

THE PSOCOPTERA (INSECTA) OF SOUTH AUSTRALIA

by

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ABSTRACT

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The number of Psocoptera known from South Australia is increased from 8 to 45, including 16 new species and 21 new records for the State. The fauna appears to be predominantly associated with bark and dried leaves as opposed to green foliage. The relationships of the fauna are discussed briefly within the context of present records of the Australian fauna.

INTRODUCTION

Two significant recent collections of Psocoptera from South Australia have prompted a detailed study of all material available from this area the results of which are presented here.

The first Psocoptera from South Australia were described by McLachlan (1866). He described *Psocus pallipes* McLachlan from Adelaide, transferring it to *Propsocus* in a postscript to the same paper. It has since been recorded from Western Australia, Queensland and New South Wales. He also described *Psocus striatifrons* McLachlan from "Australia meridionali", transferring it immediately to *Stenopsocus* Hagen. This species has not been recorded again and it is possible that it may not be South Australian even if it does occur elsewhere in southern Australia. The type locality is not precisely known. *Stenopsocus* is a Palaearctic and Oriental genus with one species in New Guinea and eastern Australia which has been found as far south as northern New South Wales. *S. striatifrons* is certainly not the same species. Detailed study of the type of *S. striatifrons* is necessary to clarify its status and confirm its generic position. Banks (1939) described *Zelandopsocus sinuosus* Banks from "Mt. Lofty Range". This species is now placed in *Austropsocus* Smithers and has been recorded from Tasmania, Victoria, Australian Capital Territory, New South Wales and Queensland. Smithers (1964a) recorded the widespread *Lepinotus reticulatus* Enderlein and *Psyllipsocus ramburii* Selys-Longchamps from caves in South Australia and *Phlotodes australis* (Brauer) from several localities (Smithers 1964b). Thornton and New (1977) recorded *Haplophallus bundoorensis* New and *H. medialis* Thornton and New from South Australia. The

former is known from Victoria, Queensland and New South Wales and the latter from New South Wales, Australian Capital Territory and Victoria. So, by 1977 eight species had been recorded from South Australia.

This paper is based on collections in the Australian Museum and the South Australian Museum. These include 41 species, of which four have already been recorded from South Australia. Four of the recorded species are not represented in the present material, 21 are new records for the State (marked with an asterisk in the list below) and 16 are new species. In all, 45 species (including *S. striatifrons*) are now known from South Australia.

The Psocoptera so far recorded from South Australia are nearly all inhabitants of bark or dead leaves; there seem to be very few species on green foliage. Precise habitat information is, however, available for only a small proportion of the material. The species which may be associated with green foliage are *Caecilius semifuscatus* (Tillyard), *Stenopsocus striatifrons* (if it is a *Stenopsocus*) and *Cladioneura punctata* sp. n. although even these cannot be confirmed as inhabitants of fresh leaves. It seems unlikely that the main method of collecting, by beating, would give samples biased toward bark dwellers as opposed to inhabitants of green leaves. The fauna as so far known seems, therefore, to be poor in inhabitants of green leaves.

Echinopsocus grayi sp. n., *Pachytroctes rugosus* sp. n. and *Sphaeropsocopsis recens* (Hickman) are leaf litter insects. *Echmepteryx* (*Loxopholia*) *brunnea* Smithers is an inhabitant of twigs and smaller branches. The two species of Trogidae, *Cerobasis guestfalica* (Kolbe) and *Lepinotus reticulatus* and also *Psyllipsocus ramburii* are very widespread domestic species which have all been taken in outdoor habitats, the last two being known also from caves. *Lachesilla pedicularia* (L.) has been recorded from several parts of the world. In Europe it is an inhabitant of trees and shrubs and is often found in homes. The only South Australian record is from packing straw from England. The two species of Ectopsocidae, *Ectopsocus californicus* (Banks) and *E. cetratus* Smithers, are inhabitants of dried leaves either on plants or as leaf litter as are *Pentacladus eucalypti* Enderlein and *Propsocus pallipes*. *Mesopsocus reticulatus* sp. n. is the first species of the family to be recorded from Australia. Several

members of this family in Africa occur in fairly dry habitats on the twigs of shrubs and the European species are found on bark of branches and twigs. The most important family of bark dwelling psocids is the Psocidae. The family is well represented in South Australia, comprising about 30% of the psocopteran fauna so far known. The two myopsocids, *Phlotodes australis* and *Ph. hickmani* (Smithers), feed on algae and fungi on bark; the former is very common on damp suburban paling fences.

Until the fauna of the whole of the continent is better known only tentative comments can be made on the relationships of the South Australian fauna as a whole although a few elements can be clearly discerned. There is a worldwide element, represented by such species as *Cerobasis guestfalica*, *Lepinotus reticulatus* and *Psyllipsocus ramburii* which have probably established themselves independently of human influence, although they are also found in domestic situations. *Ectopsocus californicus* and *Lachesilla pedicularia* are similarly very widespread species well able to establish themselves in new areas. There is an element composed of Australasian species, such as *Caecilius semifuscatus*, *Peripsocus maoricus* (Tillyard), *Propsoecus pallipes*, *Pentacladus eucalypti*, *Phlotodes australis* and the philotarsids, which are widespread in coastal regions of Australia and which, in some cases, have ranges which include New Zealand and Norfolk Island. To what extent there has been human influence in the overseas distributions is not known but such species as *Ph. australis* could easily be carried on timber. Together with these species can be included those which have a more restricted southern and eastern Australian distribution such as *Echmepteryx brunnea* Smithers, *Peripsocus edwardsi* New, *P. hickmani* New, *Spilopsocus ruidis* Smithers and *Tanystigma tardipes* (Edwards). There appear to be two other elements occurring in South Australia one of which has affinities with Western Australia, including species such as *Lasiopsocus michaelsoni* Enderlein and *Ectopsocus cetratus*, while the other has affinities in an easterly direction with Victoria and Tasmania, represented by such species as *Phlotodes hickmani*, *Spilopsocus masseyi* New and members of the *Blaste macrops* species group. Finally, there is the interesting species *Sphaeropsocopsis recens* which is known from Tasmania and South Australia and which appears to have close relatives only in South America, Angola and in Baltic amber. *Mesopsocus reticulatus* is an anomalous species in that the genus is known from many parts of the world but has not yet been mentioned in records for other parts of Australia. Its occurrence in South Australia places it in an unusual, isolated position zoogeographically.

TAXONOMIC ACCOUNT OF SOUTH AUSTRALIAN PSOCOPTERA

Smithers (1970, p. 372 *et seq.*) has given a key to the families of Australian Psocoptera. In that key the Mesopsocidae (not previously recorded from Australia) would run to couplet 6. As it has glabrous wings *Mesopsocus* will run to the Psilopsocidae, a family not yet recorded for South Australia. *Mesopsocus* differs from psilopsocids in having a tall areola postica and clear, hyaline wings; the psilopsocids have a shallow areola postica and darkly patterned wings.

LIST OF SPECIES OF PSOCOPTERA KNOWN FROM SOUTH AUSTRALIA

(* New records for South Australia, ** South Australian species not represented in present material).

LEPIDOPSOCIDAE

Echinopsocus grayi sp. n.

**Echmepteryx* (*Loxopholia*) *brunnea* Smithers

TROGIIDAE

**Cerobasis guestfalica* (Kolbe)

***Lepinotus reticulatus* Enderlein

PSYLLIPSOCIDAE

***Psyllipsocus ramburii* Selys-Longchamps

PACHYTROCTIDAE

Pachytroctes rugosus sp. n.

