PSOCIDAE (INSECTA: PSOCOPTERA) FROM THE ISLANDS OF BALI AND LOMBOK, INDONESIA

by

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SUMMARY

Collection of Psocidae in Bali and Lombok in August-December 1987 by I.W. B.T., in September 1987 by C. Lienhard, and in August 1990 by E.S.K. were examined to characterise taxonomically this family on these islands. Thirteen species of the family had previously been reported on one or both islands. Species in the collections under study not previously recorded from the islands are: Ptycta incurvata *Thornton (known from Hong Kong);* Trichadenotecnum malayense *New (known from the Malay Peninsula);* Cycetes thyrsophoroides *Enderlein (known from Java) two species (representing a new genus,* Indoblaste*); and seven other newly described species, one each of* Sigmatoneura *and* Ptycta*, three of* Psocidus *s.str. and two of* Trichadenotecnum*. Moreover, two species, one psocine and one amphigerontine could not be placed into presently diagnosed genera and may represent new genera. Descriptions of previously undescribed species are provided, as are descriptions of the males of* Clematoscenea lemniscata *Enderlein,* Psocidus reidi *Thornton, and a further description of* Cycetes thyrsophoroides. Ptycta frontalis *Thornton. A key to genera, and keys to species within larger genera, are provided, using, where possible, features observable without dissection.*

Five species from Bali are endemic, and 5 from Lombok; both islands share a further 7 species endemic to the two islands. Additionally, 10 species known from the islands are found elsewhere. The Bali-Lombok fauna of Psocidae now stands at 27 species and there is no evidence from the species discovery curve that the total fauna has yet been sampled. Of the 10 single-island endemics none is eurytopic (found at a wide range of altitudes). In contrast, of the 11 species found on both islands, 8 (73%) are eurytopic. Bali endemics tend to be highland stenotopes (on present evidence) whereas Lombok endemics tend to be restricted to middle elevations. Of the ten species known from elsewhere, only two are known from east of Lombok (from Komodo). The others are from the Malay Peninsula, Singapore, Sumatra, Java, Madura, and Hong Kong.

INTRODUCTION

Up to 1959, 127 species of psocids had been described from the Indonesian Archipelago (including the islands of Borneo and New Guinea): 71 species from Java, 5 from Sumatra, 18 from Borneo, 4 from Durian, 2 from Sula, 1 from Nusa Kambangan, one each from-

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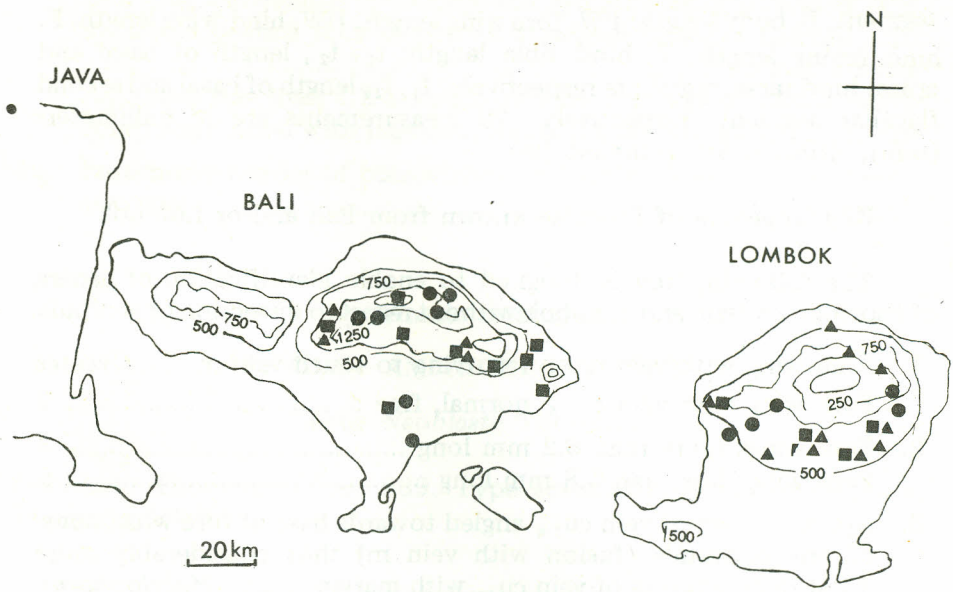
Krakatau and Lombok and 24 from New Guinea (Navas 1927; Soehardjan 1958; Soehardjan and Hamann 1959). Subsequent papers by Lee and Thornton (1967), Thornton and Wong (1968), Thornton and Smithers (1977), and Smithers and Thornton (1981) have recorded about 20 more species from Irian Jaya (Indonesian New Guinea). Seventy-six species were recorded by Thornton (1984) from the island of Bali and Lombok; 40 of these were newly decsribed and 25 were new records for Indonesia. Vaughan *et al.* (1989, 1991) reported 132 species from the Krakatau Islands and adjacent areas of Sunda Strait; 47 of these were newly described and 29 were new records for Indonesia. Thus by 1991 some 280 species were known from Indonesia, 76 of them occuring in Bali and/or Lombok.

Fifty-seven species of the large family Psocidae have been described from the Indonesian archipelago [Java 14, Sumatra 2, Borneo 5, Krakatau 4, Bali 10, Lombok 7, and New Guinea 24 (of which 6 were found in Irian Jaya)]. Species of the family are found predominantly on the bark of trees and shrubs, evidently largerly feeding on fungus; they are usually collected by beating (Thornton 1985).

The aim of this study was to examine more recent collections from Bali and Lombok in order to characterize as far as possible the Psocidae fauna of these islands and to construct a key to genera and species. The basis of the study is a number of collections of Psocidae made on Bali and Lombok from October to December 1987 by I.W.B. Thornton (IWBT), in September 1987 by Dr C. Lienhard (CL), and in August 1990 by Endang Sri Kentjonowati (ESK). All collectors made some effort to collect, mainly by beating, not only in the lowlands, but also on the slopes of volcanoes, up to 1850m in some cases (map A).



● 1977
■ 1987
▲ 1990

MAP A SHOWING COLLECTION SITES ON BALI AND LOMBOK
(contours in meters, highest contour [not numbered] 1600m)

The following abbreviations are used in species descriptions: I.O:D, ratio of interocular distance to eye diameter following the method of Pearman (Ball 1943: 27); Ct, number of ctenidia on basal hind tarsal segment; B, body length; FW, fore wing length; HW, hind wing length; F, hind femur length; T, hind tibia length; t_1, t_2, length of basal and apical hind tarsal segments respectively; f_1, f_2, length of basal and second flagellar segments respectively. All measurements are in millimeters (mm), altitudes are in meters (m).

Key to genera of Psocidae known from Bali and/or Lombok

The following key is designed to enable identification of genera of Psocidae on Bali and Lombok without resort to dissection of genitalia.

1. Fore wing with vein r_4+_5 recurving to touch vein m..... *Cycetes*
   Fore wing with vein r_4+_5 normal, free 2
2. Fore wings more than 6.2 mm long 3
   Fore wings less than 5.8 mm long 5
3. Apical section of vein cu_{1a} angled towards base of fore wing, apex of areola postica (fusion with vein m) thus considerably more distal than junction of vein cu_{1a} with margin..... *Metylophorus*
   Vein cu_{1a} meets margin of fore wing opposite to or more distal than apex of areola postica (fusion with vein m) 4
4. Vein m_3 and distal section of vein cu_{1a} in fore wing straight, parallel, cell M_3 thus narrow, rectangular..... *Clematoscenea*
   Vein m_3 and distal section of vein cu_{1a} in fore wing curved, slightly divergent, cell M_3 thus trapezoidal ..... *Psococerastis*
5. Basal and second sections of vein cu_{1a} in fore wing aligned, or nearly so, areola postica thus appearing four-sided 6
   Basal and second sections of vein cu_{1a} meet at an angle, areola postica thus appearing five-sided 8
6. Pterostigma with posterior border smoothly curved, convex .... undescribed genus of Psocinae
   Posterior border of pterostigma basally concave or straight, apically convex 7
7. Fore wing with pigment spots in apical cells .... *Trichadenotecnum*
   Fore wing apical cells hyaline ..... *Psocidus s.str.*
8. Fore wing veins rs and m connected by long cross vein .... undescribed genus of Amphigerontiinae
   Fore wing veins rs and m fussed or meet at point 9

9. Antennae more than 1.5 x length of fore wing, whole area of pterostigma pigmented; areola postica with basal and distal sections of vein cu_{1a} converging anteriorly and symmetrically to fusion vein m, areola postica thus shaped as truncated isosceles triangle .... *Sigmatoneura*
   Antennae less than 1.2 x length of fore wing; pterostigma never completely filled with pigment; areola postica not as above 10
10. Posteriorly border of pterostigma smoothly convex, no spur vein at vertex ..... *Prycta*

Systematic treatment

Subfamily AMPHIGERONTIINAE

Genus *Neoblaste* Thornton

Neoblaste Thornton 1960: 239. Type species: *Neoblaste papillosus* Thornton 1960.

Three species of the collections are included in the genus *Neoblaste*. They are similar to the two species of *Neoblaste* found from Hong Kong (Thornton 1960) in structure of gonapophyses, shape of areola postica and pterostigma, male parameres being free and hooked, hypandrium with a pair of free accessory sclerites.

Neoblaste alticola Thornton

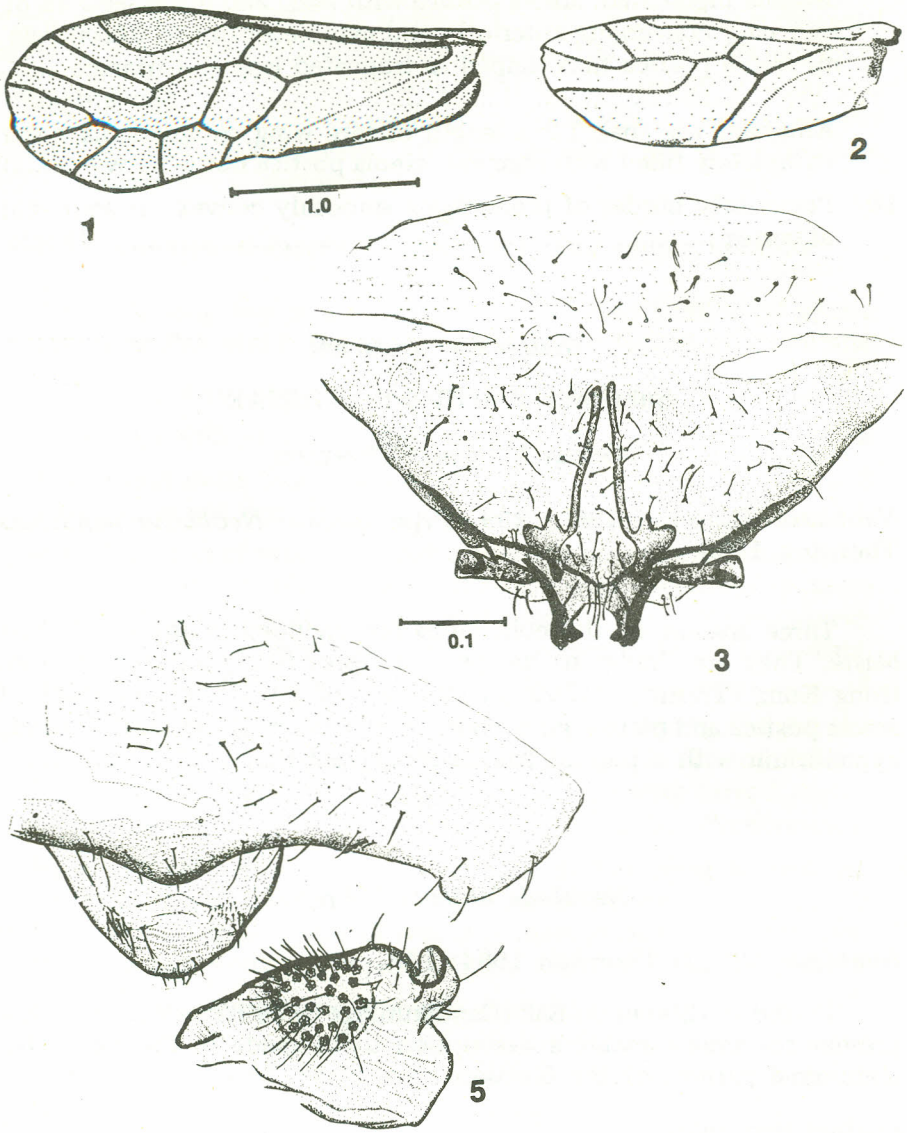
Neoblaste alticola Thornton 1984: 143.

Found at 1200 m on Bali (Candikuning) by IWBT in vii. 1977, the present specimens enable a description to be made of the distinctive abdominal pattern of the female.

Further description:

Female

Coloration: Abdomen with a buff band over segments 1-2, broad brown band over segments 3-6 and a narrow subapical buff band over segments 7-8. Middle of fore wing suffused very pale brown.



Figs 1 — 5 *Neoblaste brunnea* ♂

Material examined. BALI: west, Karang Anyar to Penulisan, 1200-1600, beating, 1♀ 27.xii.1987 IWBT (AMS); Bedugul, Botanical Garden, 1200 m, beating, 2♀ 7.viii.1990 1♂ 4♀ 8.viii.1990 ESK (ZMB); Bedugul, north of Botanical Garden, 1250 m, beating, 3♀ 8.viii.1990 ESK (ZMB). LOMBOK: Tetebatu, 500-600 m, beating, 1♂ 3♀ 6.x. 1987 IWBT (AMS); northwest, Pusuk, 680 m, protected forest, beating, 1♂ 15.xi.1987 IWBT (ZMB); Sajang forest, 1000 m, beating, 1♀ 24.viii.1990 ESK (ZMB).

The fore wing length of the 1987 specimens is slightly less than that of the holotype and the extent of the fusion of veins m and rs varies, although no specimens were found in which these veins met at a point or were connected by a cross vein.

Neoblaste cubitalis (Enderlein)

Psocus obtusus Hagen; Enderlein, 1903: 227; not Hagen, 1858: 474.

Psocus cubitalis Enderlein, 1915: 36.

Neoblaste cubitalis (Enderlein) Thornton 1984: 143

Material examined. LOMBOK: central, Setiling, north of Aik Buka, 600 m, beating, 1♀ 22.xii.1987, IWBT (ZMB); 1♀ 16.viii.1990, ESK (ZMB); east, Sapit, 625 m, citrus, beating, 1♀ 27.xi.1987, IWBT (ZMB); 1♀ 17.viii.1990, ESK (ZMB); west Suranadi, 250 m, beating, 4♀ 17.xi.1987, IWBT (AMS).

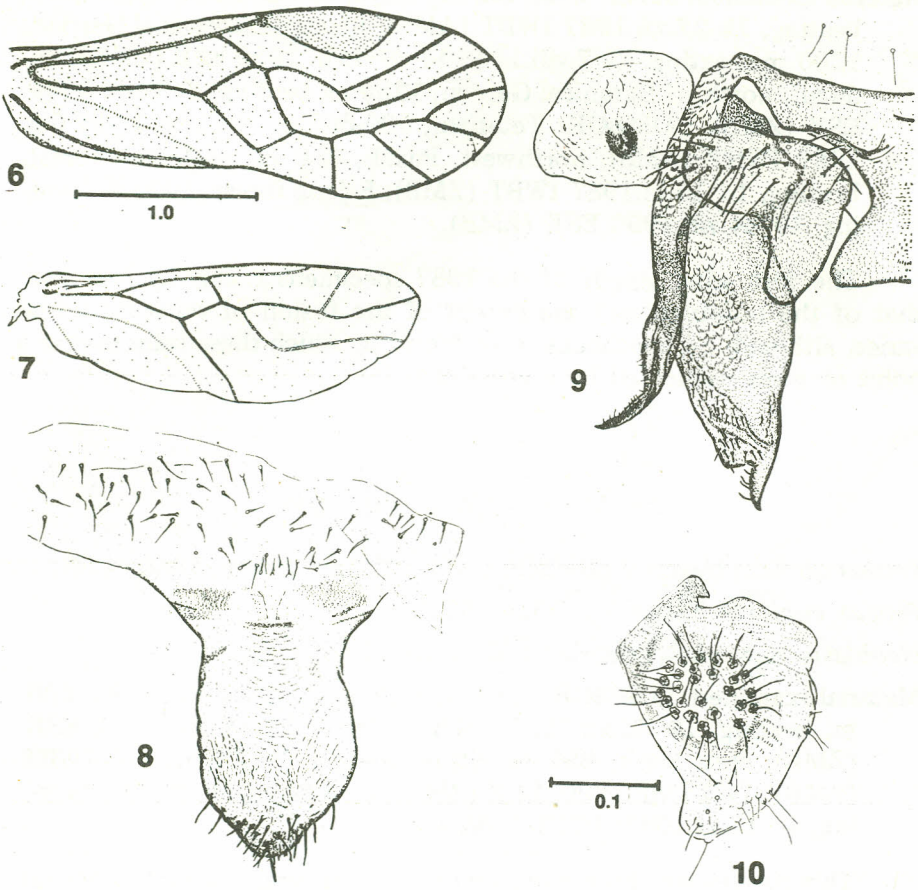
This species was previously recorded from Singapore by Enderlein (1903) and from the lowlands of Lombok (Narmada) by IWBT in vii. 1977 (Thornton 1984; thus far it has not been found in Bali. In some specimens veins m and rs of the fore wing are fused and in some they meet at point.

Neoblaste brunnea sp.n.

(figs. 1-10)

Male

Coloration (after 3 years in alcohol): Head generally pale buff, vertex yellowish. Epicranial suture pale, with brown band each side and light brown band around each eye. Eyes black. Ocelli pale, with dark brown centripetal margins. Frons brown, posterior suture light brown. Postclypeus with light brown longitudinal striae. Ge-



Figs 6 — 10 *Neoblaste brunnea* ♀

nae pale with light brown marks. labrum pale brown. Maxillary palp wholly pale buff. Antennae light brown. Thoracic terga and pleura brown except pronotum pale. Coxae and femur cream, tibia and tarsus pale brown. Fore wing (fig. 1) suffused with brown; hind wing (fig. 2).

Morphology: IO:D = 3.8. Ct = 20. Pterostigma of fore wing smoothly rounded, areola postica extensively fused with media. Parameres (fig. 3), separate, with large subapical boss. Hypandrium (fig. 3) separate, with large subapical boss. Hypandrium (fig. 3) with two pairs of accessory sclerites, the outer pair with short sharp spines. Epiproct (fig. 4) with apical and lateral fields of setae. Paraproct (fig. 5) with field of 34 trichobothria;

Female

Coloration (after 3 years in alcohol): As male, with following exceptions: genae yellowish with broad brown band near orbit, labrum pale. Legs pale buff. Fore wing (fig. 6) and hind wing (fig. 7) suffusion lighter than male.

