prove to be related to some of these, such as *T. distinctum* DATTA (1969-Assam), but the unusual paraproct characters suggest that it is relatively isolated in the genus.

17. *Metylophorus paranebulosus* n. sp. Figs. 32–35.

♀, Colouration: Buff. Eyes black. Antennal base pale: apex of  $f_1$  and whole of rest of flagellum dark brown. Ocelli in separate black annuli. Vertex with pale greyish brown patches along midline and dorsal to eyes. Postclypeus with about 8 slender pale brown striae each side of midline. Anteclypeus and labrum mid brown. Apical segment of maxillary palpi brown. Thorax buff; no contrasted markings, although central regions of dorsal lobes somewhat darkened. Legs with tibiae and tarsi slightly darker than femora. Forewing marked with pale to mid brown as in Fig. 32. Hindwing hyaline. Abdomen undarkened.

Morphology: Forewing (Fig. 32):  $Cu_{1a}$  with basal and second lengths separating at about  $120^\circ$ . Subgenital plate (Fig. 33) with long rounded median lobe bearing preapical and lateral setae; well defined lateral sclerotised regions on body of plate, setae most numerous near midline. Gonapophyses (Fig. 34): ventral and dorsal valves of similar length; dorsal valve bluntly tapered; external valve large, transverse. Epiproct (Fig. 35) trapezoidal. Paraproct (Fig. 35) with strongly produced apex and field of about 45 trichobothria. Basal hind tarsal segment with 29 ctenidia. Apical hind tarsal segment with 7 ctenidia.

Dimensions: B 6.30, FW 5.51, HW 4.12,  $f_1$  1.350,  $f_2$  1.230,  $f_1/f_2$  1.098, F 1.095, T 2.385,  $t_1$  0.735,  $t_2$  0.300,  $t_1/t_2$  2.450.

♂, Unknown.

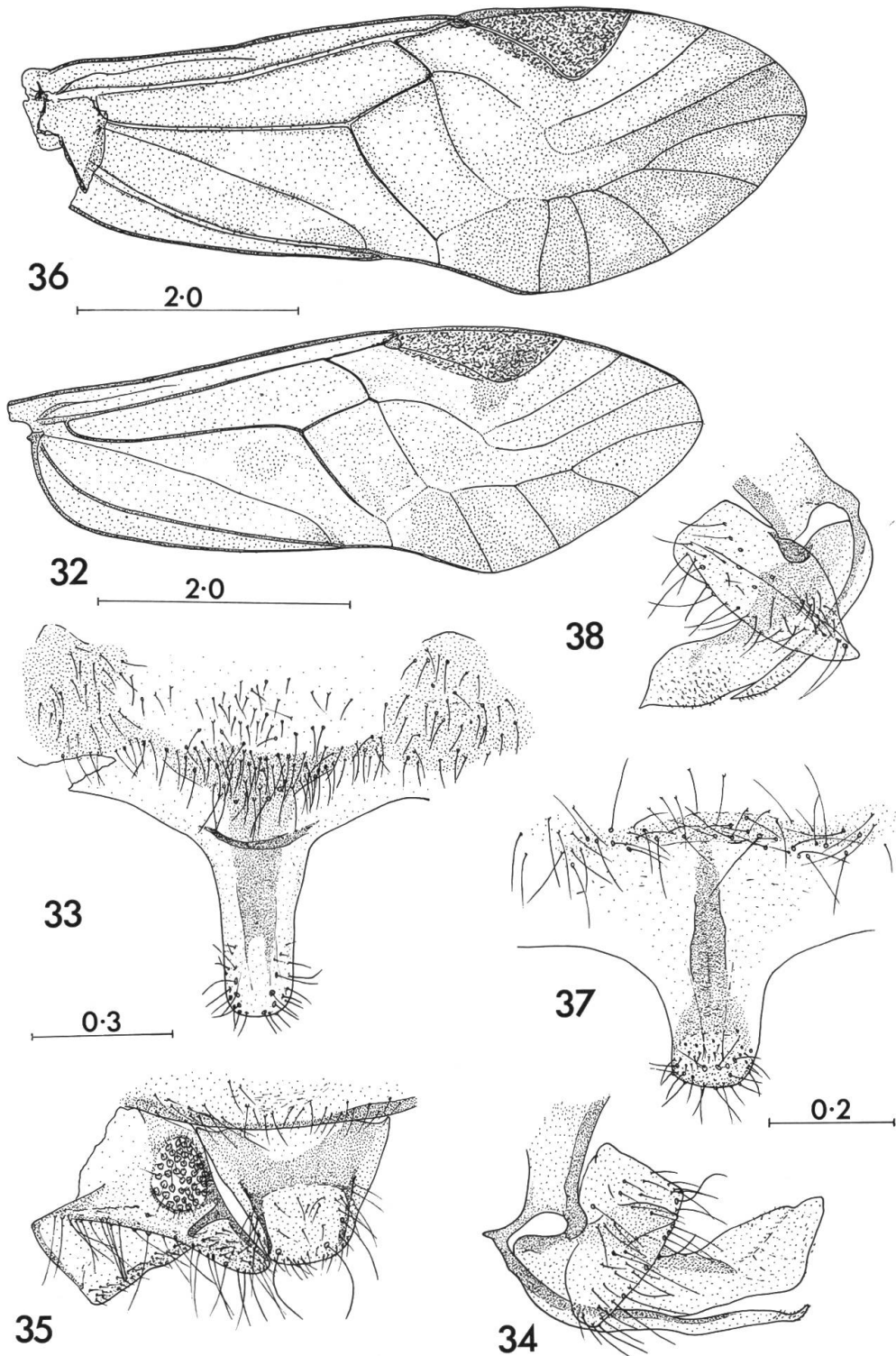
Holotype, ♀, BHUTAN, Wangdi Phodrang, 1300 m 9.6.1972.