SPHAEROPSOCIDAE

**Sphaeropsocopsis recens* (Hickman)

CAECILIIDAE

**Caecilius semifuscatus* (Tillyard)

STENOPSOCIDAE

***Stenopsocus striatifrons* (McLachlan)

LACHESILLIDAE

**Lachesilla pedicularia* (L.)

ECTOPSOCIDAE

**Ectopsocus californicus* (Banks)

**Ectopsocus cetratus* Smithers

PERIPSOCIDAE

**Peripsocus edwardsi* New

**Peripsocus maoricus* (Tillyard)

**Peripsocus hickmani* New

Peripsocus notialis sp. n.

Peripsocus hollowayi sp. n.

PSEUDOCAECILIIDAE

Cladianeura punctata sp. n.

ELIPSOCIDAE

**Pentacladus eucalypti* Enderlein

Propsoecus pallipes (McLachlan)

**Spilopsocus masseyi* New

**Spilopsocus ruidis* Smithers

PHILOTARSIDAE

***Austropsocus sinuosus* (Banks)

**Haplophallus guttatus* (Tillyard)

Haplophallus hundoorensis New

Haplophallus medialis Thornton and New

**Haplophallus sinus* Thornton and New

**Aaroniella rawlingsi* Smithers

MESOPSOCIDAE

Mesopsocus reticulatus sp. n.

PSOCIDAE

Lasiopsocus michaelsoni* Enderlein*Lasiopsocus dicellus* sp. n.*Blaste macrops* sp. n.*Blaste magnifica* sp. n.*Blaste angusta* sp. n.Ptycta umbrata* New**Ptycta glossoptera* New*Ptycta longipennis* sp. n.*Ptycta hollowayae* sp. n.**Tanystigma tardipes* (Edwards)*Tanystigma elongata* sp. n.*Tanystigma bifurcata* sp. n.*Psocidus mouldsi* sp. n.*Psocidus parilla* sp. n.

MYOPSOCIDAE

Phlotodes australis (Brauer)**Phlotodes hickmani* (Smithers)

KEY TO ADULT PSOCOPTERA FROM SOUTH AUSTRALIA

- 1 Antennae with more than 20 segments, never secondarily annulated. Tarsi 3-segmented. Pterostigma not thickened, or absent. Paraprocts with strong posterior spine 3
 - Antennae usually with 13 segments, if 15- to 17-segmented then some segments are secondarily annulated. Tarsi 2- or 3-segmented. Pterostigma thickened or not. Paraprocts without posterior spine 2
- 2 (1) Antennae 12- to 17-segmented, some secondarily annulated. Tarsi 3-segmented. Pterostigma not thickened 5
 - Antennae usually 13-segmented, Tarsi 2- or 3-segmented, if latter then flagellar segments not secondarily annulated. Pterostigma thickened 6
- 3 (1) Head long and vertical. Maxillary palp without sensillum on inner side of second segment. Cu_2 and IA end together at wing margin (i.e. nodulus present) (Psyllipsocidae)
 - Head short. Maxillary palp with sensillum on inner side of second segment. Cu_2 and IA end separately at wing margin (i.e. no nodulus) 4
- 4 (3) Claws with preapical tooth. Body and wings bearing scales (Lepidopsocidae) 18
 - Claws without preapical tooth. Body and wings not scaly (Trogidae) 19
- 5 (2) Wings, when present, flat, with complete venation. In apterous and alate forms eyes situated near vertex (Pachytroctidae) *Pachytroctes rugosus*
 - Wings, when present, with incomplete venation, curved, elytriform. Eyes situated well below vertex (Sphaeropsocidae) *Sphaeropsocopsis recens*
- 6 (2) Labial palps broadly triangular, laterally diverging. Lacinia narrow towards apex. Female gonapophyses reduced to a pair of inconspicuous, acuminate valves, with a basal seta 7
 - Labial palps short and appressed, somewhat circular. Lacinia not usually narrowed towards apex. Female gonapophyses usually of three valves, the external valve setose; if reduced then not in form of two acuminate valves 8
- 7 (6) Cu_{1n} fused with M_1 or joined to it by a crossvein (Stenopsocidae) *Stenopsocus striatifrons*
 - Cu_{1n} not fused nor joined to M (Caeciliidae) *Caecilius semifuscatus*
- 8 (6) Areola postica free or absent. Females sometimes brachypterous or apterous but without glandular setae on head 9
 - Cu_{1n} fused with M in fully winged forms. Females occasionally brachypterous, but then glandular setae are present 15
- 9 (8) Tarsi 3-segmented 10
 - Tarsi 2-segmented 12
- 10 (9) Fore and hind wings without setae (Mesopsocidae) *Mesopsocus reticulatus*
 - Fore and hind wings with at least a few marginal setae, even in brachypterous forms; usually with obvious setae 11
- 11 (10) Hind wing with margin entirely setose. Male hypandrium strongly sclerotized. Female subgenital plate with median lobe (Philotarsidae) 20
 - Hind wing with at most setae on margin between R_{2+3} and R_{4+5} . Brachyptery common. Male hypandrium lightly sclerotized. Female subgenital plate usually bilobed (Elipsocidae) 24
- 12 (9) Areola postica absent 17
 - Areola postica present 13
- 13 (12) Wings without setae (Lachesillidae) *Lachesilla pedicularia*
 - Wings setose 14
- 14 (13) Distal parts of veins in fore wing with more than one row of setae (Pseudocaeciliidae) *Cladioneura punctata*
 - Distal parts of veins in fore wing with one row of setae (Elipsocidae) 24
- 15 (8) Tarsi 2-segmented (Psocidae) 27
 - Tarsi 3-segmented 16
- 16 (15) Fore wings without setae. Wing pattern of numerous, confluent, irregular dark areas giving wing a densely mottled appearance (Myopsocidae) 47
 - Wing pattern bold, made up of large hyaline and coloured areas or without pattern (Elipsocidae) 24
- 17 (12) Hind wing with Rs and M fused for a length. R_1 meets margin at acute angle (Peripsocidae) 44
 - Hind wing with Rs and M joined by a crossvein. R_1 meets margin at right angle or almost so (Ectopsocidae) 48
- 18 (4) Fore wing with Rs branched. Hind wing developed *Echmepteryx brunnea*
 - Fore wing with Rs simple. Hind wing reduced to small, pointed, flap *Echinopsocus grayi*
- 19 (4) Fore wings reduced but present as broad flaps *Lepinotus reticulatus*
 - Fore wings virtually absent, represented by a small tubercle *Cerobasis guestfalica*