Morphology: IO:D = 4.5:1, Ct = 20. Subgenital plate (fig. 8): apex of terminal lobe tapering to rounded apex which bears setae and fine spicules; disc setose, no distinctive sclerotisation. Gonapophyses (fig. 9): dorsal valve with apical tine and a field of fine setae subapically; ventral valve acuminate, fine setae on apical region; outer valve setose, with distinct posterior lobe. Spermapore plate with small oval area of sclerotisation around pore. Paraproct (fig. 10) with field of 27 trichobothria.

Dimensions of male holotype: B = 2.1; FW = 2.86; HW = 2.12; F = 0.73; T = 1.06; t_1 = 0.23; t_2 0.10; t_1/t_2 = 3.2; f_1 = 0.47; f_2 = 0.38; F_1/f_2 = 1.24.

Holotype ♂: LOMBOK, Aik Buka, beating, 500 m, 20.xi.1987, IWBT (ZMB). Allotype ♀: same data as holotype (ZMB). Paratypes: ♂ same data as holotype (AMS). Other specimen examined: KOMODO Island: Loholiang, 100 m, 1♂ 7-10.xi.1987 IWBT (AMS).

The female differs from that of *Neoblaste papillosus* (Hong Kong), *Neoblaste alticola (Bali) and Neoblaste cubitalis* (Lombok) in the tapering distal margin of the distal lobe of the subgenital plate and no distinctive sclerotisation of the disc, and an apical field of fine spines on the ventral valve of the female gonapophyses. The hypandrium is generally similar to those of *N. cubitalis* and *N. papillosus* in having two pairs of free accessory sclerites; however, *Neoblaste brunnea* lacks the median sclerite of *N. papillosus* and the median pair of sclerites are narrower and more pointed than those of *N. cubitalis*. Moreover, the posterior border of the hypandrium proper is sclerotised, particularly laterally. The species is most similar to *N. cubitalis*.

In coloration *Neoblaste brunnea* differs from the three species mentioned above in having pale maxillary palpi and unpatterned fore wings uniformly suffused with brown. The species has not yet been found in Bali.

Indoblaste gen. nov.

Belonging to the Amphigerontiinae, eighth sternite fused with hypandrium. Hypandrium with apical pair of pegs or hooks (in some species twisted) and a pair of lateral membranes with medially directed lobes. Parameres slender, not having large hooks. Female subgenital plate with apical lobe marked off from main plate and with surface of apical lobe setose. Dorsal valve of female gonapophyses long, bluntly rounded, with distinct skeletal rod continuing to base of apical tine; outer valve with posterior lobe. Spermapore plate with complex pattern of sclerotisation round spermapore and a posterior scabbard-shaped sclerite.

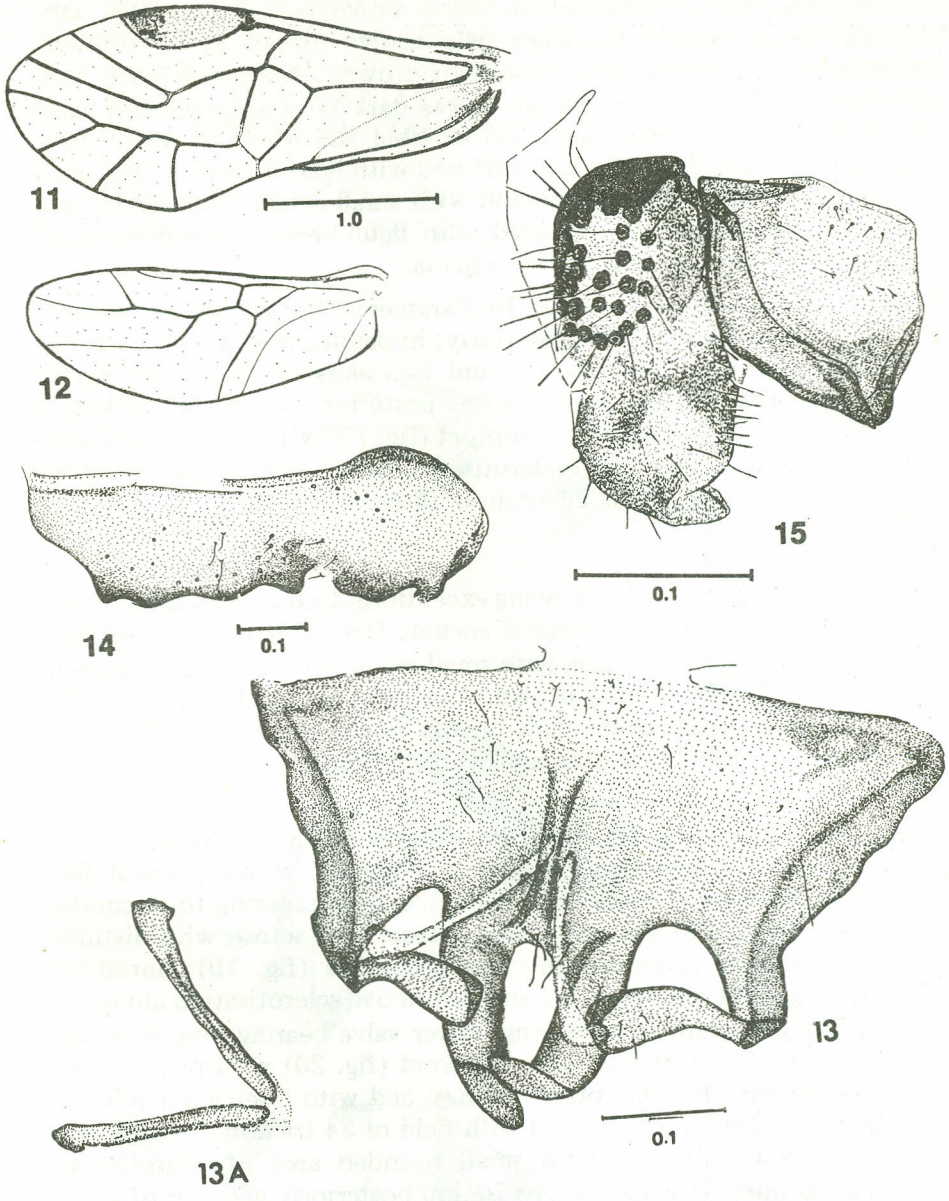
This genus is erected for two species which have the above features in common but cannot be placed in any of the existing genera or subgenera (Smithers 1990). In one species the parameres are fused anteriorly, in the other they are free; in one they are hooked posteriorly. Setae occur on the surface of the apical lobe of the subgenital plate in *Blastopsocidus* Badonnel 1967 and *Blatse* subgenus *Euclismiopsis* Badonnel 1955. In *Blastopsocidus*, however, there is no apical tine on the dorsal valve of the gonapophyses, and the accessory hypandrial sclerites cross over the mid-line and are serrate. In *Euclismiopsis* the dorsal valve ends in a short tapered point rather than a distinct tine and the parameres are stout and clearly hooked. The hypandrial structure of the two species described below does not conform to that described for any of the genera or subgenera of the subfamily.

Indoblaste lienhardi sp.n.

(figs. 11-22)

Male

Coloration (after 3 years in alcohol): Head generally cream. Vertex light brown. Epicranial suture dark brown with 2 or 3 rows of brown spots each side and across posterior margin of vertex. Eyes black. Two or three rows of similar-sized spots mesial to each eye. Ocelli pale with black centripetal margins. A brown line from ocellar tubercle to antennal socket. Frons cream with triangular brown mark



Figs 11 —15 *Indoblaste lienhardi* ♂

anterior to ocellar tubercle; frons-clypeal suture dark brown. Post-clypeus with 12 longitudinal striae, anteclypeus light brown, labrum dark brown. Maxillary palp brown except apical segment black. Genae pale, otherwise light brown. Antennae wholly dark brown. Thorax brown. Legs: coxae dark brown, femur and basal 1/3 of tibia brown, distal 2/3 of tibia and whole of tarsus dark brown. Fore wing (fig. 11) suffused with light brown, pterostigma suffused with faint brown and with small apical patch of brown. Hind wing (fig. 12) suffused with light brown. Abdomen with broad brown band as in *N. alticola.*

Morphology: IO:D = 4.1:1. Ct = 18. Parameres (fig. 13) separate, short, with small blunt hook posteriorly; hypandrium (fig. 13) with median sclerotised keel-like bar and two pairs of accessory sclerites posteriorly. Ninth tergite with posterior border sclerotised in distinct pattern (fig. 14). Epiproct (fig. 15) with distinctive sclerotisation anteriorly and sclerotised lateral extensions; paraproct (fig. 15) with field of 26 trichobothria.

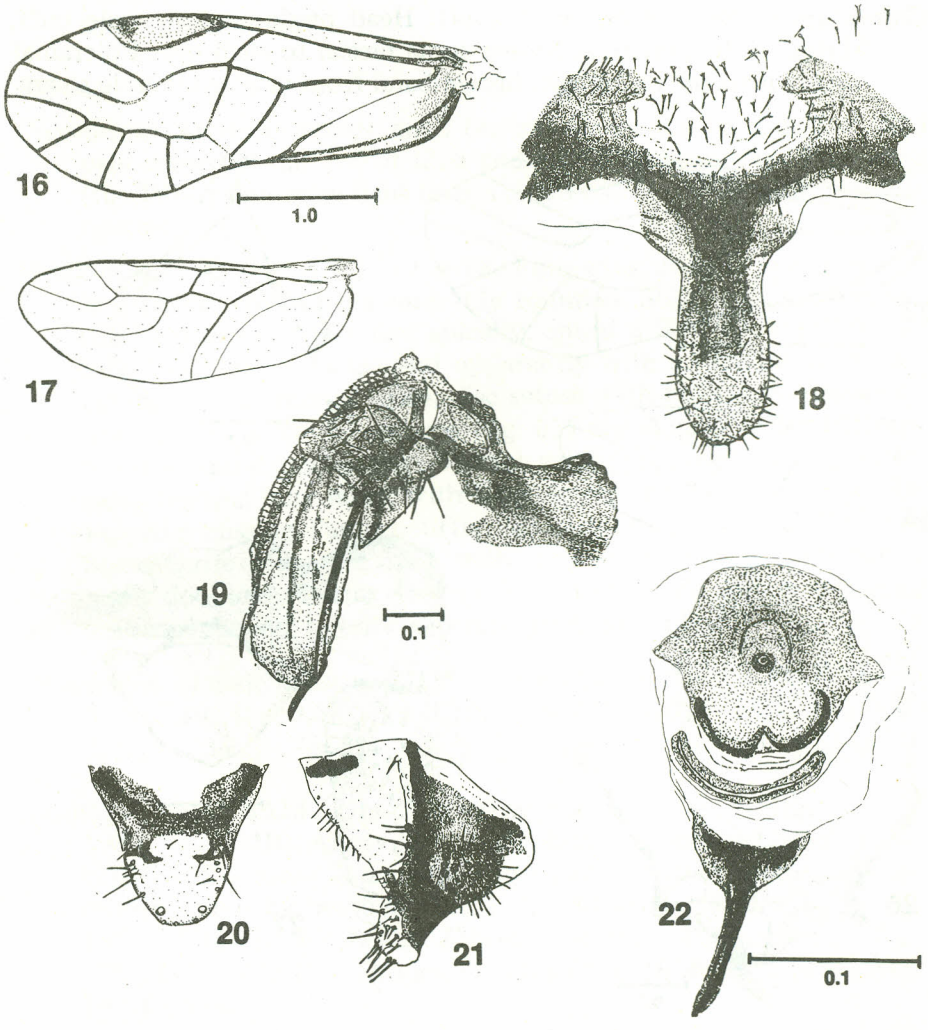
Female

Coloration: As male, with following exceptions. Genae pale, faint brown mark from orbit to antennal socket; fore wing (fig. 16) suffused light brown, pterostigma with small apical brown patch. Hind wing (fig. 17) suffused light brown. Antennae brown, except basal 1/2 of f_1 pale. Legs: coxae dark brown, femur and basal 2/3 of tibia brown, distal 1/3 of tibia and whole of tarsus dark brown.

Morphology: IO:D = 4.2:1. Ct = 20. Veins rs and m of fore wing meet at a point; pterostigma smoothly rounded; areola postical five-sided. Subgenital plate (fig. 18) apical lobe tapering to a rounded apex, apical 2/3 of apical lobe setose, disc setose with distinctive Y-shaped sclerotisation. Gonapophyses (fig. 19): dorsal valve long, with posterior tine and distinctive sclerotisation along dorsal margin; ventral valve long; outer valve bearing long setae and with pointed posterior lobe. Epiproct (fig. 20) with pair of short mesially-directed sclerotised prongs, and with 4 setae much longer than rest. Paraproct (fig. 21) with field of 34 trichobothria. Spermapore plate (fig. 22) with small rounded area of sclerotisation around pore, W-shaped sclerotisation posteriorly and pair of a free sclerites posterior to and separate from plate, the posterior one scabbard-shaped.

Dimensions of male holotype: B = 2.1; FW = 3.15; HW = 2.45; F= 0.63; T = 1.27; t_1 = 0.29; t_2 = 0.12; t_1/t_2 = 2.42; f_1 = 0.55; f_2 = 0.50; f_1/f_2 = 1.1.

Holotype ♂: LOMBOK, east central, Tetebatu, 600m, beating, 18.xi. 1987, IWBT (ZMB). Allotype ♀: same data as holotype (ZMB). Paratypes : LOMBOK, 4♀, same data as holotype (AMS). Other specimens examined (all by beating): LOMBOK: Aik Buka, 500m, 1♂ 18.viii.1987 IWBT (AMS), 1♂ 15.viii.1990 ESK (ZMB); Setiling, 600m, 1♀ 16.viii.1990 ESK (AMS); Lemor forest near Sapit, 625m, 1♂ 17.viii.1990 ESK (ZMB); North Lombok,Sembalum lawang, 1200m, 1♂ 24.viii.1990 ESK (ZMB). BALI: Ubud, monkey forest, c.300m, 1♂ 1♀ 30.xi.1987 CL (ZMB).



Figs 16 — 22 *Indoblaste lienhardi* ♀

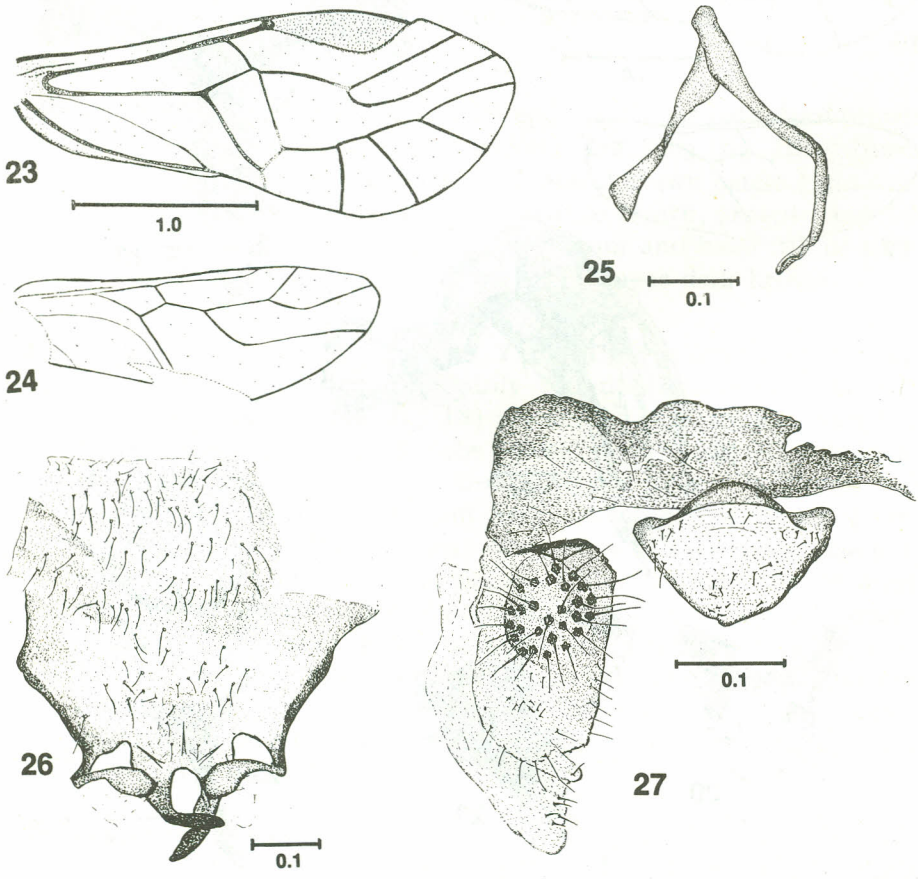
This species differs from its congener, described below, in that the parameres are not fused anteriorly and these is a strong sclerotised median keel on the hypandrium. The arms of the subgenital plate are more heavily sclerotised and there is a small brown pigment patch at the distal end of the pterostigma. Named after Dr C. Lienhard, whose collections from Java, Bali and Lombok were kindly made available to us.

Indoblaste sastrawani sp.n.

(figs. 23-33)

Male

Coloration (after 3 years in alcohol): Head predominantly pale buff, vertex with numerous brown spots mesial to each eye. Epicranial suture light brown. A light brown band from ocellar tubercle to an-



Figs 23 — 27 *Indoblaste sastrawani* ♂

tennal socket. Frons pale, epistomal suture dark brown, a brown mark between epistomal suture and ocellar tubercle. Postclypeus with 10 brown striae, anteclypeus pale, labrum dark brown. Maxillary palp pale brown, apical segment dark brown. Genae buff, unmarked. Eyes black. Antennae pale brown. Thorax brown. Legs: coxa and tarsus brown, femur and tibia pale. Fore wing (fig. 23) and hind wing (fig. 24) hyaline.

Morphology: IO:D = 4.7:1, eyes small. Ct = 17. Phallosome (fig. 25, from paratype ♂) small, delicate, wishbone shaped, parameres fused anteriorly. Hypandrium (fig. 26) with pair of twisted apical sclerites and a lateral pair of narrow prongs. Epiproct (fig. 27). Paraproct (fig. 27) with undivided field of 27 trichobothria and short blunt hook.