This species superficially resembles the one next-described, and is diagnosed following the description below.

18. *Metylophorus fuscatus* n. sp. Figs. 36–38.

♀, Colouration: as the last-described species except (1)

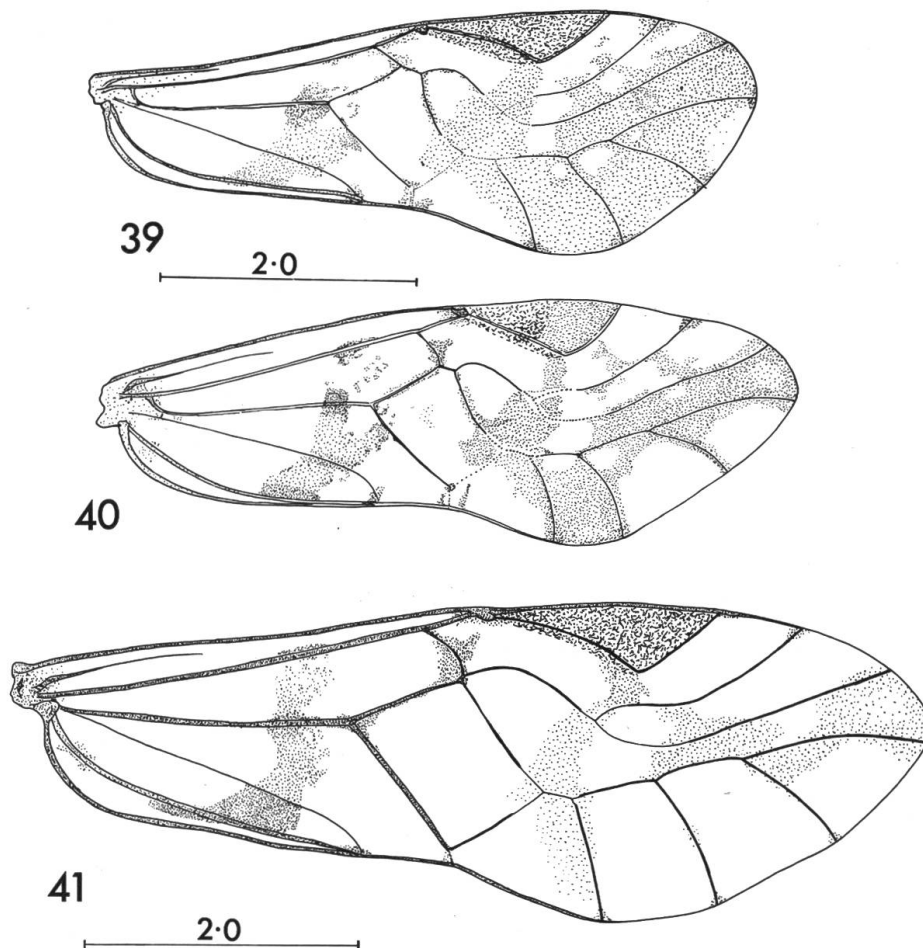




Figs. 32–38. *Metylophorus* n. spp., ♀♀. 32–35, *M. paranebulosus*: 32, forewing; 33, subgenital plate; 34, gonapophyses; 35, epiproct and paraproct. 36–38, *M. fuscatus*: 36, forewing; 37, subgenital plate; 38, gonapophyses. (Scales in mm; 37, 38 to same scale)

mesothoracic lobes more strongly browned and (2) forewing markings somewhat more pronounced, especially the intensity of pigment bordering the veins around the discoidal cell.