- 20 (11) Setae of fore wing veins sited on distinct dark brown spots, at least in basal half of wing; flagellar segments 6-8 with light apices 21
 Setae of fore wing veins not sited on dark brown spots. Flagellar segments 6-8 without light apices 22
- 21 (20) In fore wing Cu_2 bare, setae of apical veins sited on distinct brown spots *Aaroniella rawlingsi*
 In fore wing Cu_2 setose, setae of apical veins not sited on brown spots *Haplophallus medialis*
- 22 (20) In fore wing Cu_2 setose or wing very reduced. Antennal apex attenuated, with a single, long seta 23
 In fore wing Cu_2 bare. Antennal apex not attenuated, not with a single long seta *Haplophallus sinus*
- 23 (22) Femora and tibiae largely dark chocolate brown; female brachypterous *Haplophallus bundoorensis*
 Femora and tibiae light brown; female macropterous or brachypterous *Haplophallus guttatus*
- 24 (16) Areola postica fused with M or joined to it by a crossvein 25
 Areola postica free 26
- 25 (24) M with more than 3 branches *Pentacladus eucalypti*
 M with 3 branches *Propsoeus pallipes*
- 26 (24) Areola postica with Cu_{1a} curved to give a convex distal margin to cell. Hypandrium simple, without postero-lateral lobes *Spilopsocus masseyi*
 Areola postica with Cu_{1a} sinuous to give a concave distal margin to cell. Hypandrium with rounded postero-lateral lobes *Spilopsocus ruidis*
- 27 (15) Fore wing veins obviously setose *Lasiopsocus michaelsoni*
 Fore wing veins without or apparently without setae 28
- 28 (27) Fore wing with overall speckled pattern *Blaste magnifica*
 Fore wing hyaline or patterned, in which case pattern is not speckled 29
- 29 (28) Cell M_3 narrow. M_3 and Cu_{1a} parallel *Blaste angusta*
 Cell M_3 not markedly narrow. M_3 and Cu_{1a} not parallel 30
- 30 (29) Pterostigma with spurvein 31
 Pterostigma without spurvein 33
- 31 (30) Cells R_3 and R_5 strongly and extensively pigmented *Tanystigma elongata*
 Cells R_3 and R_5 not strongly and extensively pigmented 32
- 32 (31) Distinct pigmented area near margin only in cell R_1 *Tanystigma bifurcata* ♀
 No distinct pigmented area near margin in cell R_1 *Tanystigma tardipes*
- 33 (30) Fore wing hyaline except for pigmented area at margin in cell R_1 or also over whole of cell R_1 basad of hind angle of pterostigma 34
 Wing markings otherwise 35
- 34 (33) Pigmented area near margin and over whole of cell R_1 basad of hind angle of pterostigma *Ptycta hollowayae* ♂
 Pigmented area of cell R_1 only near margin *Tanystigma bifurcata* ♂
- 35 (33) Median cells strongly pigmented *Psocidus mouldsi*
 Median cells not strongly pigmented 36
- 36 (35) Area around nodulus not pigmented 37
 Area around nodulus pigmented 38
- 37 (36) Phallosome open posteriorly *Lasiopsocus dicellus* ♂
 Phallosome closed posteriorly *Ptycta hollowayae* ♂
- 38 (36) Cell R_1 strongly pigmented beyond hind angle of pterostigma *Psocidus parilla*
 Cell R_1 not so pigmented 39
- 39 (38) Cell R_5 with pigment spot anterior to areola postica *Ptycta glossoptera*
 Cell R_5 without such a spot 40
- 40 (39) No spot at separation of M and Cu_1 41
 Spot of colour at separation of M and Cu_1 42
- 41 (40) No dark areas in basal cells *Ptycta longipennis*
 Some dark areas in basal cells *Ptycta umbrata*
- 42 (40) Spot at separation of M and Cu_1 almost reaching Cu_2 43
 Spot at separation of M and Cu_1 small *Blaste macrops*
- 43 (42) Area around R_5 and M junction pigmented *Lasiopsocus dicellus* ♀
 Area around R_5 and M junction hyaline *Ptycta hollowayae* ♀
- 44 (17) Fore wings grey with hyaline areas, visible even in brachypterous females *Peripsocus edwardsi*
 Fore wing without such markings 45
- 45 (44) Fore wing with R_5 , M basad of fusion with R_5 and nodulus narrowly bordered with brown *Peripsocus hickmani*
 Fore wings without such markings 46
- 46 (45) Epicranial plates pale, bordered with pale brown *Peripsocus maoricus*
 Epicranial plates pale with a few brown marks adjacent to compound eyes, across vertex and adjacent to median epicranial suture *Peripsocus notialis*
 Epicranial plates very dark brown, a narrow pale stripe from epistomial suture towards back of head on each epicranial plate *Peripsocus hollowayi*
- 47 (16) Larger species, fore wing length 5.0-5.5 mm *Photodes australis*
 Smaller species, fore wing length 3.4-3.6 mm *Photodes hickmani*
- 48 (17) Vertex pale brown, postclypeus much darker *Ectopsocus californicus*
 Vertex pale with darker spots, postclypeal ground colour not much darker than vertex, postclypeus with dark stripes *Ectopsocus cetratus*

Family LEPIDOPSOCIDAE

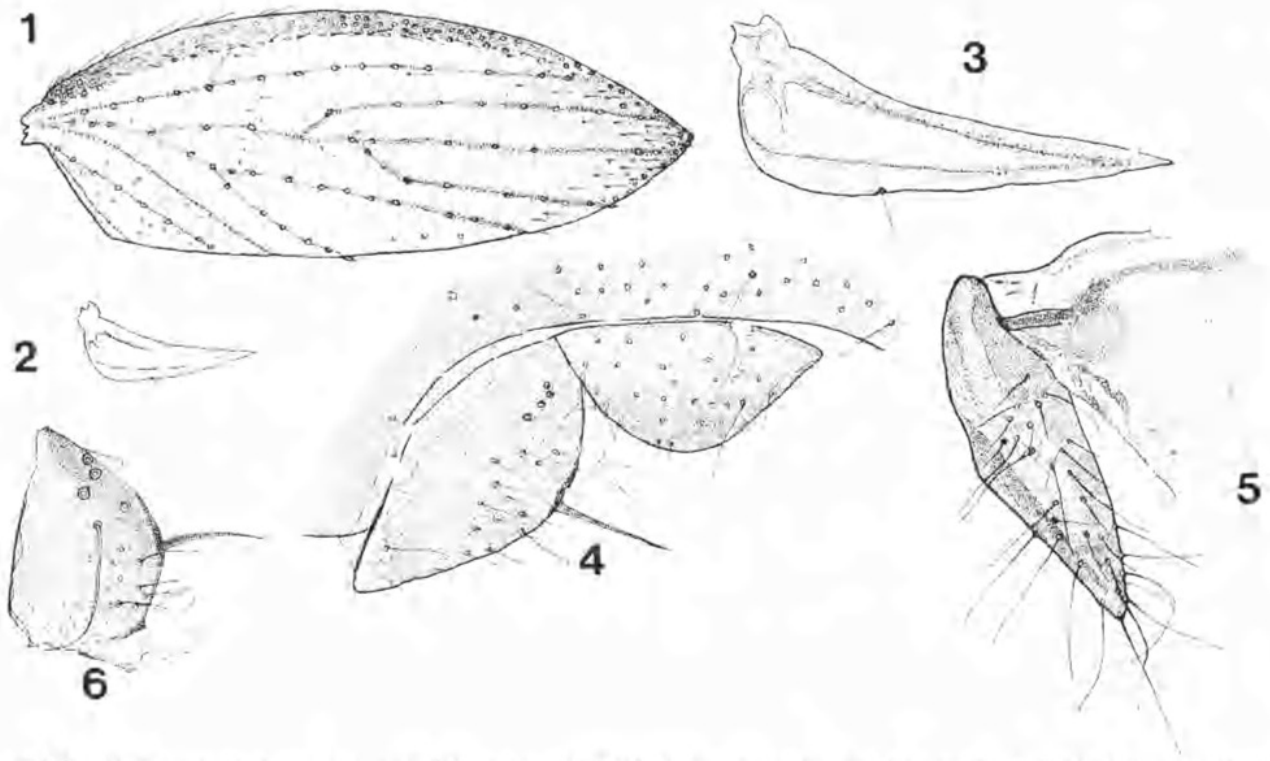
Echinopsocus grayi sp. n.