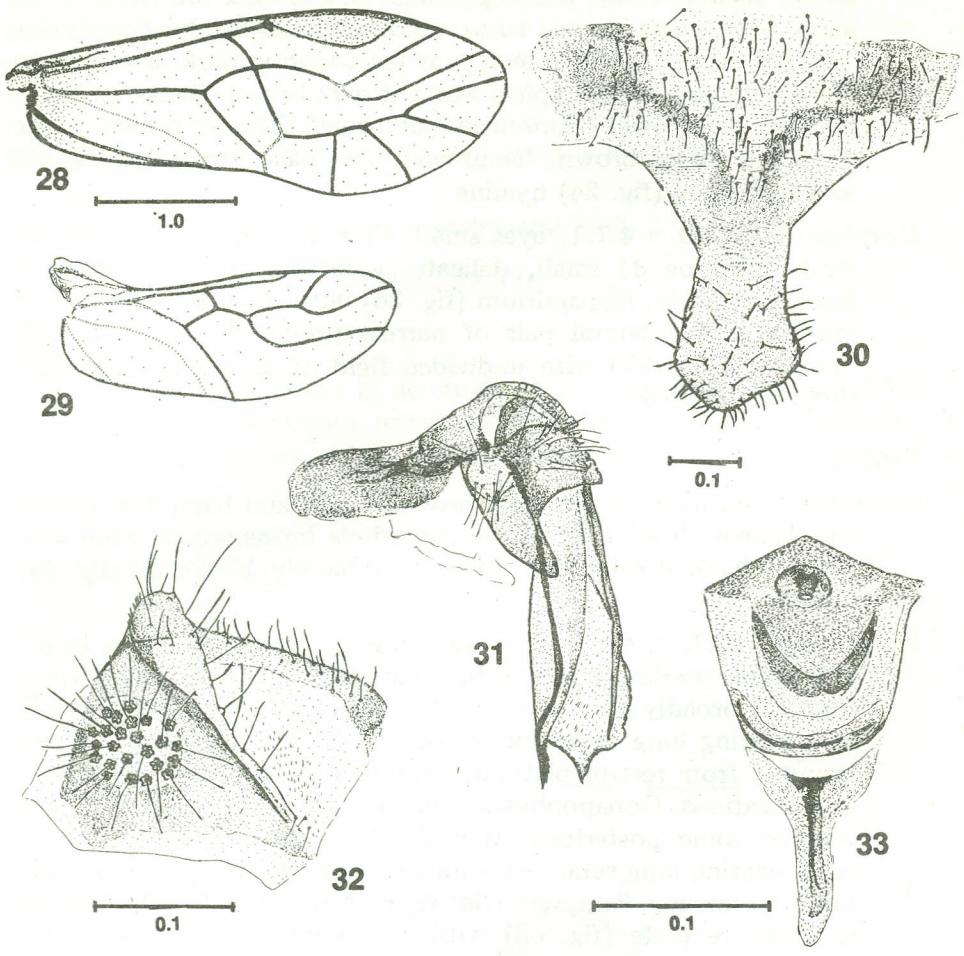
Female

Coloration: As male except coxa brown, femur and basal 3/4 of tibia pale brown, distal 1/4 of tibia and whole tarsus brown. Fore wing (fig. 28) hyaline with light brown cloud basally. Hing wing (fig. 29) hyaline.

Morphology: IO:D = 4.4:1. Ct = 18. Fore wing veins rs and m meet in a point, pterostigma smoothly rounded. Subgenital plate lobe (fig. 30) broadly rounded apically, apical 2/3 of surface of apical lobe bearing long setae and apparently with a faint suture separating it from rest of plate; disc setose with indistinct V-shaped sclerotisations. Gonapophyses (fig. 31) dorsal valve long with long serrated spine posteriorly; ventral valve long and narrow; outer valve bearing long setae, with long curved tapering posterior lobe. Epiproct missing. Paraproct (fig. 32) with field of 31 trichobothria. Spermapore plate (fig. 33) with oval sclerotisation posterior to pore, double posterior U-shaped sclerotisations and a posterior scabbard-shaped sclerite separate from the plate.

Dimensions of male holotype: B = 2.1; FW = 2.74; HW = 1.95; F = 0.70; T = 1.30; t_1 = 0.30; t_2 = 0.09; t_1/t_2 = 3.33; f_1 = 0.50; f_2 = 0.42; f_1/f_2 = 1.19.

Holotype male: BALI: Ubud, monkey forest, 300m, beating, 30.xi. 1987, CL (ZMB). Allotype ♀ : same data as holotype (ZMB). Paratype 3♂, 2♀: same data as holotype (AMS). Other specimens examined (taken by beating): BALI: Candikuning, 1200m, 1♂ 28.vii. 1977 IWBT (ZMB); JAVA: Cibodas, conifers, 1300m, 1♂ 2♀ 3.x. 1986 IWBT (ZMB); Cibodas, Gunung Gede 1600m, 1♂ 16.ii.1987 IWBT (AMS).



Figures 28 — 33 *Indoblaste sastrawani* ♀

See under *I. lienhardi* for distinction from that species. The extremely delicate, fused parameres, which may be lost easily in dissecting, are unique in the subfamily. Thornton (1984 : 146) described a male, which he did not name, from Candikuning, Bali, which is almost certainly this species, the apical prongs of the hypandrium having broken free on dissection.

Named after Mr Putra Sastrawan for his support of the collecting programme in Bali.

Key to species of *Neoblaste and Indoblaste* known from Bali and/ or Lombok.

Females

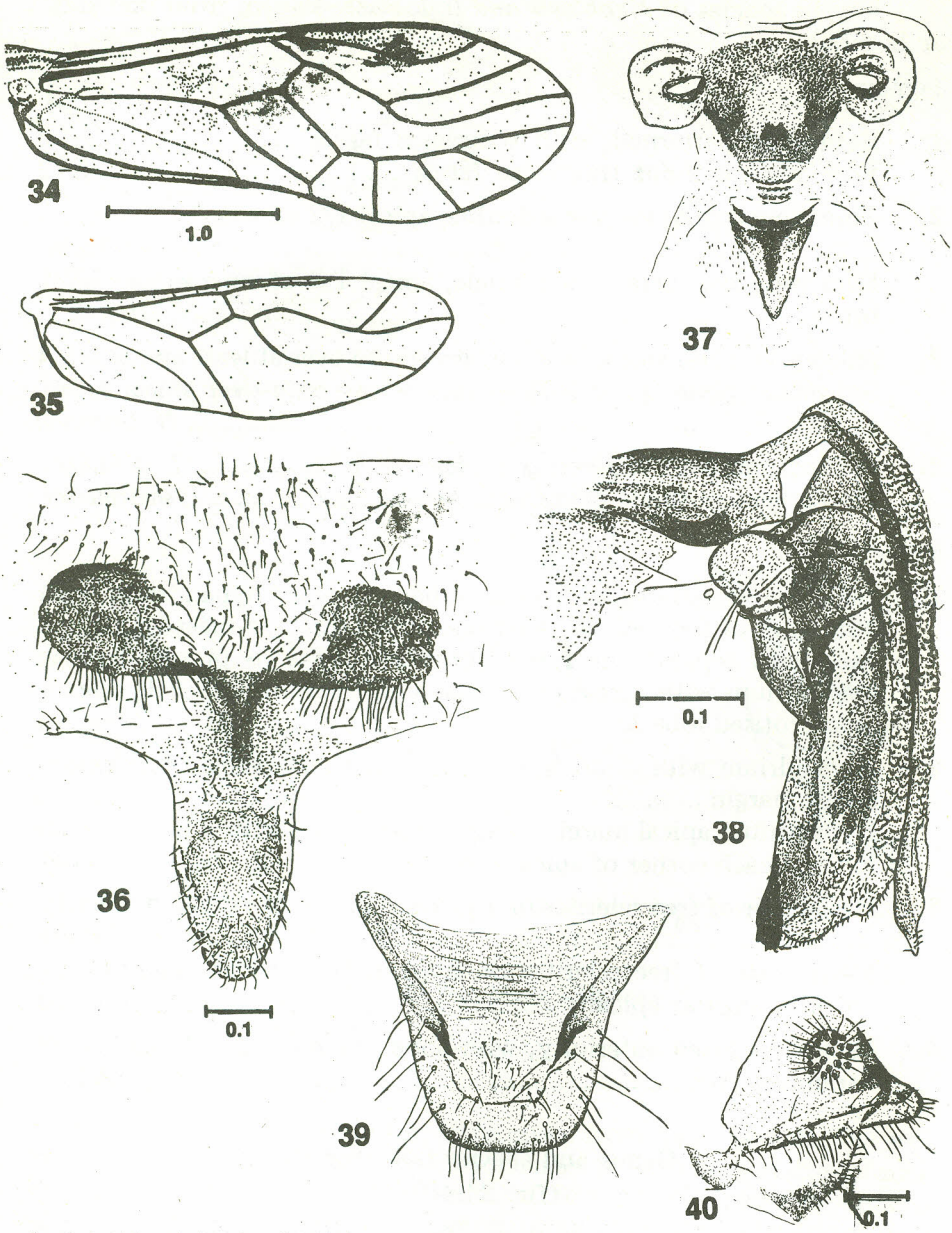
1. Fore wing patterned, with transverse fascia 2
   Fore wing without transverse fascia 3
2. Fore wing transverse fascia double, apical 1/2 of wing hyaline ... . *N. cubitaslis*
   Fore wing transverse fascia single, apical 1/2 of wing shaded light brown ..... *N. alticola*
3. Subgenital plate apical lobe surface setose over at least apical 1/2 4
   Subgenital plate apical lobe surface setose only over apical 1/6th at most .....*N. brunnea*
4. Pterostigma with pigment spot near apex ..... *I. lienhardi*
   Pterostigma without pigment spot ..... *I. sastrawani*

Males

1. Parameres separate, with large subapical boss; hypandrium with outer pair of free pointed sclerites, points directed mesad 2
   Parameres separate or fused anteriorly, boss, is present, apical; hypandrium with apical pair of twisted sclerites and each side an unsclerotised lobe 4
2. Hypandrium with clearly bifid apical lobe, no straight transverse apical margin 3
   Hypandrium apical margin straight, transverse, with a pair of small lobes at each corner of apical lobe ..... *N. alticola*
3. Mesial pair of free sclerites on hypandrium thick, rounded apically ..... *N. cubitalis*
   Mesial pair of free sclerites on hypandrium narrow, tapering anteriorly, angular apically ..... *N. brunnea*
4. Parameres fused anteriorly, wish-bone shaped ..... *I. sastrawani*
   Parameres free ..... I. *lienhardi*

Genus and species not known
(fig. 34-40)

One female from Bali and one from Lombok, both collected at mid-elevations, appear to represent a species that does not clearly fall into known genera (Smithers 1990). Due to the fact that the male is unknown formal placement wihtin a genus is postponed, and the species is not named. A descriptoin is provided below, so that when males are found in association with these females the species can be named and fully described.



Figs. 34—40 *"Genus unknown"*

Description of Bali female: (specimen no. B.87.65♀)

Coloration (after 3 years on alcohol): Head pale buff with following exceptions: broad brown median band from posterior of vertex to anterior margin of postclypeus; similar band each side from posterior margin of vertex to posterior of orbit. Eyes black. Epicranial suture dark brown. Ocelli pale, dark centripetally. Apical segment of maxillary palp dark brown. Antennae brown except scape, pedicel and basal flagellar segment pale brown. Thorax : dorsal lobes brown, side of meso- and metathorax pale buff dorsal, dark brown ventrad. Legs pale buff, except tarsus brown. Fore wing (fig. 34) with vague brown transverse fascia, pterostigma with faint brown mark. Hind wing (fig. 35) lightly suffused with brown.

Morphology: IO:D = 3.3. Ct = 21. Fore wing (fig. 34) pterostigma long, veins *rs and m* connected by long cross-vein. Subgenital plate (fig. 36) apical lobe long and setose, sclerotisation of disc bearing long setae. Spermapore plate (fig. 37). Gonapophyses (fig. 38): dorsal valve long, bluntly ending, bearing field of short setae laterov entroposteriorly; outer valve bearing long setae, with pointed posterior lobe. Epiproct (fig. 39) bearing long setae, with two lateral sclerotised prongs. Paraproct (fig. 40) with field of 26 trichobothria.

Dimensions of female: B = 2.4; FW = 3.26; HW = 2.43; F = 0.87; T = 1.35; t_1 = 0.35; t_2 = 0.14; t_1/t_2 = 2.5; f_1 = 0.59; f_2 = 0.45; f_1/f_2 = 1.31.

Specimen details : Female on which above description is based · BALI east, Putung, 450m, beating 14.xii.1987, IWBT (ZMB). Other specimen examined: LOMBOK Terbatu, 500 m, beating, 1♀ 21.viii. 1990 ESK (AMS).

The form of the pterostigma and the cross-vein in the fore wing fall this form to the genus *Amphigerontia.* However the cross-vein is much longer than in any *Amphigerontia* species, and in *Amphigerontia* the dorsal valve of the female gonapophyses has a well-marked terminal tine. In the genus *Copostigma* Enderlein 1903 [= *Mecampis* (Enderlein)] there is also a cross-vein between veins rs and m of the fore wing, but the form of the pterostigma and the dorsal and outer valves of the gonapophyses (dorsal valve with apical spine, outer valve with short posterior lobe) are quite different. *Copostigma* species, except for one in Sri Lanka, are unknown west of New Guinea.

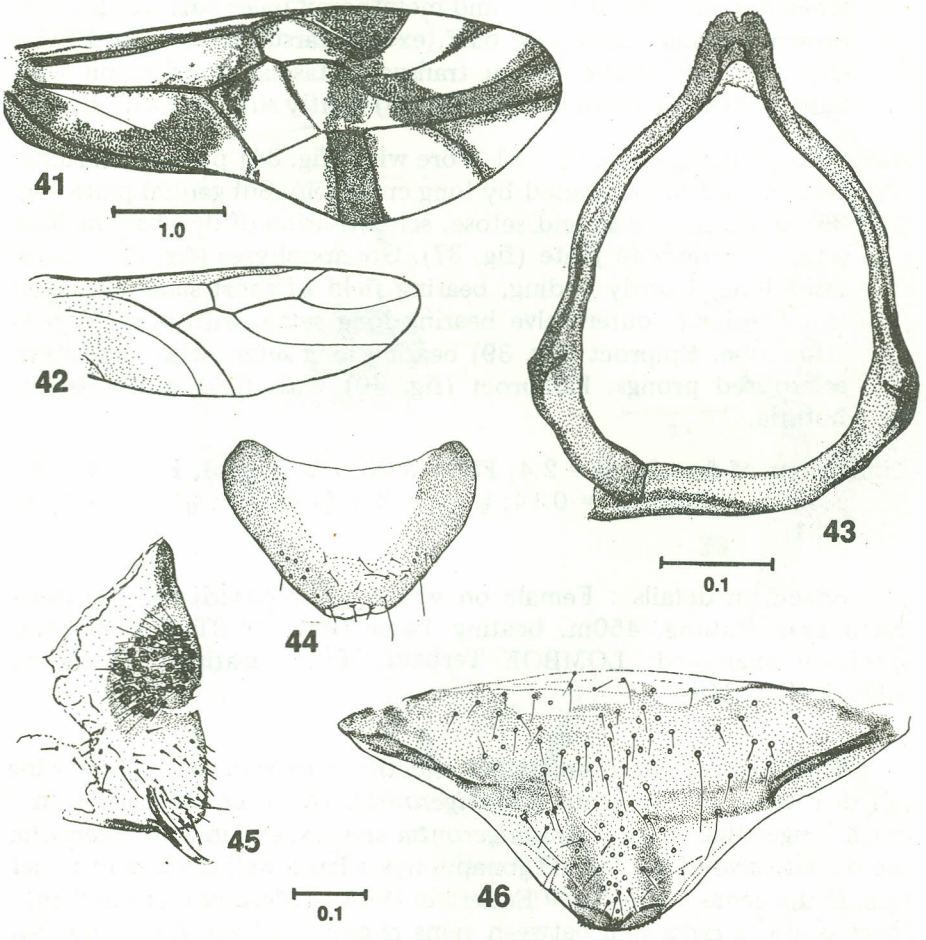
Subfamily CERASTIPSOCINAE

Genus *Clematoscenea* Enderlein

Clematoscenea Enderlein 1907: 115. Type species: *Psocus lemniscatus Enderlein 1903.*

Clematoscenea lemniscata Enderlein

(fig. 41-46)



Figs. 41 — 46 *Clematoscenea lemniscata* ♂

Psocus lemniscatus Enderlein, 1903: 218.

Clematoscenea lemniscata (Enderlein); Enderlein, 1907: 115. - not New, 1978b; 43-45.

Cerastipsocus (Clematoscenea) lemniscatus (Enderlein); Roesler, 1944: 147

Known from the Tengger Mts. of East Java, Sumatra and Bali (Enderlein 1903, Soehardjan 1958, Thornton 1984) males of this species have not previously been found. Males were found in the collections before us, from both Bali and Lombok, and we now describe this sex.

Further description

Male

Coloration (after 3 years in alcohol): Head generally cream, with brown patch at posterior of vertex, either side of epicranial suture, and dorsal to eyes. Frons and genae brown. Epicranial suture light brown. Frons-clypeal suture brown. Maxillary palp wholly dark brown. Antenna dark brown except scape and pedicel brown. Ocelli pale, black centripetally. Thorax: cream except mesothorax dark brown anteriorly, lateral lobe cream, dark brown ventrally. Legs: coxa dark brown, femur cream, tibia brown, dark brown distally, tarsus dark brown. Fore wing (fig. 41) hyaline with brown pattern. Hind wing (fig. 42) with brown cloud basally and anteromarginally.

Morphology: IO:D = 3.7; Ct = 24. Phallosome (fig. 43) a simple closed frame, spiculate anteriorly and with two small sclerified prongs lateroposteriorly. Epiproct (fig. 44); paraproct (fig. 45) with field of 40 trichobothria. Hypandrium (fig. 46) with median lobe bearing long setae, spiculate apically.

Dimensions of male described above: B = 3.25; FW = 4.99; HW = 3.49; F = 1.31; T = 2.28; t_1 = 0.62; t_2 = 0.25; t_1/t_2 = 2.48; f_1 = 1.8; f_1/f_2 = 0.82.

Male specimen upon which above further description is based: BALI east, Tanahari, 800m, beating, 11.xii.1987, IWBT (ZMB). Other specimens examined (all taken by beating): BALI: east, Besakih, 950m, 1♀ 15.xi.1987 IWBT (AMS); Bedugul, Botanical Garden, 1200m, 1♀ 8.viii.1990 ESK (ZMB). LOMBOK: north, Sajang forest, 1000m, 1♂ 24.viii.1990 ESK (AMS); Sembalun lawang, 1200m, 2♂ 1♀ 24.viii. 1990 ESK (ZMB)

Using the key of Smithers and Thornton (1981), the fore wing pattern and the association with females at Sembalun lawang, Lombok, the males above are reffered to *Clematoscenea lemniscata.* In general, the shape of the phallosome is similar to those of the other 7 species of the genus in which males are konwn, all of which occur on New

Guinea. However, in all these the phallosome lacks the sclerotised lateroposterior prongs and the hypandrium lacks the sclerotised pattern and apical ornamentation.