Morphology: Forewing (Fig. 36) with pterostigma strongly broadened; M after separation from Rs curved towards  $Cu_{1a}$ ; basal and second lengths of  $Cu_{1a}$  separate at about  $170^\circ$ ; M (? anomalous) 4-branched. Subgenital plate (Fig. 37) with short broad median lobe bearing apical and preapical setae; sclerotisation pattern of plate a T-shape, with lateral arms weakly sclerotised. Gonapophyses (Fig. 38): ventral valve shorter than dorsal valve; dorsal valve tapered to narrow apex; external valve very large. Epiproct trapezoidal, with preapical setae.



Figs. 39–41. *Psococerastis* spp., 'taprobanes'-group, forewings of forms 1 (39), 2 (40), 3 (41).  
(Scales in mm)

Paraproct with a field of about 38 trichobothria. Basal hind tarsal segment with 23 ctenidia. Apical hind tarsal segment with 6 ctenidia.

Dimensions: B 6.60, FW 6.47, HW 4.69,  $f_1$  1.530,  $f_2$  1.620,  $f_1/f_2$  0.944, F 1.200, T 2.355,  $t_1$  0.525,  $t_2$  0.300,  $t_1/t_2$  1.750.

♂, Unknown.

Holotype, ♀, BHUTAN, Sampa-Kotoka, 1400–2600 m, 9.6.1972.

*Metylophorus* is not well represented in the Oriental region. Generic separation in the Metylophorini is not wholly satisfactory, especially for females, but both the above species fall into a broad concept of *Metylophorus*.

*M. paranebulosus* is similar to *M. nebulosus* Stephens (Europe, but with unconfirmed records from India, China and Japan), and differs from it in only small characters — the more limited distribution of setae on the lobe of the subgenital plate, the smaller angle of separation of basal and second lengths of  $Cu_{1a}$ , and the shape of the apex of the dorsal gonapophysis. It is clearly related to *nebulosus* but, pending confirmation of earlier records of *nebulosus* in the Oriental region it is preferable to regard these differences as being of specific value.

*M. fuscatus* resembles *paranebulosus* in the gross colouration of the forewing, but differs from it in details and more clearly in genitalic features. The relatively short ventral valve is unusual in *Metylophorus*. The venation in the posterior region of the forewing may be anomalous.

#### 19.–21. *Psococerastis* spp. (taprobanes-group). Figs. 39–41.

Material examined: (1) 1 ♀, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m, 15.6.1972; (2) 1 ♀, BHUTAN, Thimpu river, 29.4.1972; (3), 1 ♂, 1 ♀, BHUTAN, 21 km O Wangdi Phodrang, 1700–2000 m (♂) 15.6.1972, (♀) 25.6.1972.

The taxonomy of the Oriental representatives of the *Psococerastis taprobanes* group of species is confused. Traditionally, differences in forewing markings have been taken as specific characters, and this practice appears to be sound in some cases, but not in others (see NEW 1976). The Bhutan specimens listed above appear, on forewing pigmentation, to represent three species, as indicated: the forewings of these are shown in Figs. 39–41. Female genitalia of species in this group are very similar to each other, but those of males are more distinctive. The above male appears to be distinct from all described species of the group on details of its phallosome, but the three females are very similar both to each other and to several species found elsewhere in the Oriental region.

The two sexes are provisionally associated. The species are not described here, but the forewing figures should enable recognition of this group, which, although widely distributed, has been little collected in the Himalayan region.

Further work on the group is in progress, and fuller details of the Bhutan specimens will be included in it: it is already clear, from study of purported type material of species described during the nineteenth century, that some of these may have been misrepresented by all later authors.

### Myopsocidae

#### 22. *Myopsocus sanguensis* New

*Myopsocus sanguensis*: NEW, 1973, *Oriental Insects* 7 (1): 9, Figs. 16–22, ♂, ♀, Nepal.

Material examined: 1 ♂, BHUTAN, Samchi, 300 m, 7.–11.5.1976.

This species was hitherto known only from Nepal.

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