Female

Coloration (in alcohol): Head, body, legs, antennae and maxillary palps golden brown. A faint suggestion of a darker, curved narrow line mesad of each compound eye, a darker median epicranial suture, a median line running length of pronotum and mesoscutum and with margins of mesoscutum dark. Apex of abdomen darker than head and thorax. Ocelli black. Eyes black. Fore wing transparent, tinged with golden brown; veins a little darker than rest of wing surface; when viewed with transmitted light a somewhat mottled appearance is evident with very faint indication of broad, transverse, irregular banding. Hind wing transparent, colourless.

Morphology: Brachypterous. Most of scales lost in available material, those present long and very narrow. Somewhat thickened fore wings not reaching apex of abdomen. Abdominal terga membranous under fore wings (i.e. as far as tergite 7); eighth and ninth tergites and terminal structures well sclerotized. Length of body: 2.5 mm. Median epicranial suture and anterior arms very distinct. Vertex sharp. Head with long, dense pubescence. Postclypeus bulbous. Antennae incomplete in all specimens; scape and pedicel broad, remaining segments short, about twice as long as wide. Eyes fairly large,

reaching level of vertex, with an occasional seta between facets. IO/D:2.0; PO:0.7. Ocelli well-developed, anterior ocellus only a little smaller than lateral ocelli. Lacinia narrow, parallel-sided with an emarginate apex so that the end is divided into a smaller inner tooth and a larger outer tooth. Maxillary palp with elongate second segment with small sensillum; fourth segment a little broadened distally. Prothorax sharp dorsally, strongly pubescent. Measurements of hind leg: F: 0.72 mm; T: 1.16 mm; t_1 : 0.43 mm; t_2 : 0.11 mm; t_3 : 0.11 mm; rt : 4:1:1. Hind femur short and broad, dorsal edge convex with large setae. Tibia long and narrow, apex with two stout and one small spur. Claws with preapical tooth but without evident denticles basad of tooth. Fore wing length: 1.96 mm; width: 0.72 mm. Fore wing (Fig. 1) not reaching apex of abdomen, narrowing towards apex; membrane somewhat thickened. Anterior margin somewhat thickened. Distal section of Sc (i.e. from stigmapophysis to marginal thickening) distinct. R_1 runs parallel to wing margin for a long length, reaching margin not far short of wing apex. Rs fused with M for a short length just distad of stigmapophysis, simple, not branched. M 2-branched, the anterior branch, apparently M_1 is, in fact, Rs. Cu_1 forks at level of stigmapophysis so that the areola postica is long. Veins not well developed but evident, indicated by position of rows of long, erect setae, represented by alveolae in figure. Membrane densely



FIGS. 1-6. *Echinopsocus grayi* sp. n. 1. ♀ Fore wing. 2. ♀ Hind wing (same scale as fore wing). 3. ♀ Hind wing (enlarged). 4. ♀ Epiproct and paraproct. 5. Gonapophyses. 6. ♂ Paraproct.

covered with scales and scale-like setae, most of which are lost in available specimens. Hind wing length: 0.44 mm, width: 0.12 mm. Hind wing (Figs. 2, 3) reduced to a membranous, acuminate flap with faint suggestion of one vein near anterior border and another, even less distinct, running more or less parallel with the hind margin. A single small seta occurs about half-way along hind margin. Epiproct (Fig. 4). Paraproct (Fig. 4). Subgenital plate simple, rounded behind. Gonapophyses (Fig. 5). Ninth tergite and median part of eighth tergite more heavily sclerotized than other abdominal terga, being the areas exposed through wing reduction.

Male

Coloration (in alcohol): As female.

Morphology: General morphology as female, similarly brachypterous. Eyes as in female. Length of hind leg: F: 0.64 mm; T: 1.04 mm; t_1 : 0.39 mm; t_2 : 0.08 mm; t_3 : 0.08 mm; rt : 4.9:1:1. Fore wing length: 1.68 mm; width: 0.68 mm. Form and venation as in female. Hind wing as in female. Hypandrium well sclerotized, with gently rounded hind margin, a group of strong setae in middle of hind margin. Phallosome with external parameres posteriorly strongly acuminate, their apices strongly incurved. Epiproct simple, rounded behind. Paraproct (Fig. 6).

Material Examined: SOUTH AUSTRALIA. ♀ (holotype), ♂ (allotype), in litter, Mambray Creek, 19.iv.1973, M. Gray. Paratypes: 2 ♀, as holotype.

Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Echinopsocus* Enderlein was erected on the basis of a single specimen, in poor condition, of *E. erinaceus* Enderlein from New Guinea (Enderlein 1903). No additional material of this genus has become available until now. *E. grayi* has most of the generic characters of *E. erinaceus* but differs in the fore wings not having a long apical extension although they are somewhat pointed. Enderlein (1903, p. 331) indicated that he was unable to find ocelli in *E. erinaceus* but they are present in *E. grayi*. The venation of *Echinopsocus* is quite distinctive, however, and *E. grayi* agrees with the type species. R_1 is long; R_s is not branched, appearing to arise from M owing to the evanescence of the basal section of that vein basad of its fusion with M; M is 2-branched, the anterior branch reaching the margin near the bluntly pointed wing apex. Although most of the setae and scales have been lost from the four available specimens, those which remain and the arrangement of alveolae indicate that *E. grayi* is clothed in scales through which protrude a fairly dense covering of strong, erect setae, as described for

E. erinaceus. The immediately apparent difference between *E. grayi* and *E. erinaceus* is the difference in wing shape, the apical extension being considerable in *E. erinaceus* whereas the apex is bluntly pointed in *E. grayi*.

Although *E. grayi* does not conform to the characters of the generic definition so far as ocelli and fore wing shape are concerned it is not considered necessary to erect a separate genus for it. It suffices to enlarge the limits of *Echinopsocus* to include species which do have ocelli and in which the wing shape is more nearly normal.

Echmepteryx (Loxopholia) brunnea Smithers

Echmepteryx (Loxopholia) brunnea Smithers 1965.

J. ent. Soc. Qd. 4: 75, Figs. 11-16.

Material Examined: SOUTH AUSTRALIA. 1 ♀, Yalata, 131°45'E, 31°30'S, 29.ix.1978, M. S. and B. J. Moulds. 1 ♀, 40 km. W. Nullarbor, 130°29'E, 31°28'S, 29.ix.1978, M. S. and B. J. Moulds.

This species has been recorded from New South Wales and Queensland.

Family TROGIIDAE

Cerobasis guestfalica (Kolbe)

Hyperetes guestfalicus Kolbe, 1880. *Iber. westf. ProvVer. Wiss. Kunst* 8: 132; pl. IV, fig. 22.

Hyperetes pinicola Kolbe, 1881. *Ent. Nachr.* 7: 227.

Tichobia alternans Kolbe, 1882. *Ent. Nachr.* 8: 212.

Cerobasis muraria Kolbe, 1882. *Ent. Nachr.* 8: 212.

Hyperetes tessulatus Hagen, 1883. *Stettin. ent. Ztg.* 44: 216.

Albardia alternans (Kolbe). Jacobson and Bianchi, 1904. *Neuropt. Russ. Emp.* p. 496.