Genus *Psococerastis* Pearman

Psococerastis Pearman 1932: 202. Type species: *Psocus gibbosus* (Sulzer 1776) = *Psocus longicornis* (Fabricius 1777).

Psococerastis annae Thornton

Psococerastis annae Thornton 1984: 151-154.

Material examined (all taken by beating). BALI: Besakih, 950m, 1♂ 15.xi.1987 IWBT (AMS); Candikuning, 1200m, 1♀ 20.xii.1987 IWBT (AMS); Karanganyar to Penulisan, 1200-1600m, 1♀ 27. xii.1987 IWBT (AMS); Batur caldera, 1500m, 1♀ 28.xii.1987 IWBT (ZMB); Wanagiri, north of Candikuning, 1220m, 1♀ 7.viii. 1990 ESK (ZMB); Bedugul, Botanical Garden, 1200m, 3♂ 7.viii. 1990 ESK (ZMB); Menanga, southwest Besakih, 800m, 1♀ 5.viii. 1990 ESK (ZMB). LOMBOK: Narmada, garden, 200m, (wing) 13.viii. 1990 ESK (ZMB).

This species was described from material collected in the highlands of Bali in vii 1977 and xii. 1982.

There are variation in fore wing length and pigmentation in the specimens listed above. Fore wings of the 1987 specimens are smaller than those of the holotype (c. 3/4 of holotype wing length), the basal transverse fascia is rather more distinct, and there is more pigmentation in cell Cu_1 immediately basal to the origin of vein m. Male and female fore wing patterns and lengths are similar. One of the 1990 females (from Bali, south west Besakih), however, is larger than the 1987 specimens, but still smaller than the holotype. On Bali this species has been collected only in the highlands, at 800m or above. An isolated male fore wing found on the beating tray in Lombok at about 200m in 1990 is the only evidence of *P. annae*'s occurrence on Lombok, and the species is regarded as being confined to Bali pending more substantial evidence of its occurence elsewhere.

Psococerastis lombokensis (Navas)

Psocus lombokensis Navas, 1927: 40, fig. 20.

Psocidus lombokensis (Navas) Smithers, 1967: 109.

Psococerastis lombokensis (Navas) New, 1976: 366-367.

Females were collected from Sapit, Lombok in April 1896. Collections were made in the Sapit area in July 1997 and November 1987 (IWBT) and again in August 1990 (ESK) but the species was not found.

Genus *Metylophorus* Pearman

Metylophorus Pearman 1932: 202. Type species: *Psocus nebulosus* Stephens 1836.

Metylophorus lisae Thornton

Metylophorus lisae Thornton 1984: 140.

Material examined. BALI: Bedugul, north of Botanical Garden, 1200m, beating, 1♀ 8.viii.1990 ESK (ZMB).

M. lisae was described from a single female found at 1200m, Candikuning, Bali. It differs from other species of the genus in fore wing pattern and genitalic details. The above specimen was found at the same altitude and at a location close to that of the holotype; the male is unknown.

Genus *Sigmatoneura* Enderlein

Sigmatoneura Enderlein 1908: 761. Type species: *Cerastipsocus subcostalis* Enderlein 1903.

Scaphopsocus Smithers 1960: 373 (Smithers 1976: 72).

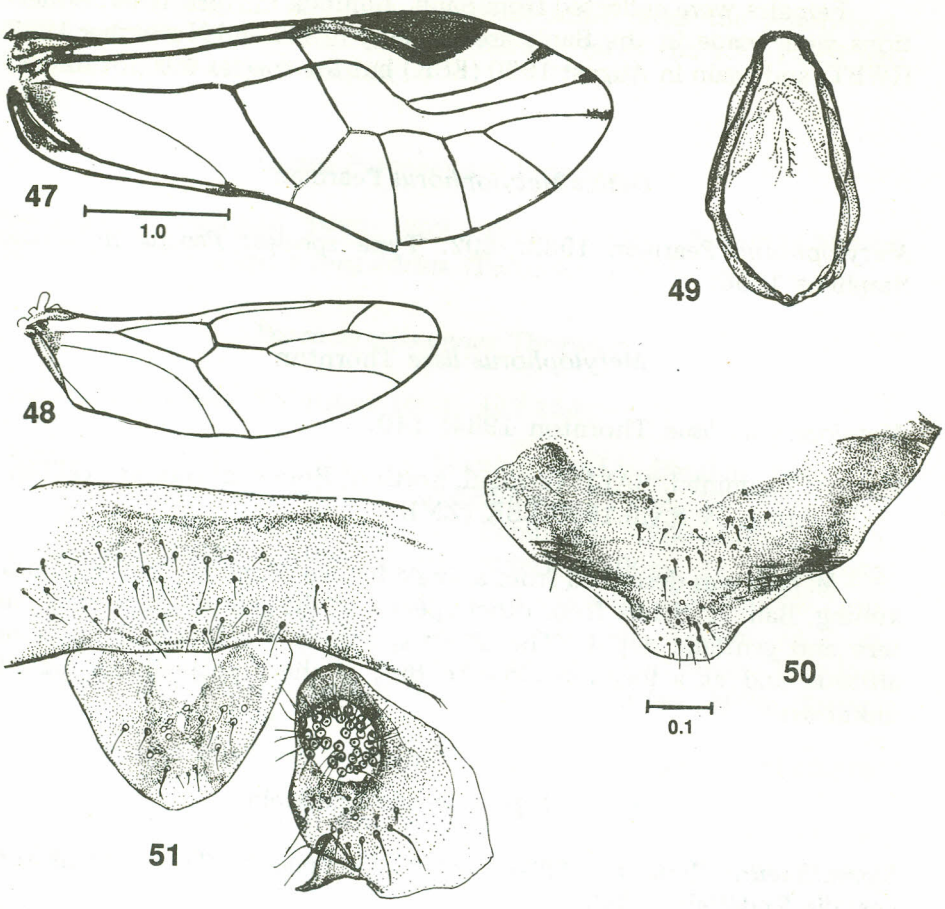
Sigmatoneura basalis sp.n.

(fig. 47-51)

Female unknown.

Male

Coloration: Head cream, epicranial suture dark brown with rows of brown spots each side to posterior margin of vertex, similar spots mesial to each eye. Eyes black. Ocelli brown, brown band from ocellar tubercle to antennal socket and rectangular brown mark from ocellar tubercle to anterior of frons. A brown spot between antennal socket and frons-clypeal suture. Frons-epicranial suture



Figs 47 — 51 *Sigmatoneura basalis* ♂

dark brown. Postclypeus with 12 dark brown striae. Genae cream, unmarked. Maxillary palp dark brown except basal segment and 3/4 of second segment pale. Antennae dark brown except scape and pedicel brown. Thorax: dorsal lobe dark brown, pale along sutures, lateral lobe cream with central brown mark. Legs: dark brown except dist at 1/2 of tibia brown. Fore wing (fig. 47) hyaline with brown mark basally, pterostigma fully pigmented, a small brown mark at apices of veins r_{2+3} ; r_{4+5} ; m_1 ; Hind wing (fig. 48) hyaline.

Morphology: IO:D = 3.8. Ct = 20. Phallosome frame simple, closed (fig. 49). Hypandrium (fig. 50) symmetrical, setose. Paraproct (fig. 51) with field of 38 trichobothria. Epiproct (fig. 51).

Dimensions of male holotype: B = 2.5; FW = 4.05; HW = 2.68; F = 0.68; T = 1.07; t_1 = 0.32; t_2 = 0.10; t_1/t_2 = 3.2; f_1 = 0.54; f_2 = 0.34; f_1/f_2 = 1.6.

Holotype ♂: BALI east, Gunung Seraya, 300m, beating, 12.xii.1987, IWBT (ZMB). Paratypes: 3♂, same data as holotype (AMS). Other specimen examined. KOMODO Island: Loholiang, 100m, beating, 1♂ 7-10.xi.1987 IWBT (ZMB).

The fore wing of *Sigmatoneura basalis* is pigmented basally, the pterostigma being fully pigmented. The male of *Sigmatoneura formosa* Banks(1918), from Australia, has the same fore wing pattern but veins rs and m in the fore wing of *S. basalis* meet at a point, whereas in *S. formosa* these veins are connected by a cross vein, the phallosome frame of *S. formosa* is open whereas that of *S. basalis* is closed, and the epiproct of *S. formosa* is sclerotised posteriorly and lateroanteriorly whereas in *S. basalis* this sclerotisation is lacking. *S. orientalis* (New 1975), from Singapore, also has a closed phallosome frame but this is narrower posteriorly than that of *S. basalis;* in addition, the areola postica meets the media at a point, rather than being fused for a distance. *S. basalis* is also rather similar to the Nigerian *S. smithersi* (New 1973); however, the phallosome of *S. basalis* is less rectangular anteriorly and the hypandrium possesses a long seta, lacking in *S. smithersi*, each side near the lateral margin some distance from the apex.

Genus *Cycetes* Enderlein

Cycetes Enderlein 1907: 108. Type species: *Cycetes thyrsophoroides* Enderlein 1907.

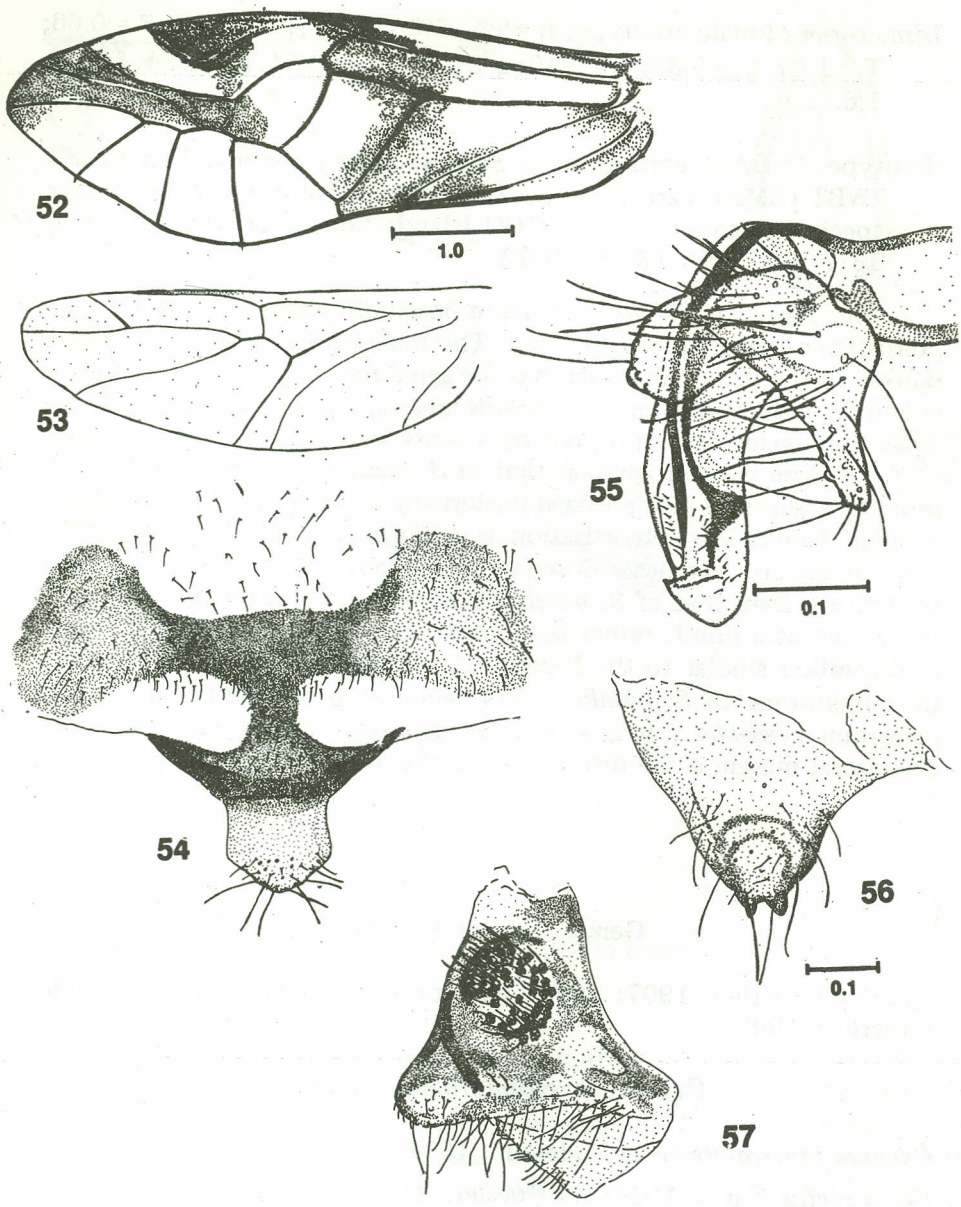
Cycetes thyrsophoroides Enderlein

Cycetes thyrsophoroides Enderlein, 1907:109

Goya pictus Navas, 1927:37, Roesler, 1944:148

Cycetes pictus (Navas), Wiedner 1966:245

This species is known from 3 specimens from Java (2 females from Semarang and 1 specimen (sex unknown) from Borobudur). New (1976) provided a description, including genitalia, of the type of *Goya pictus*, from Borobudur. We have collected females from Gunung Seraya; East Bali, which we assign to this species. A description of one of these is provided here.



Figs. 52 — 57 *Cycetes thyrsophoroides Enderlein*

Coloration (after 3 years in alcohol): Head generally cream with irregular brown spots each side epicranial suture to posterior margin of vertex and mesial to orbits. Ocelli black, eyes black, a brown band from ocellar tubercle to antennal socket. Central area of frons with brown stirrup mark. Postclypeus with 14 brown striae.

Maxillary palp pale except apical segment dark brown. Antenna dark brown, almost black, except pedicel, scape and f_1 pale brown. Fore wing (fig. 52) hyaline with brown markings. Hind wing (fig. 53) hyaline. Thorax: dorsal lobe of prothorax dark brown, pale alongside sutures; dorsal lobe of metathorax dark brown except antedorsum of metathorax pale, lateral lobes predominantly cream, brown along sutures. Legs, coxa brown, femur brown dorsally, pale ventrally, tibia pale, dark brown apically, tarsus dark brown.

Morphology: IO:D = 4.3. Ct = 22. In forewing (fig. 52) vein r_{4+5} recurving to fuse with vein m for a short distance. Subgenital plate (fig. 54): apical lobe short, triangular apically, setose; main body of plate with two areas of sclerotisation connected by median sclerotised isthmus. Gonapophyses (fig. 55): dorsal valve hooked ventro-posteriorly with subapical field of setae; ventral valve broad apically, setose; outer valve bearing very long setae. Epiproct (fig. 56) with pair of protuberances and four long setae posteriorly. Paraproct (fig. 57) with field of 49 trichobothria.

Dimensions of female holotype: B = 5.0; FW = 5.35; HW = 3.77; F = 1.31; T = 2.28; t_1 = 0.62; t_2 = 0.25; t_1/t_2 = 2.48; 1.8; f_2 = 2.19; f_2 ; 2.19; f_1/f_2 = 0.8.

Specimen on which above description is based: BALI, east, Gunung Seraya, 300m, beating, 12.xii.1987, IWBT (ZMB). Other specimens: 7♀, data as above (3♀ ZMB, 4♀ AMS) was described from a female found in the Northern Territory, Australia near the Max Arthur River, and also *Cycetes collessi* Smithers 1977. It differs from *C. thyrsophoroides* in occurs in Western Australia. *Cycetes collessi* Smithers 1977. It differs from *C. thyrsophoroides* in wing pattern and genitalic details. The fore wing of *C. collessi* lacks the pigmentation in the apical angle of cell Cu_2. The two areas of sclerotisation in the subgenital plate disc of *C. thyrsophoroides* are more distinct than in *C. collessi*, and the sclerotisation of the apical lobe is fairly uniform. The epiproct of *C. collessi* lacks the six long setae lateroposteriorly that are present in *C. thyrsophoroides*.

Subfamily PSOCINAE

Genus *Psocidus* Pearman

Psocidus Pearman 1934: 122. Type species: *Psocidus zanzibarensis* Pearman 1934.

Male specimen upon which above description is based: **LOMBOK**, Tetebatu, 500m, beating, 21.viii.90, ESK (ZMB). Other specimens examined (all by beating): BALI WNW, Batur caldera, 1♂ 6♀ 1050m, 29 xii 1987 IWBT (ZMB); slope of Gunung Agung, Pidpid, 400m 1♀ 10.xii 1987 IWBT (AMS); Lake Batur, Buahan, 1050m, 5♂ 9♀ 28.xii.1987 IWBT (AMS); Seraya, Gunung Seraya, 300m, 3♂ 2♀ 12.xii.1987 IWBT (AMS); Arca, southwest of Bekasih, 850m, 1♀ 5.viii.1990 ESK (ZMB); Bedugul, Botanical Garden, 1200m, 1♀ 7.viii.1990 ESK (ZMB). LOMBOK: central. Aikbuka, 500m, 9♀ 20.xi.1987 IWBT (AMS); east central, Tetebatu, 600m, 1♂ 18.xi.1987 IWBT (AMS); Tetebatu, 500m, 5♂ 12♀ 21.viii.1990 ESK (ZMB); Central, Setiling, 600m, 1♂ 22.xi.1987 IWBT (ZMB).

The above males are referred to *P. reidi* on head pattern, general coloration and fore wing and their frequent association with females of this species. They differ from males of three other described species of *Psocidus s.str. (P. validus* Thornton 1960 and *P. strictus* Thornton 1960 from Hong Kong, *P. murphyi* New 1975 from Singapore) in lacking lateral prongs on the ninth tergite and in that the phallosome is rectangular posteriorly.

The phallosome of *P. reidi* is rather similar to that of *P. zanzibarensis* Pearman 1934 (which can be regarded as the type species of *psocidus sensu strictu*, see Thornton 1984) differing only slightly in extent of sclerotisation; however, in *P. reidi* the phallosome has a pair of straight rod-sclerites (incipient in *P. zanzibarensis* as shown in Pearman's fig. 2P), and the hypandrium lacks the unsclerotised area of the posterior margin which is clearly shown in Pearman's figure. The hypandrium also differs in details of sclerotisation from those of the Oriental species mentioned above. In addition, the trichobothrial fields on the male paraproct of *P. reidi* are not as clearly divided into two sub-fields as they are in *P. zanzibarensis*. *Psocidus apertus* (Bali and Lombok), like *P. reidi*, lacks prongs on the ninth tergite of the male but unlike *P. reidi* also lacks phallosome rods; in *P. apertus*, moreover, the phallosome is rounded posteriorly, and the male eyes are large (IO:D = 0.6).

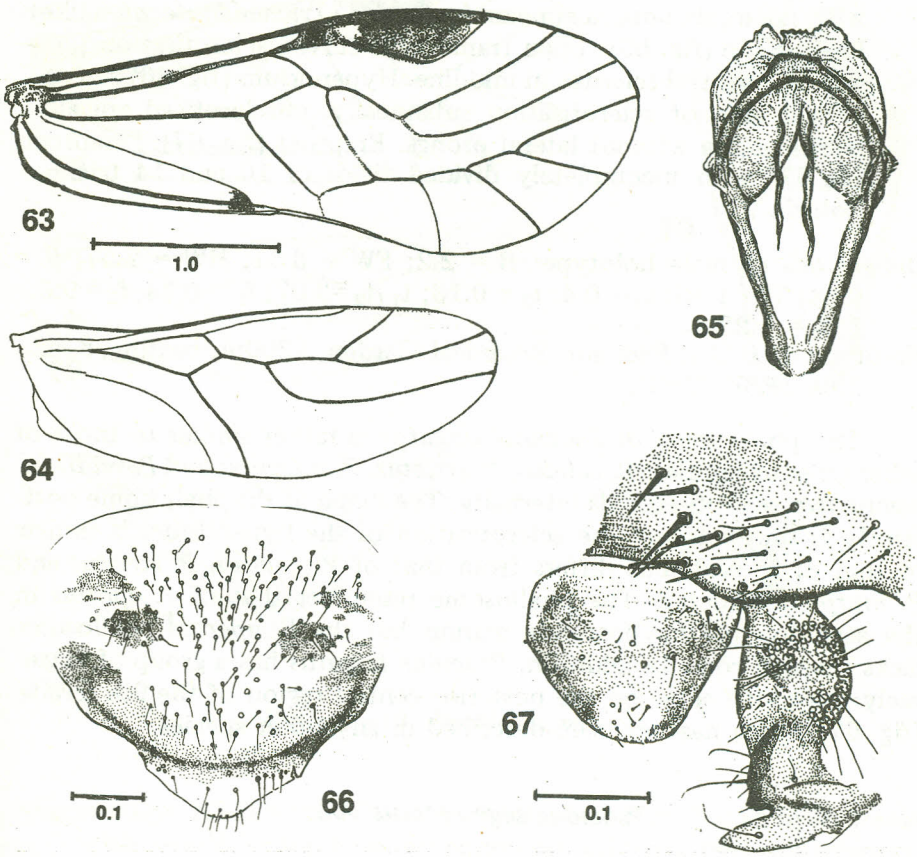
In the 1987 and 1990 collections, males from Bali all have large eyes (IO:D = 0.9 to 1.6) and those from Lombok all have smaller eyes (IO:D = 1.7 to 2.8); however, in coloration and details of genitalia the two groups of males are indistinguishable.

Psocidus tergatus sp.n.

(figs. 63-67)

Female - unknown.

Male



Figs 63 — 67 *Psocidus tergatus* ♂

Coloration (after 3 months in alcohol): Head generally light brown. Epicranial suture dark brown, with dark brown spots each side extending to posterior margin of vertex. A brown band from mesial edge of orbit to ocellar tubercle. Central area of frons with circular brown 'stirrup mark'. Antennal socket bordered by brown pigment. Antenna dark brown, almost black. Frons-clypeal suture dark brown, almost black. Postclypeus with brown striae. Maxillary palp light brown except apical segment dark brown. Thorax:

dorsal lobes light brown with dark brown spots; lateral lobes brown, light brown along sutures. Legs: coxa and tarsus dark brown, femur and tibia light brown. . Fore wing (fig. 63) hyaline, except pterostigma almost wholly dark brown and brown pigment at apex of cell Cu_2. Hind wing (fig. 64) hyaline.

Morphology: IO:D = 1.1. Ct = 19. Fore wing (fig. 63) vein m fused with rs, areola postica appears four-sided (*Trichadenotecnum*-like). Phallosome (fig. 65): open frame with curved sclerotisation posteriorly, two rod sclerites in mid-line. Hypandrium (fig. 66) setose, curved area of sclerotisation subapically, unsclerotised apically. Ninth tergite without lateral prongs. Epiproct (fig. 67). Paraproct (fig.67) with incompletely divided fields of 10 and 14 trichobothria.

Dimensions of male holotype: B = 2.2; FW = 3.51; HW = 2.57; F = 0.84; T = 1.43; t_1= 0.4; t_2= 0.13; t_1/t_2=3.07; f_1 = 0.74; f_2= 0.6; f_1/f_2 = 1.23.

Holotype ♂: BALI, Bedugul, Botanical Garden, 1200m, beating, 8.viii. 1990, ESK (ZMB).

The phallosome of *Psociaus tergatus* is rather similar to those of other Oriental species (*P. validus*, *P. strictus*, *P. murphyi* and *P. reidi)* in having two sclerotised rods internally. The shape of the phallosome posteriorly is unusual, and the sclerotisation of the hypandrium is similar to that of *P. reidi* but differs from that of *P. validus*, *P. strictus* and *P. murphyi* in detail. The phallosome resembles that of *P. apertus* in the serration of the posterior margin but the *P. apertus* phallosome lacks internal rods. In addition, *Psocidus tergatus* has a group of extremely thick stiff setae on the posterior central region of the 9th tergite (fig. 67) which has not been described in any other species.

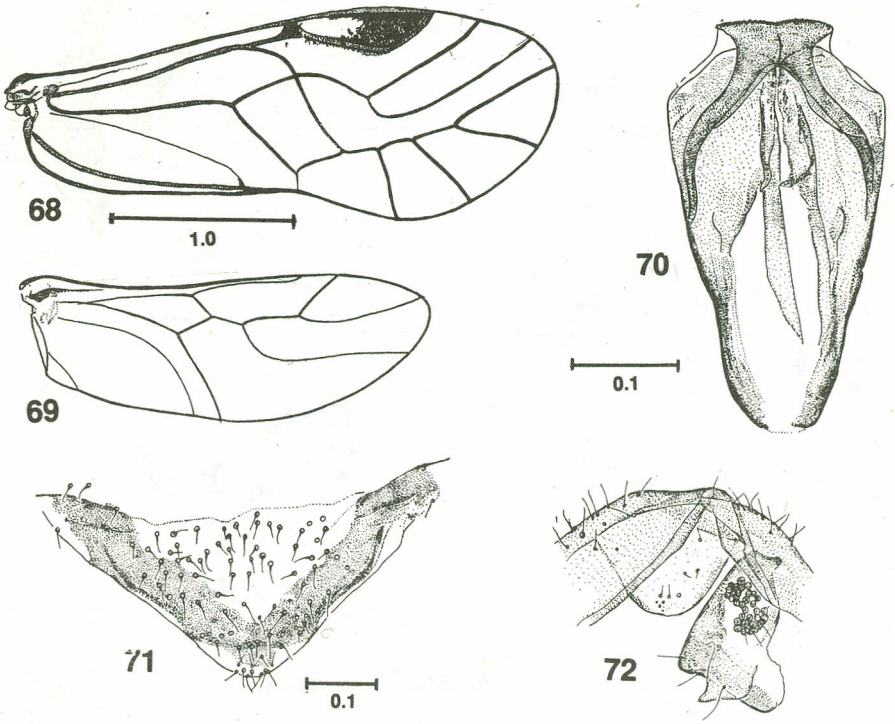
Psocidus segmentatus sp.n.

(figs. 68-77)

Male

Coloration (after 3 months in alcohol): Head generally creamy buff. Two rows of brown spots each side of epicranial suture extending to posterior border of vertex; similar spots along mesial edge of orbits. A brown band from ocellar tubercle to posterior antennal socket and from socket to posterior margin of postclypeus. A brown mark from anterior margin of antennal socket to frons-clypeal suture. Postclypeus buff with brown striae, anteclypeus brown. Maxillary palp pale except apical segment dark brown.

Gena with faint brown marking. Antennae dark brown. Thorax dorsally brown. large wide cream band along sutures. Leg: coxa and tarsus dark brown, femur and tibia buff. Pigment in apex of cell Cu_2 of fore wing (fig. 68) lacking. Hind wing (fig. 69).

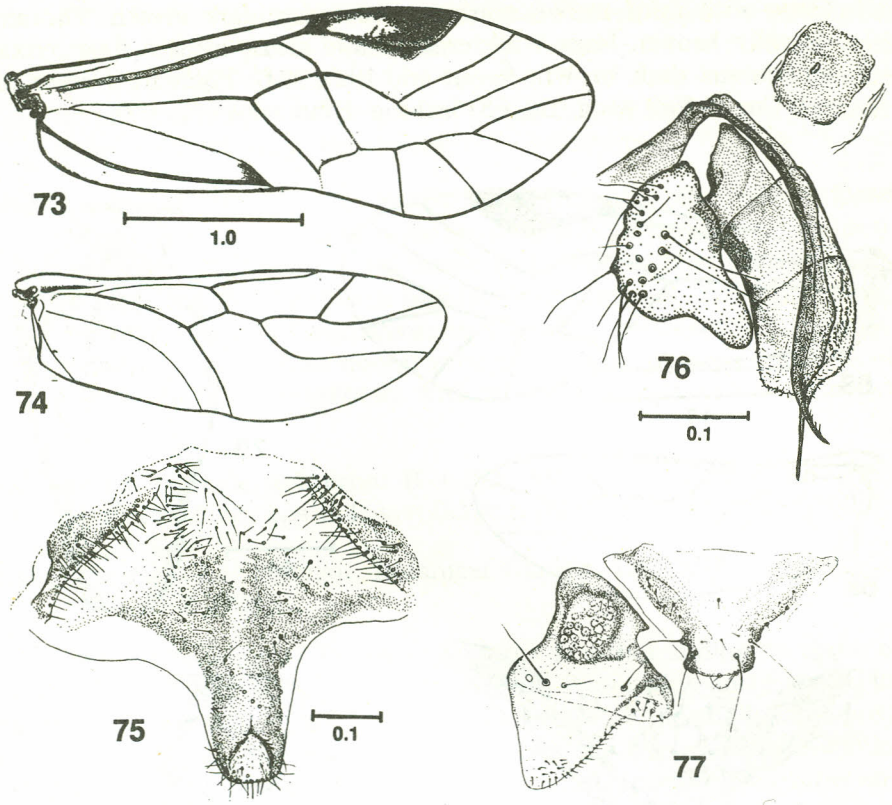


Figs 68 — 72 *Psocidus segmentatus* ♂

Morphology: IO:D = 2.5. Ct = 19. Phallosome (fig. 70) as open frame with peculiar sclerotised extension apically and two rod sclerites. Ninth tergite without lateral prongs. Hypandrium (fig. 71) unpigmented apically, V-shaped sclerotisation subapically. Epiproct (fig. 72); paraproct (fig. 72) with two sub-fields of 12 and 18 trichobothria.

Female

Coloration (after 3 months in alcohol): As male with following exceptions: in fore wing (fig. 73) apical half of pterostigma brown, brown pigment in apical angle of cell Cu_2. Hind wing (fig. 74) hyaline.



Figs 73 — 77 *Psocidus segmentatus* ♀

Morphology: IO:D = 3.3. Ct = 22. Fore wing (fig. 73) veins rs and m meet at a point or are fused for a distance. Subgenital plate (fig. 75) apical lobe blunt, setose apically; disc with lateral sclerotised area each side, with 1 - 2 rows of setae along anterior edge of area. Gonapophyses (fig. 76): dorsal valve short, blunt apically, a long spine medioposteriorly; ventral valve broad subapically, apical spine with minute spicules; outer valve bearing long setae . and with rounded lobe. Paraproct (fig. 77) with trichobothrial field not clearly divided into two sub-fields of 12 and 14 trichobothria. Epiproct (fig. 77) bearing four long setae posteriorly.

Dimensions of male holotype: B = 2.2; FW = 2.98: HW = 2.20; F = 0.65; T = 1.12; t_1 = 0.30; t_2 = 0.10; t_1/t_2 = 3; f_1 = 0.60; f_2 = 0.47; f_1/f_2 = 1.28.

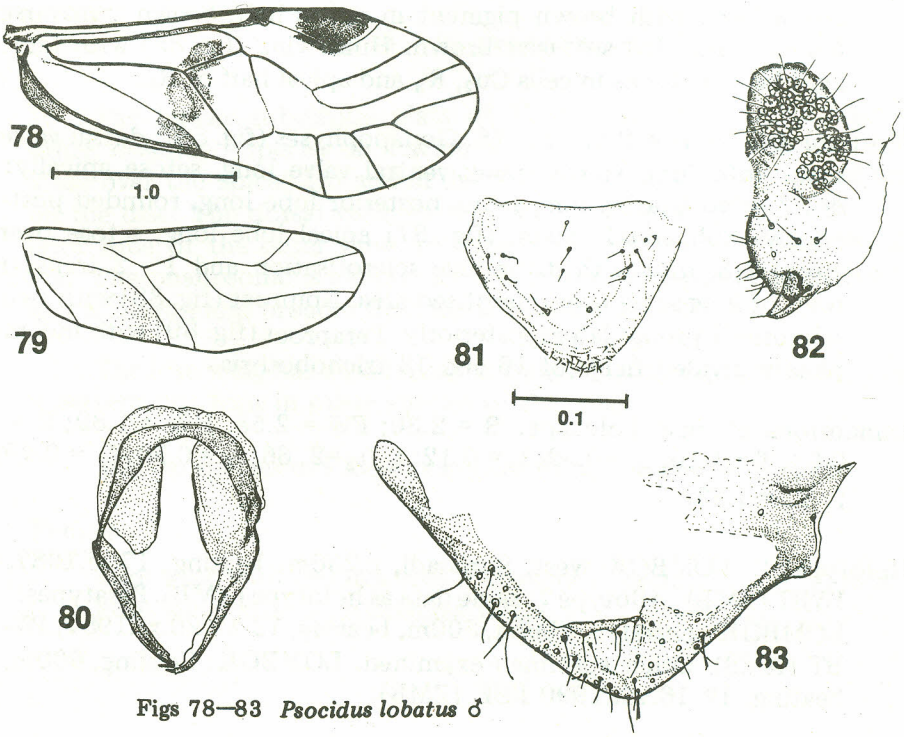
Holotype ♂: LOMBOK, Sapit, 625m, beating, 17.viii.1990, ESK (ZMB). Allotype ♀ : same data as holotype : 11♂, 12♀, same data as holotype (6♂ 6♀ AMS, 5♂ 6♀ ZMB). Other specimens examined: LOMBOK: Tetebatu, 500m, beating. 1♂ 21.viii.1990 ESK (ZMB); Pusuk, protected forest, 670m, beating, 1♂ 22.viii.90 ESK (ZMB).

The apical lobe of the subgenital plate is rather similar to those of *P. apertus* and *P. reidi;* however, the peculiar lateral sclerotisation on the disc is absent in both these species. In addition, the dorsal valve of the gonapophyses differs from those of *apertus* and *reidi* in being divided by horizontal lines (or sutures) into three regions (fig. 76). The phallosome is quite distinctive, differing from all described species of *Psocidus* in the posterior sclerotised extension. In having two rod sclerites in the phallosome *P. segmentatus* is similar to *P. reidi, P. validus, P. strictus* and *P. murphyi;* however, the rods of *segmentatus* appear to be blade-like; the hypandrium also differs from these species in details of apical sclerotisation.

The species is evidently confined to Lombok.

Psocidus lobatus sp.n.

(fig. 78-89)



Figs 78—83 *Psocidus lobatus* ♂

Male

Coloration (after 3 years in alcohol): Head creamy buff. Epicranial suture pale, with brown spots along each side extending to posterior margin, and mesial to each orbit. Ocelli pale, dark brown centripetally, light brown patch each side of protuberance. Eyes black. Frons cream with circular 'stirrup mark', a brown patch each side of this mark. Postclepeus cream with brown striae. Frons-clypeal suture pale buff. Genae pale, brown mark mesial to antennal socket. Maxillary palp light brown except apical segment dark brown. Thorax brown with large cream patches. Fore wing (fig. 78) with distinct transverse fascia, hyaline in apical 1/3, hind wing (fig. 79) without apical brown cloud. Femur brown dorsally; tibia buff, dark brown distally.

Morphology: IO:D = 0.8. Ct = 20. Ninth tergite without lateral prongs. Phallosome (fig. 80) as short, broad, open frame. Epiproct (fig. 81) Paraproct (fig. 82) with indistintly separate fields of 16 and 19 trichobothria. Hypandrium (fig. 83).

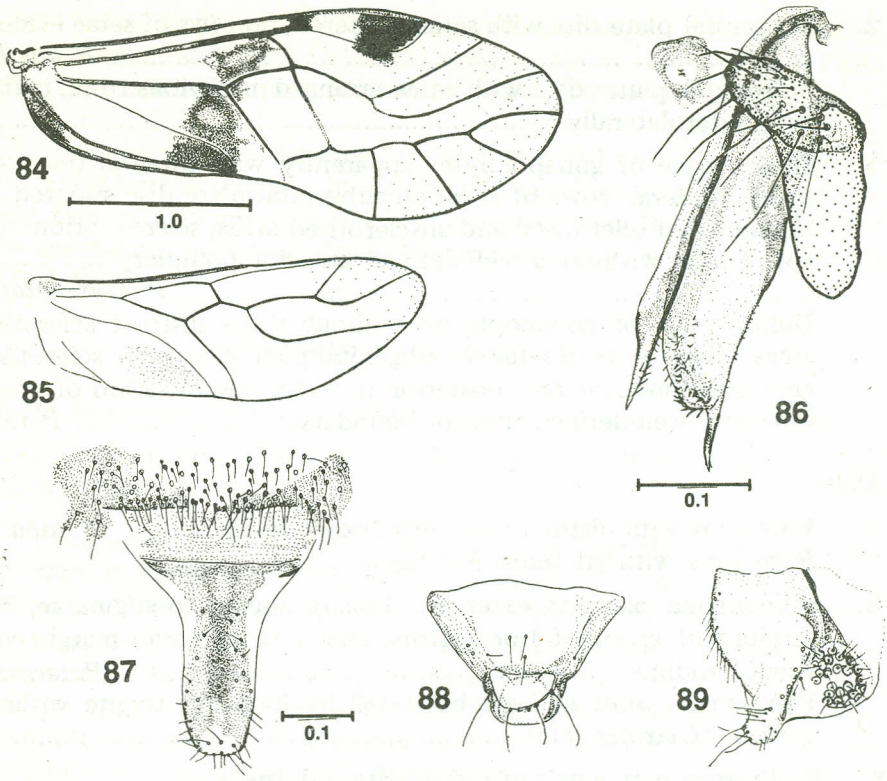
Female

Coloration (after 3 years in alcohol): As in male with following exceptions: femur buff, dark brown dorsodistally; fore wing (fig. 84) pterostigma with brown pigment in apical half, brown transverse fascia, apical 1/3 suffused brown. Hind wing (fig. 85) with faint light brown clouds in cells Cu_2, R_3 and apical half or R_5.