Cerobasis guestfalica (Kolbe). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

Material Examined: SOUTH AUSTRALIA. 5 ♀, Port Elliot, 13.v.1980, G. and J. Holloway.

C. guestfalica is a cosmopolitan species which is found in domestic habitats as well as in the wild.

Lepinotus reticulatus Enderlein

Clothilla inquilina (Heyden). Hagen, 1882. *Stettin. ent. Ztg.* 43: 526, Pl. II, Fig. 6.

Atropos inquilina (Heyden). Kolbe, 1888. *Jb. Ver. Naturk. Zwickau* 1887: 190, 191.

Lepinotus reticulatus Enderlein, 1905. *Res. Swed. Exp. Egypt* 18: 31, Fig. 9; Pl. I, Figs 1, 2; Pl. 2, Figs. 12, 19, 23.

Not represented in the present material, this species has been recorded from caves in South Australia (Smithers, 1972).

Family PSYLLIPSOCIDAE

Psyllipsocus ramburii Selys-Longchamps

Psocus pedicularius Rambur, 1842. *Historie naturelle des Insectes*, p. 323.

Psyllipsocus ramburii Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 145.

Nymphopsocus destructor Enderlein, 1903. *Zool. Anz.* 27: 76.

Ocelloria gravinympha Weber, 1906. *N.Y. Med. J.* 84: 885, Fig. 1.

Nymphopsocus troglodyta Enderlein, 1909. *Arch. Zool. exp. gen.* 5 (1): 536, Pl. 18, Figs 9-11, 13, 14.

Fita vestigator Navas, 1913. *Rev. Acad. Madrid* 12: 333, Fig. 4.

Fabrella convexa Lacroix, 1915. *Bull. Soc. ent. Fr.* 1915: 194.

Not represented in the present material, this species has been recorded from South Australian caves (Smithers, 1972).

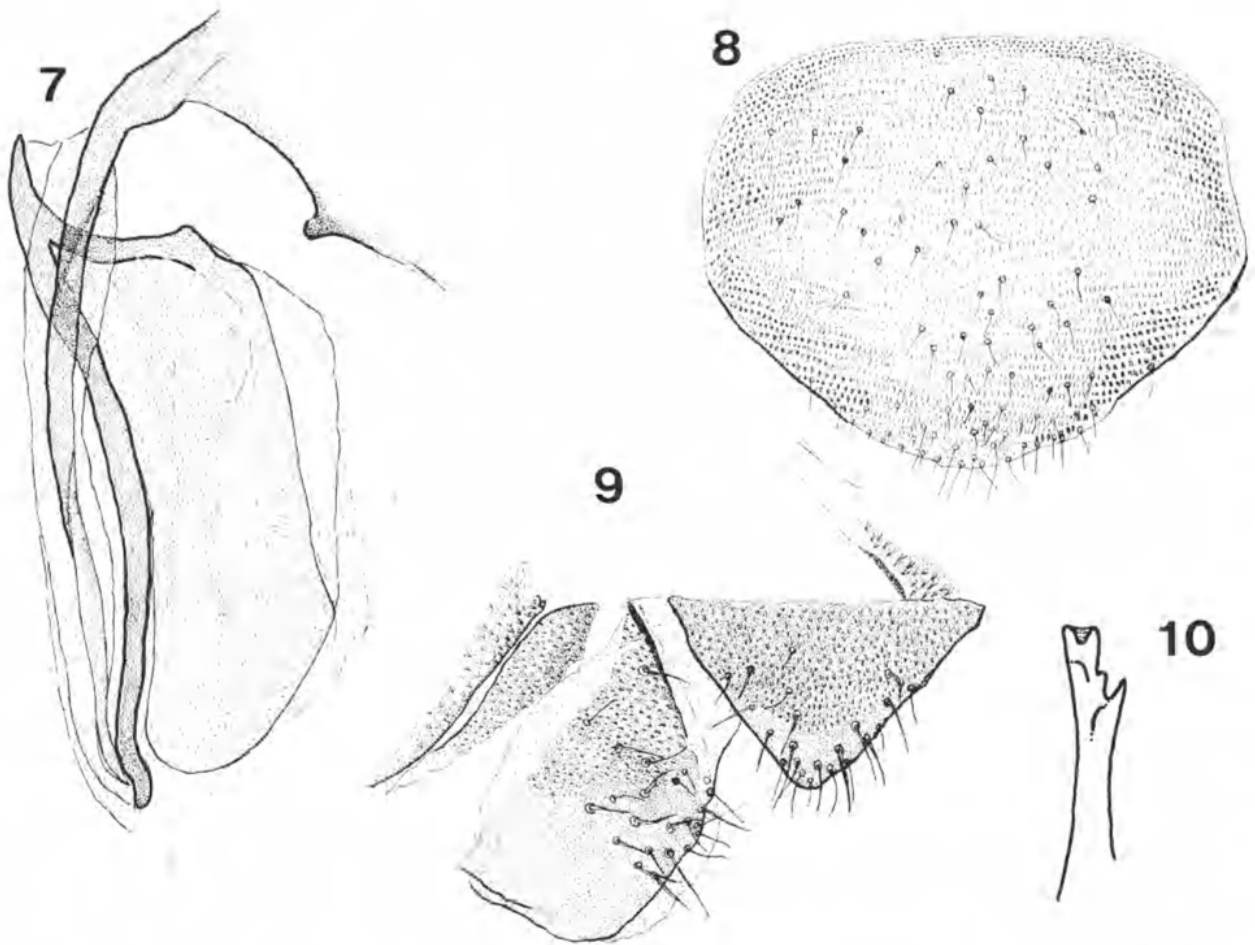
Family PACHYTROCTIDAE

Pachytroctes rugosus sp. n.

Female

Coloration (in alcohol): Head, thoracic nota, legs, first two abdominal terga, a lateral patch on each side of third abdominal tergum and eighth tergum dark brown. Ninth tergum and epiproct pale brown; paraprocts dark brown. Other abdominal terga very lightly sclerotized but segments are indicated by broken bands of subcutaneous brown pigment. Antennae brown, a little paler than head. Eyes black.

Morphology: Apterous. Median epicranial suture extending about one third distance towards epistomial suture; anterior arms represented by a line of tiny papillae visible only in cleared specimen. Hind border of head straight between eyes. Sculpturation of vertex consisting of short, raised bars in haphazard arrangement, that of the postclypeus similar but finer. Lengths of antennal segments: f_1 : 0.12 mm; f_2 : 0.12 mm. First three flagellar segments without annulations; antennae annulated from fourth



FIGS. 7-10. *Pachytroctes rugosus* sp. n. 7. Gonapophyses. 8. Subgenital plate. 9. ♀ Paraproct. 10. ♀ Lacinia.