Morphology: IO:D = 2.5. Ct = 18. Gonapophyses (fig. 86): dorsal valve long, with long apical spine; ventral valve long, setose apically; outer valve bearing long setae, posterior lobe long, rounded posteriorly. Subgenital plate (fig. 87) apical lobe long, setose over apical 2/3; disc with distinctive sclerotisation and 1 - 2 transver rows of long setae over sclerotised area. Epiproct (fig. 88) with two sclerotised prongs lateraposteriorly. Paraproct (fig. 89) with incompletely divided fields of 16 and 18 trichobothria.

Dimensions of male holotype: B = 2.30; FW = 2.58, HW = 1.89; F = 0.63; T = 1.10; t_1 = 0.32; t_2 = 0.12; t_1/t_2 =2. 66; f_1 = 0.50; f_2 = 0.40; f_1/f_2 = 1.25.

Holotype ♂: LOMBOK west, Suranadi, c.250m, beating, 17.xi.1987, IWBT (ZMB). Allotype ♀: same data as holotype (ZMB). Paratypes: LOMBOK central, Aikbuka, 500m, beating, 1♂ 1♀ 20.xi.1987, IWBT (AMS). Other specimen examined. LOMBOK: Setiling, 600m, beating, 1♀ 16.viii.1990 ESK (ZMB).



Figs 84 — 89 *Psocidus lobatus* ♀

The female subgenital plate of *P. lobatus* differs from those of other described species in having the apical lobe covered with long setae over the apical 2/3 and in the well-marked transverse line of setae on the disc. The dorsal valve of the female gonapophyses and the posterior lobe of the outer valve are unusually long for species of the genus. The phallosome is simple, lacking rods or any posterior extension, and is shorter and broader than those of other species.

The fore wing has a well-marked transverse fascia, even in the male, a pattern not seen in other species of *Psocidus*.

Key to species of *Psocidus* known from Bali and/or Lombok

Females

1. Fore wing with distinct brown transverse fascia..... *P. lobatus*
   Fore wing without transverse fascia 2

2. Subgenital plate disc with setae scattered, no rows of setae evident ..... *P. apertus*
Subgenital plate disc with setae arranged in obvious rows, particu larly anterolaterally 3

3. Dorsal valve of gonapophyses apparently with three distinct segments; lateral rows of setae on subgenital plate disc situated on boundary of sclerotised and unsclerotised areas, sclerotisation of apical lobe without a well-defined anterior boundary .... *P. segmentatus*
Dorsal valve of gonapophyses without three distinct sclerotised areas; alteral rows of setae on subgenital plate disc with sclerotised area both anterior and posterior to rows, sclerotisation of apical lobe with well-defined anterior boundary. ..... *P. reidi*

Males

1. Fore wing with distinct transverse brown fascia..... *P. lobatus*
Fore wing without transverse fascia 2

2. Pterostigma pigment extending basally almost to stigmasac, 9th tergite with group of 4 or 5 strong setae near posterior margin each side of midline ..... *P. tergatus*
Pterostigma with at least basal 1/3 hyaline, 9th tergite without groups of strong setae. 3

3. Phallosome with a pair of rod sclerites internally 4
Phallosome without internal sclerites ..... *P. apertus*

4. Phallosome with blade-like internal sclerites; posterior margin straight, transverse, phallosome narrowing slightly immediately anterior to posterior margin ..... *P. segmentatus*
Phallosome internal sclerites narrow, slightly sinuous; phallosome posteriorly squarish, with lateral rounded lobes, not narrower immediately anterior to posterior margin ..... *P. reidi*

Genus *Ptycta* Enderlein

Ptycta Enderlein 1925: 102. Type species: *Psocus haleakalae* Perkins 1899.

Ptycta precincta Thornton

Ptycta precincta Thornton 1984: 155-157.

Material examined (all beating). BALI: east, Tanaharan, 850m, 1♀ 10. xii.1987 IWBT (ZMB), 800m, 2♀ 11.xii.1987 IWBT (ZMB); Candiku-

ning, 1200m, 1♀ 20.xii.1987 IWBT (AMS). LOMBOK: Aikbuka, 500m, 1♂ 1♀ 20.xi.1987 IWBT (AMS); Tetebatu, 500m, 4♂ 1♀ 21.viii.1990 ESK (ZMB); Sajang forest, 1000m, 1♂ 24.viii.1990 ESK (ZMB).

This species was described from Bali and Lombok material. There is considerable variation in male and female fore wing length and the male fore wing pigmentation is less extensive than that of the female. The species has now been found on both Bali and Lombok at altitudes of 500-1200m.

Ptycta incurvata Thornton

Ptycta incurvata Thornton 1960: 245-248.

Material examined: LOMBOK, central, Aikbuka, 500m, beating, 1♂ 20.xi.1987 IWBT (ZMB).

Ptycta incurvata was originally described from Hong Kong and has not been recorded previously from Indonesia. The specimen above is referred to *P. incurvata* rather than *Ptycta krakatau* Vaughan *et al.* 1989 (Krakatau Is.), on the grounds of head and leg pattern, as well as genitalic detail. The epiproct of *P. krakatau* lacks the two lateral sclerites and the apophysis of the paraproct differs from that of *P. incurvata.* Moreover, the head of *P. krakatau* has two transverse brown bands on the frons laterally, whereas *P. incurvata* lacks these. The femur of the above specimen agrees with *P. incurvata* in being pale, dark brown distally, whereas that of *P. krakatau* lacks the brown distal mark. The corrugated bow-like structure at the anterior edge of the epiproct, mentioned by Thornton (1960), is actually the thickened anterior edge of the epiproct.

Ptycta frontalis Thornton

(figs. 90-94)

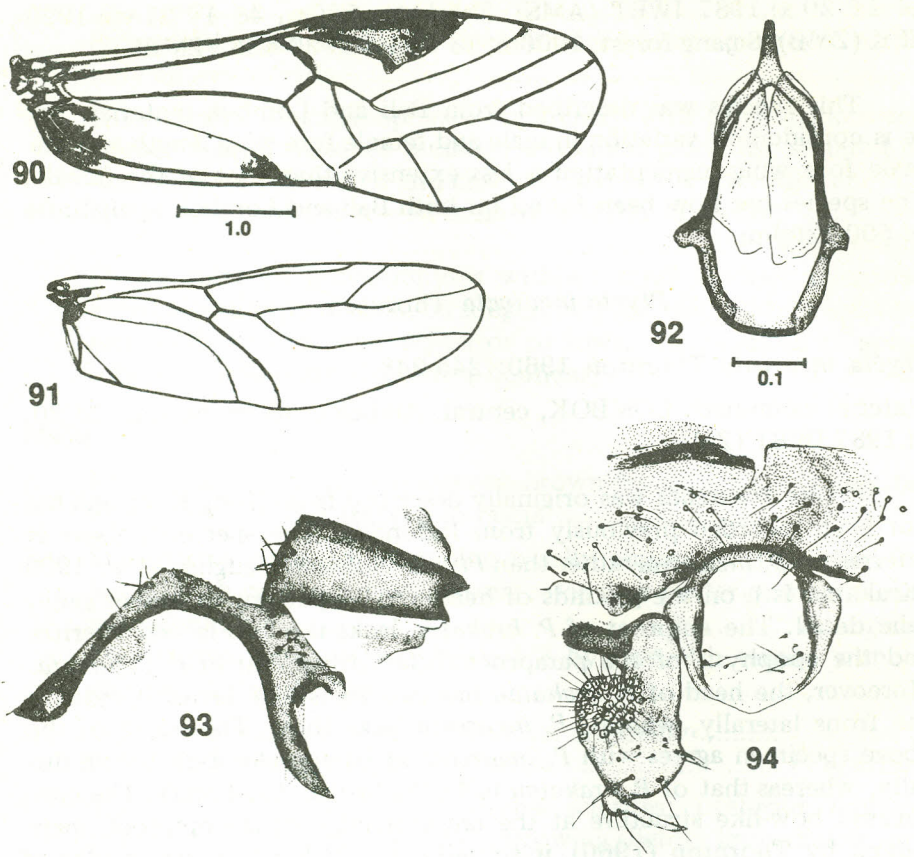
Ptycta frontalis Thornton 1984: 154-155.

This species was described from two females taken in the Bali highlands in July 1977; we have now a male from the same area.

Further description

Male

Coloration (after 3 months in alcohol): As in female with the following exceptions: antenna dark brown; prothoracic coxa brown; femur dark brown dorsally; tibia brown, dark brown apically. Fore wing (fig. 90) with no pigment in cell Cu_1. Hind wing (fig. 91) hyaline.



Figs 90 — 94 *Ptycta frontalis* ♂

Morphology: IO:D = 0.8; Ct = 17. Phallosome (fig. 92) a closed frame with lateral apophyses, narrow tapering apical tine rounded apically and covered with short spinelets. Hypandrium (fig. 93, broken) symmetrical with simple apical tongue having fine marginal teeth. Epiproct (fig. 94) with corrugate bow-like anterior margin Paraproct (fig. 94) with field of 32 trichobothria.

Dimensions of male described above: B = 3.2, FW = 4.83, HW = 3.54; F = 0.95; T = 1.4; t_1 = 0.37; t_2 = 0.24; t_1/t_2 = 1.54; f_1 = 1.19; f_2 = 1.11, f_1/f_2 = 1.07.

Male described above: BALI, Wanagiri north of Candikuning, 1220m, beating, 7.viii.1990. ESK (ZMB).

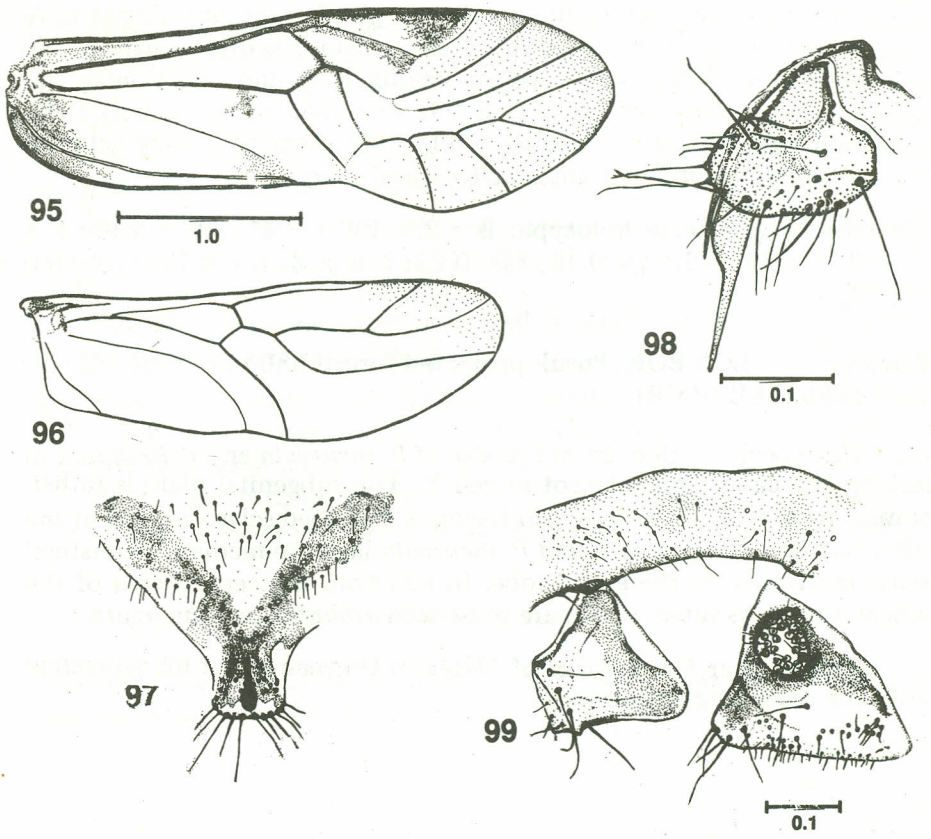
In pigment pattern of fore wing and in head pattern, this male conforms to the description of the female of *P. frontalis* except that the small pigment patches in cell Cu_1 are absent. The male genitalia of *frontalis* are rather similar in detail to those of *P. incurvata and P. krakatau;* however, the median sclerotisation of the hypandrial 'tongue' is narrower than those of *incurvata and krakatau* and the marginal teeth are very small towards the base of the tongue. The male also differs from both *P. incurvata and P. krakatau* on lacking pigment in cells Cu_1 and R of the fore wing.

Ptycta sardjani sp.n.

(figs. 95-99)

Male unknown.

Female



Figs 95 — 99. *Ptycta sardjani* ♀

Coloration (after 3 months in alcohol): Head light brown. Epicranial suture brown, 2-3 rows of brown spots along midline and across posterior margin of vertex. A brown band mesial to each orbit continues to antennal socket. Ocelli pale, black centripetally. Eyes black. Central area of frons with U-shaped brown mark, a faint brown band each side. Postclypeus with brown striae, anteclypeus pale brown, maxillary palp pale brown except apical and subapical segments dark brown. Genae cream, with faint brown spot under each orbit. Antennae dark brown except scape and pedicel pale brown. Thorax dark brown, light brown along sutures. Legs: coxa and tarsus dark brown; femur buff, dark brown distally, tarsus pale dark brown apically. Fore wing (fig. 95) suffused faint brown over apical 1/3, dark brown pigment over basal 1/10, brown pigment patches in mid-wing. Hind wing (fig. 96) with apical light brown cloud.

Morphology: IO:D = 1.8. Ct = 25. Subgenital plate (fig. 97) having Y-shape sclerotisation, apical lobe truncate, unpigmented subapically, bearing long setae on apical margin; a 'drumstick shaped' sclerotised area on apical lobe medially. Gonapophyses (fig. 98): dorsal valve acuminate posteriorly, bearing short setae; ventral valve rather short, styliform; outer valve bearing long and short setae, no posterior lobe. Paraproct (fig. 99) with field of 27 trichobothria. Epiproct (fig. 99) sclerotised anteriorly, bearing 5 long setae in a transverse line just anterior to apical margin.

Dimensions of female holotype: B = 2.9, FW = 3.45, HW = 2.65; F = 0.71; T = 1.6; t_1 = 0.48; t_2 = 0.12; t_1/t_2 = 4; f_1 = 0.74; f_2 = 0.64; f_2/f_2 = 1.16.

Holotype ♀ : LOMBOK, Pusuk protected forest, 680m, beating, 22.viii. 1990, ESK (ZMB).

This species differs from females of *P. incurvata* and *P. krakatau* in lacking the basal pigment spot in cell R. The subgenital plate is rather similar to that of *P. krakatau* in having a Y-shaped sclerotisation of the disc, but both *P. krakatau and P. incurvata* lack the median 'drumstick' sclerotised area on the apical lobe. In addition, the central area of the apical lobe lacks setae, which are present in *krakatau and incurvata*.

Named after Mr. Sardjan of Mataram University, for his assistance with the collecting on Lombok.

Key to species of *Ptycta* known from Bali and /or Lombok

Males

1. Frons darker brown the adjacent sclerites, forming a transverse brown band across front of head ..... *P. frontalis*
   Frons pale with brown patches, no continuous dark brown band across front of head 2
2. Postclypeal striae darker mid-way, forming a dark transverse band across postclypeus; hypandrial tongue asymmetrical apically; phallosome frame with apical tine truncate apically, not beset with spinelets ..... *P. precincta*
   Postclypeus with brown striae not darkening mid-way, no transverse band evident; hypandrical tongue symmetrical apically; phallosome tine rounded apically and beset with spinelets .... *P. incurvata*

Females

1. Fore wing with patches of brown pigment, including a patch in centre of cell Cu_2, small patches in apical 1/3 of cell Cu_1, and in middle of section of vein m forming distal boundary of discoidal cell ..... *P. precincta*
   Fore wing without pigment patches in centre of cell Cu_2, apical 1/3 of cell Cu_1, or in middle of apical section of vein m 2
2. Fore wing with large patches of pigment in middle of cell Cu_1, apical 1/3 of cell R, and apical 1/6th of cell Cu_2 forming a broken transverse fascia ..... *P. incurvata*
   Fore wing without pigment in cell R, small patch in cell Cu_1, thus no transverse fascia evident 3
3. Fore wing smoky over distal 1/3, gradually paling rowards apex, a faint pigment patch over apex of vein cu_{1b}; outer valve without posterior lobe ..... *P. sardjani*
   Fore wing in distal 1/3 hyaline, a distinct dark pigment patch over vein cu_{1b}; outer valve with small posterior lobe ..... *P. frontalis*

Genus *Trichadenotecnum* Enderlein

Trichadenotecnum Enderlein 1909: 329. Type species: *Hemerobius sexpunctatus* Linnaeus 1761.

Trichadenotecnum malayense New

Trichadenotecnum malayense New 1975b: 256-258

Material examined (all by beating). BALI: Candikuning, 1200m, 1♀ 20.xii.1987 IWBT (AMS); Arca, southwest of Besakih, 850m, ♀ 5.viii.1990 ESK (ZMB). LOMBOK: Setiling, 600m, 1♀ 16.viii.1990, ESK (ZMB).

This species was described from the Malay Peninsula (Trengganu Besut) and the male is unknown. The above specimens are clearly referable to *T. malayense*, and constitute the first record of the species from Indonesia.

Trichadenotecnum bidentatum Thornton

Trichadenotecnum bidentatum Thornton 1984: 158-160.

Material examined. LOMBOK: Sapit, 625m, beating, 1♀ 13.viii.1990, ESK (ZMB).

This species was described from Bali and Lombok material. The specimen above is referred to *T. bidentatum* on coloration and wing pattern; the fore wings of *Trichadenotecnum nebulosum* Vaughan *et al.* 1991 (W. Java) lack the prominent dark spots in the apical cells. Only one specimen was collected in 1990 from Sapit (east Lombok); 13 years previously a female was found in Narmada (west Lombok) by Thornton.

Trichadenotecnum arciforme Thornton

Trichadenotecnum arciforme Thornton 1961: 11; 1984: 157-158.

Described from a male taken in Hong Kong, the female of this species was described by Thornton (1984) from Bali material (Candikuning, primary forest, 1200m, vii.1977). A female was also collected in a forest near Ubud in xi.1981, and form Lombok (Mt. Rinjani, Pusuk, 1000m) in vii.1977. The species is not present in the more recent collections.

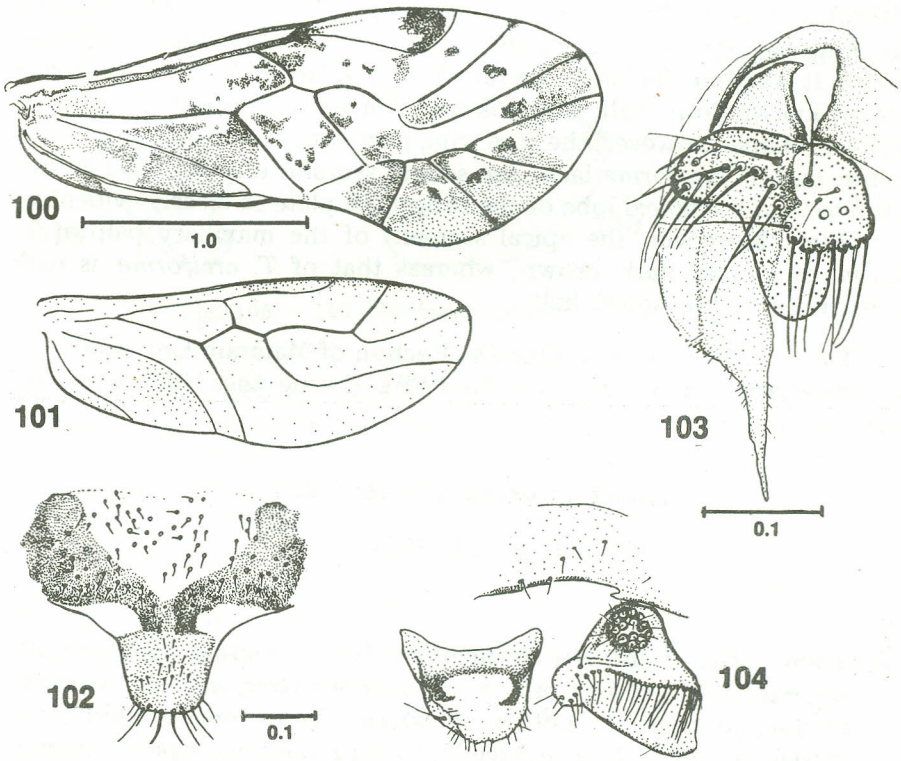
Trichadenotecnum rachimi sp.n.

(figs. 100-104)

Male unknown

Female

Coloration (after 3 years in alcohol): Head generally cream. Vertex with brown markings, epicranial suture dark brown anteriorly. Eyes black. Antennae light brown. Gena cream with brown mark lateroventrally. Maxillary palp pale except apical segment dark brown. Ocelli pale, dark centripetally, a brown band from protuberance to antennal socket. Frons cream, light brown centrally, dark brown laterally, antennal socket bordered with brown line. Postclypeus unmarked posteriorly and laterally, otherwise with brown striae. Thoracic antedorsum brown, dorsal lobes pale buff, dark brown along sutures. Thoracic pleura dark brown dorsally and ventrally, pale buff medially. Legs: coxa pale buff; femur pale buff, dark brown distally; tibia pale buff, dark brown subapically; tarsus light brown. Fore wing (fig. 100) with brown pigmented pattern. Hind wing (fig. 101) suffused with brown, a darker cloud in cell Cu_2.



Figs 100 — 104 *Trichadenotecnum rachimi* ♀

Morphology: IO:D = 1.9. Ct = 17. Fore wing (fig. 100), areola postica appearing 4-sided. Subgenital plate (fig. 102) apical lobe short, broad, squarish, bearing an apical row of 12 setae of various lengths, the median pair long and stout; a field of short fine setae in central area of apical lobe; disc with wide V-shaped sclerotisation, apices of arms of V broad. Gonapophyses (fig. 103): dorsal valve with long spine posteriorly and fine setae subapically; ventral valve very short, setose latero-posteriorly; outer valve bearing very long strong setae, rounded posterior lobe. Paraproct (fig. 104) with field of 21 trichobothria. Epiproct (fig. 104) with a curved sclerite each side, finely setose along posterior margin.

Dimensions of female holotype: B = 1.8; FW = 2.55; HW = 1.95; F = 0.55; T = 1.01; t_1 = 0.3; t_2 = 0.1; t_1/t_2 = 3; f_1 = 0.49; f_2 = 0.48; f_1/f_2 = 1.02.

Holotype ♀ : LOMBOK, west Suranadi, 250m, beating, 17.xii.1987, IWBT (ZMB).

Trichadenotecnum rachimi differs from other described species of the genus in fore wing pattern and genitalic details. In the key of New (1978a) it runs to *Trichadenotecnum apertum* Thornton 1961 but the fore wing pattern and subgenital plate structure clearly differ from that species. It is rather similar to the female of *Trichadenotecnum arciforme* (above) known from Bali, Lombok and Hong Kong, especially in gonapophyses shape. However, the fore wing pigment pattern differs in some details, and *T. arciforme* lacks the sclerotised and unsclerotised areas at the base of the apical lobe of the subgenital plate so clearly evident in *T. rachimi*. Moreover, the apical segment of the maxillary palp of *T. rachimi* is wholly dark brown, whereas that of *T. arciforme* is dark brown only in the apical half.

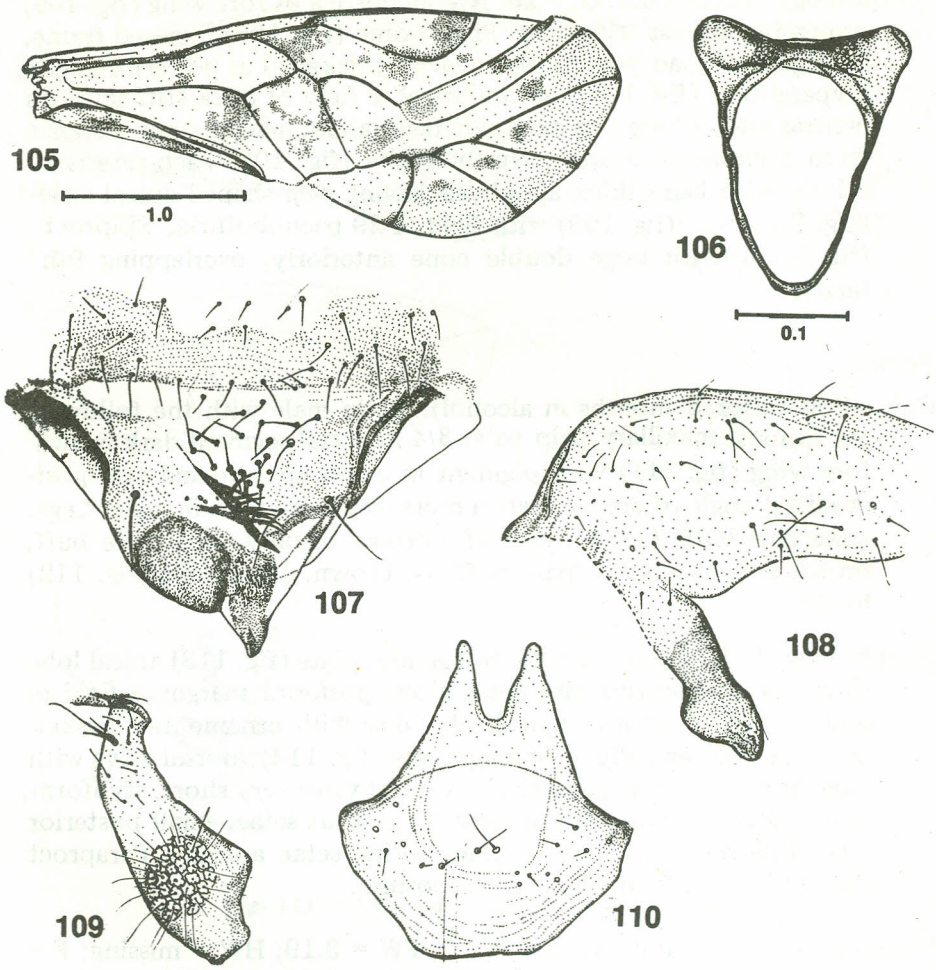
This species is named after Dr. Rachim of Mataram University, for his cooperation and assistance to IWBT during the 1987 work on Lombok.

Trichadenotecnum santosai sp.n.

(figs. 105-115)

Male

Coloration (after 3 months in alcohol): Head generally creamy-buff. Epicranial suture dark brown broad brown band each side with extending to posterior border of vertex; narrow brown band along mesial edge of each orbit. Ocelli pale with dark centripetal margins.



Figs 105 — 110 *Trichadenotecnum santosai* ♂

Eyes black. A brown band from ocellar tubercle to edge of orbit. Frons cream, faint brown centrally, dark brown laterally. Antennal socket bordered with brown line; Antennae pale brown. Genae pale with dark brown mark ventrally. Frons-clypeal suture dark brown laterally. Postclypeus unmarked posteriorly and laterally, otherwise dark brown with indistinct striae, forming a dark T-shaped or shallow Y-shaped pattern. Anteclypeus brown. Labrum pale. Maxillary palp pale, dark brown only in apical half of distal segment. Thorax creamy buff, with restricted brown patches. Legs: coxa brown; femur pale buff, brown distally; tibia pale buff; tarsus light brown. Fore wing (fig. 105) with brown pattern.

Morphology: IO:D = 0.6. Ct = 26. Areola postica of fore wing (fig. 105) appearing almost triangular. Phallosome (fig. 106) a closed frame, triangular, broad posteriorly, heavily thickened at posterior angles. Hypandrium (fig. 107) asymmetrical, a field of thick stiff setae on central area, a long seta each side near lateral margin some distance from asymmetrical apex. Ninth tergite (fig. 108) each side posteriorly with lagre thick apophysis having pear-shaped apical swelling. Paraproct (fig. 109) with field of 29 trichobothria. Epiproct (fig. 110) with large double cone anteriorly, overlapping 9th tergite.

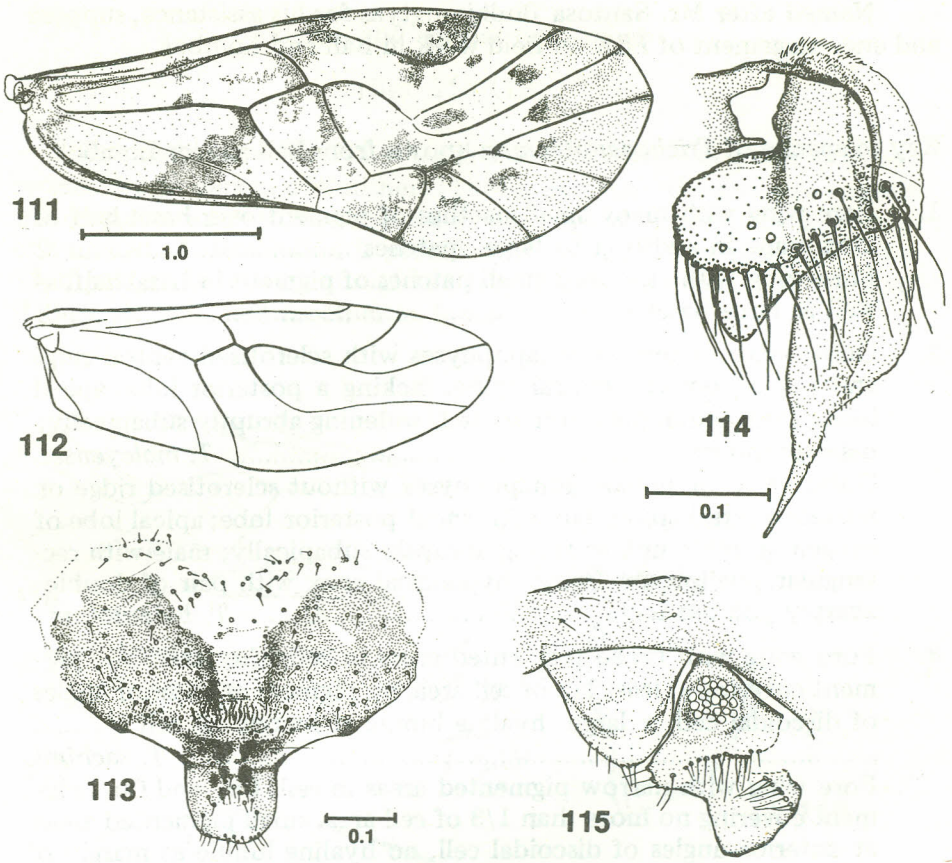
Female

Coloration (after 3 months in alcohol): As in male with the following exceptions: maxillary palp pale, 3/4 of distal segment dark brown fore wing (fig. 111) with pigment in cell R apically and over posterodistal angle of areola postica more extensive than in male. Legs: coxa pale buff; femur pale buff, brown distally; tibia pale buff, brown subapically; t_1 pale buff, t_2 brown. Hind wing (fig. 112) hyaline.

Morphology: IO:D = 3.6. Ct = 24. Subgenital plate (fig. 113) apical lobe short, broad, bearing fine setae along posterior margin; a field of setae in central area of apical lobe; disc with ornamented 'basket-like' pattern centrally. Gonapophyses (fig. 114): dorsal valve with long spine, fine setae anteriorly; ventral valve very short, styliform; outer valve bearing row of very long stout setae, small posterior lobe. Epiproct (fig. 115) simple, 3 fine setae apically. Paraproct (fig. 115) with field of 22 trichobothria.

Dimensions of male holotype: B = 2.0; FW = 3.19; HW = missing; F = 0.60; T = 1.25; t_1 = 0.39; t_2 = 0.12; t_1/t_2 = 3.25; f_1 = 0.59; f_2 = 0.55; f_1/f_2 = 1.07.

Holotype male: BALI, Bedugul, Botanical Garden, 1200m, beating, 17.viii.1990, ESK (ZMB); Allotype ♀: BALI, Wanagiri, north of Candikuning, 1220m, beating, 7.viii.1990, ESK (ZMB). Paratypes: 1♂, same data as holotype (AMS); 1♀, same data as allotype (AMS); 2♀, Bedugul, Botanical Garden, 1200m, beating, 8.viii.1990, ESK (ZMB). Other specimens examined (all beating): LOMBOK: Sesaot 500m, 1♀ 10.viii.1990 ESK (ZMB); Tetebatu, 500m, 1♀ 21.viii. 1990 ESK (ZMB); Pusuk protected forest, 600m, 2♂1♀ 22.viii.1990 ESK (ZMB); Sajang forest, 1000m, 1♂ 3♀ 24.viii.1990 ESK (AMS). Sembalum lawang, 1200m, 1♂ 24. viii.1990 ESK (AMS).



Figs 111 — 115 *Trichadenotecnum santosai* ♀

The female of *T. santosai* keys to *T. apertum* Thornton in the key of New (1978a) but the wing pattern and subgenital plate structure clearly separate it from this species. The male does not key in New (1978a). In sclerotisation of subgenital plate *T. santosai* is rather similar to *T. arciforme and T. rachimi* (above). However, the distinctive 'basket-like' ornamentation in the central area of the disc, the median sclerotisation at the base of the apical lobe, and the very large sclerotised areas on the main plate distinguish this species. The highly distinctive phallosome, epiproct and hypandrium, as well as the lateral apophyses on the posterior margin of the ninth tergite all serve to distignuish males from those of other species.

It is remarkable that both sexes of this species were found on both Bali and Lombok in August 1990, but the species was not found previously. Possibly adults have a short flight period.

Named after Mr. Santosa Budhiningtyas for his assistance, support and encouragement of ESK on field work in Bali and Lombok.

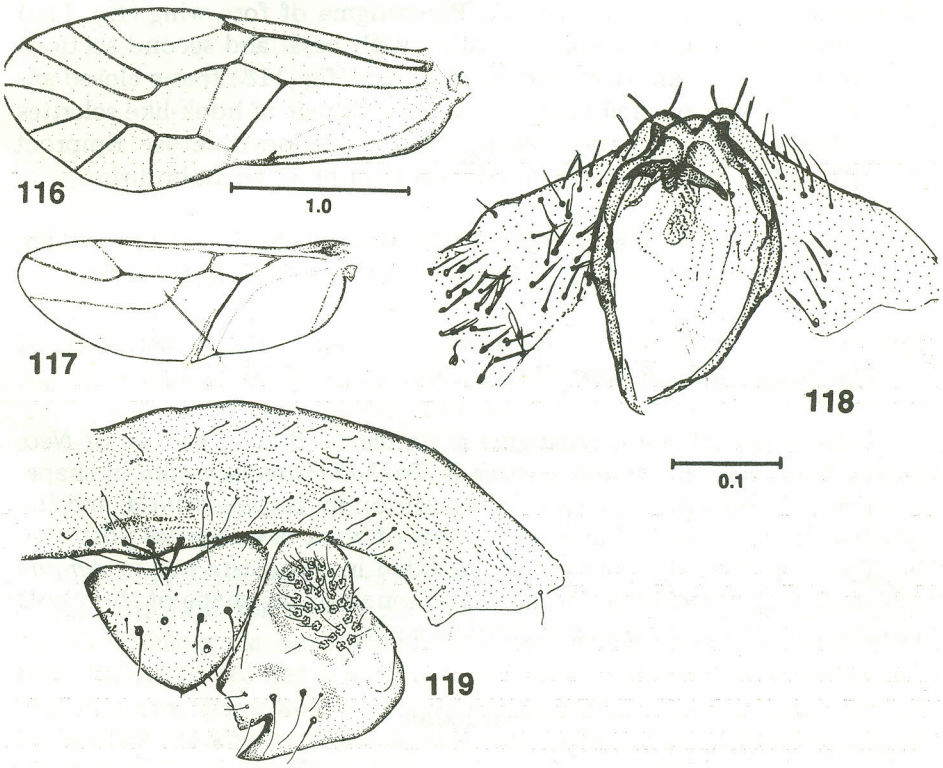
Key to species of *Trichadenotecnum* known from Bali and/or Lombok

1. Fore wing with many small pacthes of pigment over basal half of membrane in addition to large patches 2
   Fore wing with at most 3 small patches of pigment in basal half, as well as large patches 3
2. Outer valve of female gonapophyses with sclerotised ventral ridge and curved postero-ventral spine, lacking a posterior lobe; apical lobe of subgenital plate constricted, widening abruptly subapically; male unknown ..... *T. malayense*
   Outer valve of female gonapophyses without sclerotised ridge or postero-ventral spine, but with small posterior lobe; apical lobe of subgenital plate not widening abruptly subapically; male with rectangular phallosome frame, hypandrial apex with pair of double sharply pointed teeth ..... *T. bidentatum*
3. Fore wing with broad pigmented areas in cells Cu_1 and Cu_2, pigment covering at least 1/2 of cell area, no pigment at anterior angles of discoidal cell, a large hyaline lunule at margin of cell M_1 ..... *T. rachimi*
   Fore wing with narrow pigmented areas in cells Cu_1 and Cu_2, pigment covering no more than 1/3 of cell area, small pigmented areas at anterior angles of discoidal cell, no hyaline lunule at margin of cell M_1 4
4. Subgenital plate of female with central oval area of 'basket-like' surface ornamentation (fig. 113), lateral sclerotised areas of disc very broad, covering 3/4 area of disc; male epiproct with large double cone anteriorly; male 9th tergite with thick lateral apophysis having pear-shaped terminal swelling; hypandrium lacking apical spines; phallosome thickened and sclerotised at posterior angles. ..... *T. santosai*
   Subgenital plate of female without oval area of surface ornamentation, lateral sclerotised areas of disc not broad, covering less than 1/3 surface area of disc; male epiproct simple, no anterior extension; male 9th tergite with lateral peg-like extension, not swollen apically, with spherical spinous lobe at its base; hypandrium with 3 apical sclerotised spines; phallosome not broadened and sclerotised apically, coffin-shaped ..... *T. arciforme*

Genus and species not known

(figs. 116-119)

One male from Bali is not assignable to any known genus using the recent key to genera of Smithers (1990). Erection of a genus to contain this is not attempted on the basis of the single specimen, nor is the species named. A description is provided below for future reference. The head pattern is rather unusual and may enable association of the sexes if they are collected together in future.