segment. Eyes fairly small, their upper margin lying level with vertex. Small tubercles present between facets. Ocelli absent. Lacinia (Fig. 10) apparently with five apical teeth, the fifth not clearly separated. Fourth segment of maxillary palp elongate, four times as long as wide. Thoracic terga of approximately equal width and length, clearly delineated, finely sculptured with small, pointed spicules arranged in irregular transverse rows. Dorsally, the first, second, eighth and ninth terga heavily sclerotized, remaining terga lightly sclerotized, almost membranous, except for a small irregular area near the lateral margin on segment three. Second segment laterally sclerotized. Eighth segment much shorter than ninth, the latter being more than twice as long as eighth and much narrower opposite epiproct than adjacent to eighth tergite. Sculpturation as in thoracic terga but absent from median area in anterior half of second abdominal segment; spicules less densely arranged on ninth tergite, especially in middle of plate. Femora of pro- and mesothoracic legs strongly broadened with long setae. Hind femora only slightly broadened. Measurements of hind leg: F: 0.38 mm; T: 0.49 mm; t_1 : 0.24 mm; t_2 : 0.05 mm; t_3 : 0.07 mm; rt: 4.8:1:1.4. Epiproct (Fig. 9) finely papillate except for a narrow posterior area; setose. Paraproct (Fig. 9), setose, papillae in dorsal half only. Subgenital plate (Fig. 8) very large, setose and papillate, the papillae arranged roughly in transverse rows. Gonapophyses (Fig. 7). **Material Examined:** SOUTH AUSTRALIA. ♀ (holotype), ex dry sclerophyll *Eucalyptus* litter, Melrose, Flinders Ranges, 16.iv.1973. M. R. Gray. Paratypes: 2 ♀, as holotypes. Holotypes and paratypes in the Australian Museum.

Discussion: *Pachytroctes rugosus* differs from *P. achrosta* Thornton and Woo (from the Galapagos) in lacking postclypeal striations and pale thoracic terga. The gonapophyses are similar in shape but the external valve of *P. rugosus* lacks a sensillum. It differs from *P. tapinelloides* Badonnel (from Africa) in having the fourth and fifth antennal segments annulated. *P. australis* Ribaga, *P. dichromoscelis* Badonnel and *P. granulosus* Badonnel (all African) differ in having the sculpturation of the vertex in the form of fine granulations, not bar-shaped ridges. In *P. bicoloripes* Badonnel (African), *P. insularis* Thornton and Woo (Marianas) and *P. niveinctus* Badonnel (African) the metathorax is white. In *P. aglypha* Badonnel (African) the sculpturation of the head is indistinct and, as in *P. auran-tiacus* Badonnel (African) and *P. ambiguus* Badonnel (African) there are no granulations between the ommatidia.

The only previous record of this genus from Australia is that of an unidentified species taken from bags of peanuts in shell at Kingaroy, Queensland,

Family SPHAEROPSOCIDAE

Sphaeropsocopsis recens (Hickman)

Sphaeropsocus recens Hickman, 1934. *Occ. Pap. R. Soc. Tasm.* 1933: 83, Figs. 4A-4F.

Sphaeropsocopsis recens (Hickman). Badonnel, 1963. *Biol. l'Amerique australe* 2: 291, 323.

Material Examined: SOUTH AUSTRALIA. 1 ♀, ex *Eucalyptus* litter, dry sclerophyll, Melrose, Flinders Ranges, 16.iv.1973. M. R. Gray. 1 ♀, Mt. Lofty, 26.iv.1943. H. Womersley.

This small interesting species was described from dry grass tussocks in Tasmania (Hickman 1934). The genus is known also from Chile and Angola. The closely related genus *Sphaeropsocus* Hagen is known from one species in Baltic aniber.

Family CAECILIIDAE

Caecilius semifuscatus (Tillyard)

Maoripsocus semifuscatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 191, Fig. 16; Pl. 18, Fig. 11.

Caecilius semifuscatus (Tillyard). Smithers, 1969. *Rec. Canterbury Mus.* 8: 280, Figs. 44-48.

Material Examined: SOUTH AUSTRALIA. 20 ♂, 23 ♀, Wirrulla, ESE Ceduna, 28.ix.1978. M. S. and B. J. Moulds. 1 ♂, 1 ♀, 50 km WNW Ceduna, 28.ix.1978. M. S. and B. J. Moulds. 12 ♀, Pooginook Park, 13-16.vi.1979. G. A. Holloway. 1 ♀, 20 km SE Pt. Augusta, Horrock's Pass, Flinders Ranges, 17.vi.1979. G. A. Holloway. 2 ♀, 15 km N Port Broughton, 7.v.1980. G. and J. Holloway. 1 ♀, 10 km N Goolwa, 13.v.1980. G. and J. Holloway. 1 ♂, 18 km N Ardrossan, 8.v.1980. G. and J. Holloway. 1 ♂, Telowie Gorge, 10 km E Port Germein, 20.v.1981. G., J. and A. Holloway.

This species, originally described from New Zealand, has also been recorded from Curtis Island, Bass Strait. These records are the first from the Australian mainland.

Family STENOPSOCIDAE

Steropsocus striatifrons (McLachlan)

Psocus striatifrons McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 351.

Stenopsocus striatifrons (McLachlan). McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.

This species was described from "Australia meridionali" and is not represented in the present material. The original locality may not have been in South Australia and nothing referable to this species has since been reported in the literature.

Family LACHESILLIDAE***Lachesilla pedicularia* (L.)**

Hemerobius pedicularius Linnaeus, 1758. *Systema Naturae* p. 551.

Lachesilla pedicularia (L.). Enderlein, 1919. *Cat. Coll. Selys Longchamps* 3 (2): 16.

For complete synonymy see Smithers (1967).

Material Examined: SOUTH AUSTRALIA. 1 ♀, in packing straw from England, Adelaide, v.1937.

L. pedicularia is a very widespread species being known from the Palearctic Region, Comoros, Argentina and South Marianas. There is one previous Australian record, from Victoria.

Family ECTOPSOCIDAE***Ectopsocus californicus* (Banks)**

Peripsocus californicus Banks, 1903. *J. N.Y. ent. Soc.* 11: 237.

Ectopsocus californicus (Banks) Badonnel, 1955. *Pub. culi. Comp. Diam. Angola* 26: 185.

Ectopsocus congener Tillyard. Smithers, 1969. *Rec. Canterbury Mus.* 8 (4): 289, Figs. 71-75.

Material Examined: SOUTH AUSTRALIA. 1 ♀, 9 km S Edithburgh, 7.v.1980, G. and J. Holloway. 1 ♂, 2 ♀, Mt. Alma, 12 km SW Victor Harbor, 12.v.1980, G. and J. Holloway. 1 ♂, 4 km N Murray Bridge, 22.v.1981, G. and A. Holloway.

This species is known from North America, New Zealand and Antipodes Islands; previous Australian records are from Tasmania and New South Wales.

***Ectopsocus cetratus* Smithers**

Ectopsocus cetratus Smithers, 1972. *Aust. Zool.* 17 (1): 15, Figs. 1-8.

Material Examined: SOUTH AUSTRALIA. 7 ♂, 36 ♀, 3 km E Nundroo, 132°30'E, 31°50'S, 29.ix.1978, M. S. and B. J. Moulds. 5 ♀, Wilmington, Flinders Ranges, 6.v.1980, G. A. Holloway. 2 ♀, 50 km WNW Ceduna, 28.ix.1978, M. S. and B. J. Moulds. 3 ♂, 10 ♀, 40 km E Nullarbor, 131°15'E, 31°25'S, 29.ix.1978, M. S. and B. J. Moulds. 2 ♀, Yalata, 131°45'E, 31°30'S, 29.ix.1978, M. S. and B. J. Moulds.

This species was described from Western Australia; these are the only subsequent records for the species.

Family PERIPSOCIDAE***Peripsocus edwardsi* New**

Peripsocus edwardsi New, 1973. *J. Aust. ent. Soc.* 12: 40, Figs. 1-6.