Figs 116 — 119. *"Genus unknown"*

Male

Coloration (after 3 years in alcohol): Head light brown. Epicranial suture brown, dark brown marks each side of epicranial suture extending along posterior margin of vertex, similar markings along mesial edge of orbits. Ocelli pale, dark centripetally, eyes black. Broad triangular brown mark on frons, extending to lateral borders of frons. Brown band from ocellar tubercle to antennal socket. Antennae wholly brown. Postclypeus with 10 striae. Maxillary palp pale except distal segment light brown. Thorax brown, legs wholly brown. Fore wing (fig. 116) almost hyaline with light brown cloud in basal half, pterostigma unpigmented. Hind wing (fig. 117) hyaline.

Morphology: IO:D = 3;5; Ct = 17. Pterostigma of fore wing (fig. 116) smoothly rounded, areola postica with basal and second sections of vein cu_{1a} almost in line. Phallosome (fig. 118) frame closed anteriorly only by membranous tissue, with pair of hook-like sclerites and radula "sacs". Hypandrium (fig. 118) bilobed, setose. Epiproct (fig. 119). Paraproct (fig. 119) with field of 31 trichobothria.

Dimensions of male : B = 1.7; FW = 2.61; HW = 1.88; F = 0.61; T = 0.95; t_1 = 0.26; t_2 = 0.09; t_1/t_2 = 2.8; f_1 = 0.44; f_2 = 0.25; f_1/f_2 = 1.5.

Specimen on which above description is based ♂: BALI east, slope of Gunung Agung, Pidpid, 400m, 10.xii.1987, IWBT (ZMB).

The shape of the pterostigma is similar to that of species of *Neoblaste;* however, the areola postica is *Trichadenotecnum*-like in shape. Vein rs is fused with m, unlike the condition in *Amphigerontia,* and the phallosome is a closed frame with a pair of hook-like sclerites posteriorly. The specimen thus cannot be included in *Neoblaste* nor in *Amphigerontia.* The closed frame of the phallosome and the shape of the areola postica are typical of the subfamily Psocinae.

Discussion

Although there have now been four specialist collecting visits to Bali and Lombok some species were still being newly discovered in numbers on the last visit in 1990 (fig. 120). It appears that the Psocidae fauna has not yet been thoroughly sampled, and further collecting is needed, preferably at other times of year and in other habitats. The male of six species (including three previously described species, *Cycetes thyrsophoroides, Metylophorus lisae* and *Trichadenotecnum malayense)* and the female of another four species have yet to be found.

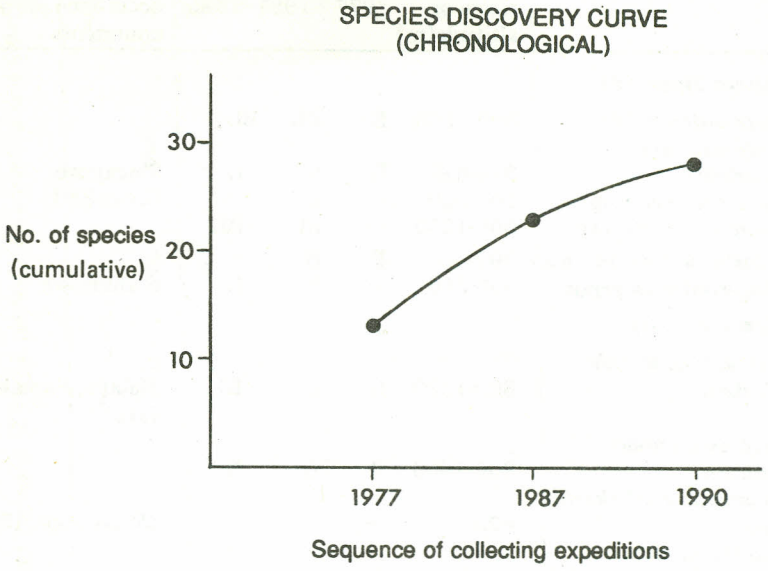


Fig. 120. Graph indicating cumulative number of species taken on each of 3 expeditions to Bali and Lombok.

Twenty seven species of Psocidae are now known from the islands of Bali and Lombok of which 15 have been described previously (Table 1). *Ptycta incurvata* dan *Trichadenotecnum malayense* are here recorded from Indonesia for the first time and twelve new species are described, two in a new genus and two possibly representing new genera. Five of the species are known from outside Indonesia, all from Asia (two from Hong Kong, two from West Malaysia and one from Singapore).

Table 1. Species of Psocidae collected from Bali and/or Lombok in surveys of 1977, 1989 and 1990.

	range of altitude(m)	1977	1987	1990	occurence elsewhere, comments
Amphigerontiinae (6)					
Neoblaste alticola Th.	500-1600	B	BL	BL	
Neoblaste cubitalis (Enderlein)	250-625	L	L	L	Singapore.
Neoblaste brunnea n.sp.	100-500	—	L		Komodo I.
Indoblaste lienhardi n.sp.	300-1200	—	BL	BL	
**Indoblaste sastrawani* n.sp.	300	B	B	—	
*Amphigerontiinae genus	450-500	—	B	L	♂ unknown
Cerastipsocinae (6)					
**Clematoscenea lemnis cata* (Enderlein)	800-1200	L	B	BL	Malaya, Sumatra, Java
**Psococerastis annae* Thornton	800-1600	B	B	B	
**Psococerastis lombokensis* Navas	625	—	—	—	2♀ Lombok 1896
**Metylophores lisae* Thornton	1200	B	—	B	
**Sigmatoneura basalis* n.sp.	100-300	—	B	—	Komodo I.; ♀ unknown Java;
**Cycetes thyrsophoroides* Ederlein	300	—	B	—	Java; unknown
Psocinae (15)					
Psocidus apertus Thornton	300-1600	B	B	BL	
Psocidus reidi Thornton	50-1200	BL	BL	BL	Madura I.
**Psocidus tergatus* n.sp.	1200	—	—	B	♀ unknown
**Psocidus segmentatus* n.sp.	500-625	—	—	L	
Psocidus lobatus n.sp.	300-680	—	L	L	
Ptycta precincta Thornton	500-1200	BL	BL	L	
**Ptycta incurvata* Thornton	500	—	L	—	Hong Kong
**Ptycta frontalis* Thornton	1200-1600	B	—	B	Java
**Ptycta sarjani* n.sp.	680	—	—	L	♂ unknown
Trichadenotecnum malayense New	600-1200	—	B	L	♂ unknown Malay Pen.
Trichadenotecnum bidentatum Thornton	200-1200	BL	—	L	
**Trichadenotecnum arciforme* Thornton	1000-1200	BL	—	—	Hong Kong
Trichadenotecnum rachimi n.sp.	300	—	L	—	♂ unknown
Trichadenotecnum santosai n.sp.	500-1200	—		BL	
Psocinae genus	400	—	B	—	♀ unknown

* stenotopic, i.e. restricted to one of the following altitudinal zones-low: 0-300m; mid: 301-700m; high: 701-1600m. Species without asterisk regarded as eurytopic, i.e. occur in more than one zone.

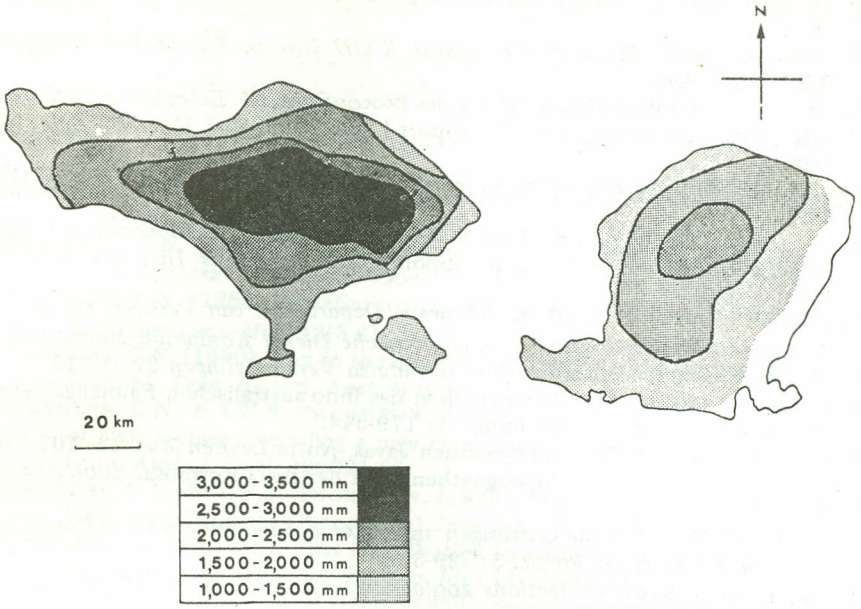
Table 2. Distribution of species of Psocidae occuring on Bali (B) and Lombok (L) with respect to endemism and altitude (end = endemic).

	1-island end		2-island end	Non-endemic				TOTAL
	B	L	total	BL	B	L	BL	total	
stenotopic 0-300m (low)	1	1	2	0	2	0	0	2	5
stenotopic 301-700m (mid)	1	4	5	1	0	1	0	1	7
stenotopic 701-1600m (high)	3	0	3	0	1	0	2	3	6
total stenotopic	5	5	10	1	3	1	2	6	17
eurytopic	0	0	0	6	0	2	2	4	10
TOTAL	5	5	10	7	3	3	4	10	27

Five species are known from Bali only, five from Lombok only, and seven occur on both islands but are unknown elsewhere (Table 2). Thus 17 species out of the 27 (two/third) are endemic to Bali-Lombok and 10 species are found elsewhere. Three of the latter occur on Lombok, 3 on Bali and 4 are found on both islands.

Three of the five Bali endemics are found in the highlands, one in the lowlands and one at mid-altitudes (Table 2), whereas most of the Lombok endemics (four of the five) are found at mid-altitudes, none at high altitudes. All ten single-island endemics are stenotopic (i.e. having a range including only one altitudinal zone). In contrast, of the seven species which are 2-island endemics, six (86%) are eurytopic (occuring in more than one altitudinal zone). Eleven of the 27 species known occur on both islands, and of these, eight (73%) are eurytopic. Thus there is a suggestion that single-island endemism is correlated with stenotopy and occurrence on both islands or non-endemicity is associated with eurytopy (10 of 17 such species are eurytopic). This suggestion must be terated with caution; observed eurytopy and stenotopy are inevitably related to number of specimens collected, and the fewer specimens collected, the greater the likelihood that stenotopy will be indicated. Further collecting on the islands is needed to rule out this possible effect of numbers collected.

More than half the Bali endemics (3 of the 5) have been collected only in the highlands but none of the 5 Lombok endemics has been found above 700m. The 7 species endemic to the two islands all occur at medium of high elevations, also suggesting some association with highland habitats. Average annual rainfall in the Lombok highlands is less than in the Bali highlands, Lombok being generally drier than Bali (Map B). The very wet highlands of Bali have no counterpart on Lombok, even at higher elevations, and this is probably reflected in microclimatic and microfloral differences.



Map B. Average annual rainfall of Bali and Lombok in mm. (data from Berlage, 1949).

Another possible explanation of the high endemicity on the islands is the lack of published work on Indonesian Psocidae generally, particularly from mountainous areas. For example, several of the putative endemic species may occur in collections recently made in the mountains of Java by Thornton and Lienhard. Of the 71 species of Psocidae now known from Indonesia, 27 (37.5%) are known from Bali and /or Lombok, and only 6 of these are known from elsewhere in Indonesian the archipelago, again a reflection of relative collecting efforts.

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LEGENDS TO FIGURES

Map A. Collecting sites on various expeditions to Bali and Lombok (contours in m).

Figures 1—5 *Neoblaste brunea* ♂ : fore wing (1), hind wing (2), hypandrium and parameres (3), epiproct (4), paraproct (5). Figures 1 and 2, and 3-5 to common scales.

Figures 6—10 *Neoblaste brunnea*, ♀ : fore wing (6), hind wing (7), subgenital plate (8), gonapophyses (9), paraproct (10), Figures 6 and 7, and 8-10, to common scales.

Figures 11—15 *Indoblaste lienhardi*, ♂ : fore wing (11), hind wing (12), hypandrium and parameres (13) Phallosome of paratype male (13A), ninth tergite (14), epiproct and paraproct (15). Figures 11 and 12, and 13 and 15, to common scales.

Figures 16—22 *Indoblaste lienhardi*, ♀ : fore wing (16), hind wing (17), subgenital plate (18), gonapophyses (19), epiproct (20), paraproct (21), spermapore plate (22), Figures 16 and 17, and 18-21, to common scales.

Figures 23—27 *Indoblaste sastrawani*, ♂ : fore wing (23), hind wing (24), phallosome of paratype male (25), hypandrium (26), epiproct and paraproct (27), Figures 23 and 24 to common scale.

Figures 28—23 *Indoblaste sastrawani*, ♀ : for wing (28), hind wing (29), subgenital plate (30), gonapophyses (31), paraproct, (32), spermapore plate (33). Figures 28 and 29, and 30 and 31, to common scales.

Figures 34—40 Genus unknown ♀ : fore wing (34), hind wing (35), subgenital plate (36), spermapore plate (37), gonapophyses (38), epiproct (39), paraproct (40). Figures 34 and 35, and 37-39, to common scales.

Figures 41—46 *Clematoscenea lemniscata* Enderlein, ♂ : fore wing (41), hind wing (42), phallosome (43), epiproct (44), paraproct (45), hypandrium (46). Figures 41 and 42, and 44-46, to common scales. hypandrium (50), epiproct and paraproct (51). Figures 47 and 48, and 49-51, to common scales.

Figures 52—57 *Cycetes thyrsophoroides*, ♀ : fore wing (52), hind wing (53), subgenital plate (54), gonapophyses (55), epiproct (56), paraproct (57). Figures 52 and 53, and 54, 56 and 57, to common scales.

Figures 58—62 *Psocidus reidi* Thornton, ♂ : fore wing (58), hind wing (59), phallosome (60), hypandrium (61), epiproct and paraproct (62). Figures 58 and 59, and 60-62, to common scales.

Figures 63—67 *Psocidus tergatus* ♂ : fore wing (63), hind wing (64), phallosome (65), hypandrium (66), epiproct and paraproct (67). Figures 63 and 64, and 65 and 67, to common scales.

Figures 68—72 *Psocidus segmentatus*, ♂ : fore wing (68), hind wing (69), phallosome (70), hypandrium (71), epiproct and paraproct (72), Figures 68 and 69, and 71 and 72, to common scales.

Figures 73—77 *Psocidus segmentatus*, ♀ : fore wing (73), hind wing (74), subgenital plate (75), gonapophyses (76), epiproct and paraproct (77). Figures 73 and 74, and 75 and 77, to common scales.

Figures 78—83 *Psocidus lobatus*, ♂ : fore wing (78), hind wing (79), phallosome (80), epiproct (81), paraproct (82), hypandrium (83). Figures 78 and 79, and 80-83, to common scales.

Figures 84—89 *Psocidus lobatus*, ♀ : fore wing (84), hind wing (85), gonapophyses (86), subgenital plate (87), epiproct (88), Paraproct (89). Figures 84 and 85, and 87-89, to common scales.

Figures 90—94 *Ptycta frontalis* Thornton, ♂ : fore wing (90), hind wing (91), phallosome (92), hypandrium (93), epiproct and paraproct (94). Figures 90 and 91, and 92-94, to common scales.

Figures 95—99 *Ptycta sardjani*, ♀ : fore wing (95), hind wing (96), subgenital plate (97), gonapophyses (98), epiproct and paraproct (99). Figures 95 and 96, and 97 and 98, to common scales.

Figures 100-104 *Trichadenotecnum rachimi*, ♀ : fore wing (100), hind wing (101), subgenital plate (102), gonapophyses (103), epiproct and paraproct (104). Figures 100 and 101, and 102 and 104, to common scales.

Figures 105-110 *Trichadenotecnum santosai*, ♂ : fore wing (105), phallosome (106), hypandrium (107), apophysis on ninth tergite (108), paraproct (109), epiproct (110). Figures 106-110 to common scale.

Figures 111-115 *Trichadenotecnum santosai*, ♀ : fore wing (111), hind wing (112), subgenitla plate (113), gonapophyses (114), epiproct and paraproct (115). Figures 111 and 112, and 113 and 115, to common scales.

Figures 116-119 Genus unknown, ♂ : fore wing (116), hind wing (117), hypandrium and phallosome (118), epiproct and paraproct (119). Figures 116 and 117, and 118 and 119, to common scales.

Figures 120 Cumulative number of species taken on each of 3 expeditions to Bali and Lombok.

Map B. Average annual rainfall of Bali and Lombok in mm. (data from Berlage, 1949).