Material Examined: SOUTH AUSTRALIA. 3 ♂, 1 ♀, 20 km. SE Port Augusta, Horrock's Pass, Flinders Ranges, 17.vi.1979, G. A. Holloway. 3 ♂, Germein Gorge, Flinders Ranges, 11.5 km E Pt. Germein, 7.vi.1979, G. A. Holloway. 2 ♂, 2 ♀, Germein Gorge, 19.v.1981, G. and J. Holloway.

This species, in which the females are brachypterous, has previously been recorded only from Victoria.

***Peripsocus maoricus* (Tillyard)**

Peripsocopsis maoricus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 194, Fig. 18; Pl. 18, Fig. 12.

Peripsocus macropterus Edwards, 1950. *Pap. R. Soc. Tasm.* 1949: 124, Figs. 89-94.

Peripsocus maoricus (Tillyard). Thornton and Wong, 1968. *Pacific Ins. Monogr.* 19: 10, 135.

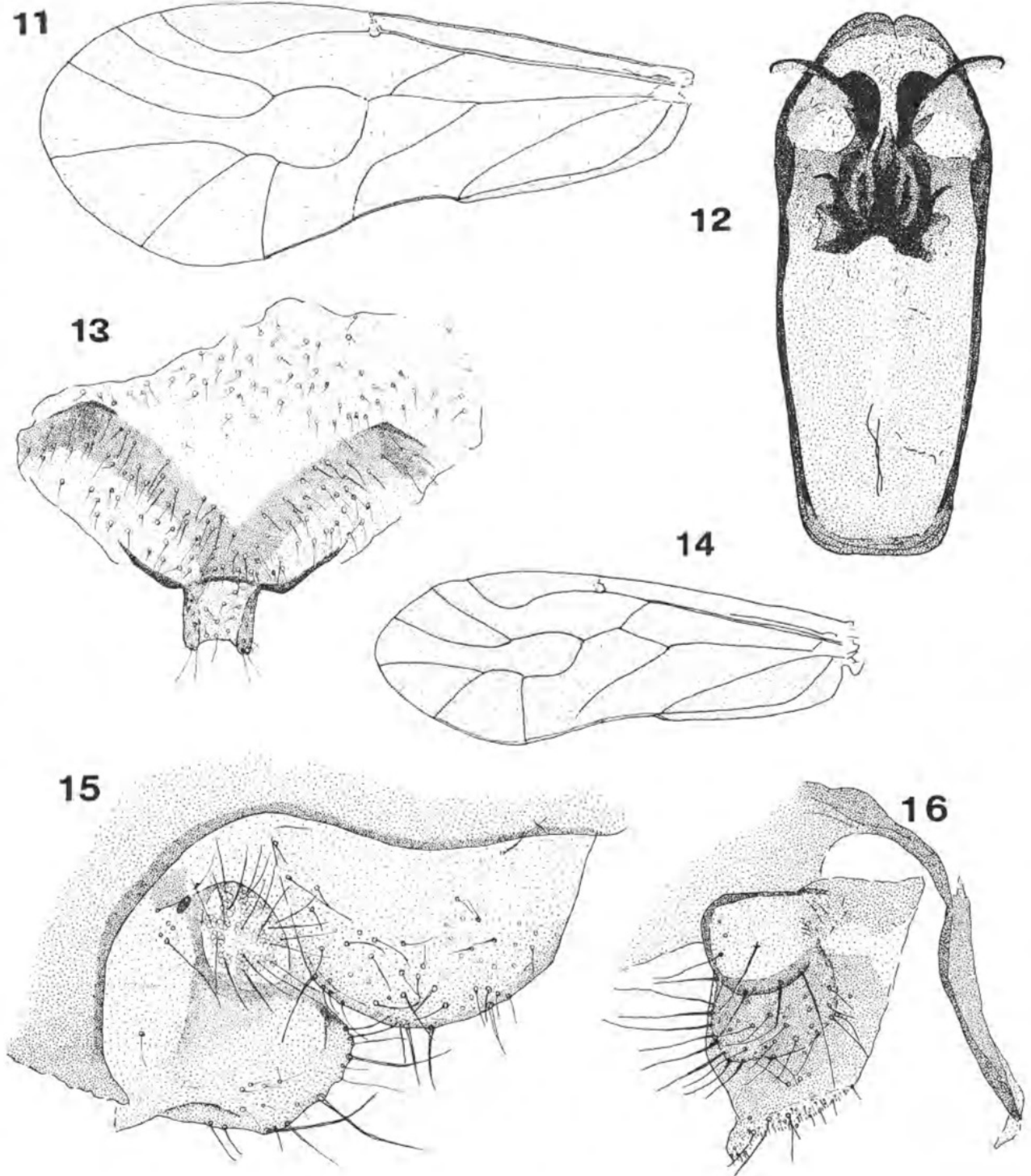
Material Examined: SOUTH AUSTRALIA. 30 ♂, 23 ♀, 6 km W Kapunda, 18.vi.1979, G. A. Holloway. 2 ♂, 6 ♀, 5 n, 9 km S Edithburgh, 7.v.1980, G. and J. Holloway. 7 ♂, 17 ♀, 2 n, Spring Gully Park, 9 km SSW Clare, 18.vi.1979, G. A. Holloway. 1 ♀, Pooginook Park, 15.vi.1979, G. A. Holloway. 3 ♂, Germein Pass, Flinders Ranges, 6.v.1980, G. and J. Holloway. 17 ♂, 17 ♀, Germein Gorge, Flinders Range, 11.5 km E Pt. Germein, 7.vi.1979, G. A. Holloway. 1 ♂, Wirrulla, ESE Ceduna, 28.ix.1978, M. S. and B. J. Moulds. 21 ♂, 55 ♀, 23 n, 25 km E Peake, 23.vi.1979, G. A. Holloway. 19 ♂, 21 ♀, 1 n, 23 km E Tailem Bend, 13.v.1980, G. and A. Holloway. 12 ♂, 24 ♀, 15 km W Tailem Bend, 13.v.1980, G. and A. Holloway. 9 ♂, 19 ♀, 2 km E Parilla, 23.vi.1979, G. A. Holloway. 11 ♂, 7 ♀, 3 n, 4 km E Pinnaroo, 14.v.1980, G. and J. Holloway. 2 ♂, 2 ♀, 4 km S. Moonta, 7.v.1980, G. and J. Holloway. 2 ♂, 1 ♀, 18 km N Ardrossan, 8.v.1980, G. and J. Holloway. 1 ♂, 6 ♀, 9 n, 10 km N Goolwa, 13.v.1980, G. and J. Holloway. 6 ♀, 20 ♀, 41 n, 16 km S Minlaton, 7.v.1980, G. and J. Holloway. 2 ♂, 13 ♀, Adelaide, 22.ix.1965, H. Womersley. 8 ♂, 10 ♀, 7 n, 12 km SE Port Wakefield, 8.v.1980, G. and J. Holloway. 4 ♂, 2 ♀, 19 n, 2 km W Williamstown, 8.v.1980, G. and J. Holloway. 3 ♂, ex Cypress Pine, Alligator Gorge Rd., near Mt. Remarkable, Flinders Ranges, 17.iv.1979, G. Holloway. 3 ♀, W end of Horrock's Pass, 19.v.1981, G. and J. Holloway. 10 ♂, 17 ♀, ex *Casuarina*, Mt. Gambier, 23.v.1981, G., J. and A. Holloway. 30 ♂, 55 ♀, Germein Gorge, 19-20.v.1981, G. and J. Holloway. 6 ♂, 10 ♀, Burra Gorge, 20 km SSE Burra, 21.v.1981, G., J. and A. Holloway. 1 ♂, 2 km SE Williamstown, 22.v.1981, G. and A. Holloway. 1 ♂, Telowie Gorge, 10 km E Pt. Germein, 20.v.1981, G. and J. Holloway.

Peripsocus maoricus appears to be widely distributed, at least through the southern part of the continent and Tasmania. It has been recorded from Tasmania, Victoria, Western Australia and now from South Australia. It was originally described from New Zealand.

***Peripsocus notialis* sp. n.**

Male

Coloration (in alcohol): Head pale brownish cream with pale brown markings. A few brown marks close against upper margin of compound eyes



FIGS. 11-16, *Peripsocus notialis* sp. n. 11. ♂ Fore wing. 12. Phallosome. 13. Subgenital plate. 14. ♀ Fore wing. 15. ♀ Paraproct. 16. Gonapophyses.

and across vertex with broken patch on either side of median epicranial suture near back of head. Postclypeus with anteriorly converging, pale brown stripes not reaching anteclypeus. Genae and labrum as head. Antennae and maxillary palps brownish. Eyes black. Ocellar tubercle brownish. Lobes of mesothoracic notum pale brown; parapsidal sutures paler than lobes. Legs pale brownish cream with slightly darker tarsi. Fore wing (Fig. 11) hyaline, uniformly very lightly tinged with pale brown; pterostigma opaque but not darker than rest of membrane. Hind wing membrane as fore wing. Veins brown, all well developed, none evanescent. Abdomen pale; phallosome sclerifications indistinctly visible through hypandrium.

Morphology: Median epicranial suture distinct; anterior arms evanescent. Antennae much thicker than in female. Lengths of flagellar segments: f_1 : 0.68 mm; f_2 : 0.48 mm. Eyes large; reaching well above level of vertex. Facets exceptionally large; eye emarginate where almost in contact with antenna base. IO/D: 0.80; PO: 1.0. Ocelli large, on well developed tubercle. Lacinia very narrow near distal end, hardly divided apically. Fourth segment of maxillary palp long, parallel sided with rounded apex, four times long as wide. Measurements of hind leg: F: 0.60 mm; T: 1.16 mm; t_1 : 0.32 mm; t_2 : 0.16 mm; rt: 2:1; ct: 22, 0. Legs long and narrow. Fore wing (Fig. 11) with fairly broad costal cell. Cu_1 evanescent just before margin. Fore wing length: 4.0 mm; width: 1.6 mm. Hind wing length: 3.0 mm; width: 1.1 mm. Epiproct triangular with angles rounded, setose, sparsely spiculate in median area near base; spicules very small. No clunial comb. Paraproct simple, ovoid, with very large circular trichobothrial field, the setae long and fine. Hypandrium simple, with a broad sclerotized band parallel with hind margin; margin interrupted in middle; setose. Phallosome (Fig. 12) closed anteriorly with distinctly sclerotized margin interrupted posteriorly. Sclerification of penial bulb heavy, of two, posteriorly outwardly curving sclerites subtended by a complex set of symmetrically arranged sclerites.

Female

Coloration (in alcohol): As male but marks on head a little more extensive. Fore wings (Fig. 14) as in male but costal cell, anterior half of cell R and anterior part of cell R_1 as far as apex of pterostigma hyaline, contrasting with the very pale brownish tinge in rest of membrane. Hind wing hyaline, faintly tinged with pale brown along veins. Terminal abdominal structures brown.

Morphology: Length of body: 2.3 mm. Lengths of flagellar segments: f_1 : 0.40 mm; f_2 : 0.26 mm.

Antennae much finer than in males. Eyes fairly small, much smaller than in males. IO/D: 1.7; PO: 0.75. Measurements of hind leg: F: 0.52 mm; T: 0.96 mm; t_1 : 0.20 mm; t_2 : 0.16 mm; rt: 1.3:1; ct: 8, 0. Fore wing length: 2.8 mm; width: 1.1 mm. Fore wing (Fig. 14). Hind wing length: 2.2 mm; width: 0.8 mm. Epiproct (Fig. 15). Paraproct (Fig. 15) simple, with small trichobothrial field, the setae long and fine. Subgenital plate (Fig. 13). Gonapophyses (Fig. 16).

Material Examined: SOUTH AUSTRALIA. ♂ (holotype), ♀ (allotype), ex cypress pine, Alligator Gorge Rd., near Mt. Remarkable, Flinders Range, 17.vi.1979, G. A. Holloway. Paratypes: 5 ♂, 19 ♀, as holotype (one ♀ on slide). Other material: 5 nymphs, as holotype.

Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Peripsocus notialis* is a species which is somewhat sexually dimorphic. The female has the anterior part of the wing hyaline in contrast to the uniformly coloured wing of the male. The female wings are considerably shorter than in the large male and the legs are stouter, with fewer ctenidia not regular in arrangement. In general arrangement the sclerifications of the penial bulb resemble these in *P. norfolkensis* Smithers & Thornton and *P. maoricus* (Tillyard) but differ in proportion and shape. The female differs in IO/D ratio and in wing colour. Proportions of the gonapophyses also differ but they resemble each other in having a broad ventral valve. *Peripsocus notialis* is similar in size to *P. edwardsi* New but differs in having much paler wings. In *P. edwardsi* the wing membrane is faintly tinged with grey but there are discrete hyaline patches in most cells. In *P. notialis* the male fore wing membrane is very faintly but uniformly tinged with pale brown. In the female the costal cell and a narrow strip behind R and R_1 is hyaline. The female is somewhat brachypterous. There are slight differences in proportions of the gonapophyses and, although similar in general structure, the male phallosome has differently proportioned sclerifications of the penial bulb. In *P. hamiltonae* Smithers, a slightly smaller species, there is a distinct darkening across the wing from stigmapophysis to nodulus, which is not present in *P. notialis*. *P. hickmani* New is a much smaller species than *P. notialis* with a fore wing length of less than 3 mm as opposed to that of 4 mm for *P. notialis*. In *P. hickmani* there is a little pigmentation adjacent to the basal section of Rs and M basad of fusion with Rs which is absent from *P. notialis*. The phallosome in *P. notialis* has a transverse anterior border with complex sclerification of the penial bulb and narrow, outwardly curved external parameres. In *P. hickmani* the phallosome

tapers to a broken, narrow anterior end and the external parameres are broad and short; the sclerifications of the penial bulb are simpler, being in the form of a few longitudinal rods and a rugosely sclerotized bulbous area. *P. mauricus* has a distinctive three lobed apex to the arch formed by the distally fused inner parameres and the wing is uniformly more darkly tinted than in *P. notialis*. *P. notialis* is much larger than *P. melaleuca* New. The female of *P. melaleuca* has tapering lateral extensions of the sclerotized area of the subgenital plate; these areas are broad in *P. notialis*. The phallosome of *P. melaleuca* has short, broad, external parameres. In *P. milleri* (Tillyard), *P. morulops* (Tillyard) and *P. tillyardi* New the wings are much darker in general with even darker areas along some of the wing veins. In *P. roseus* Smithers the pterostigma is distinctively reddish in the distal half in life (this color fades in alcohol). The main veins have dark and light sections which give a distinctive appearance of being broken and discontinuous.

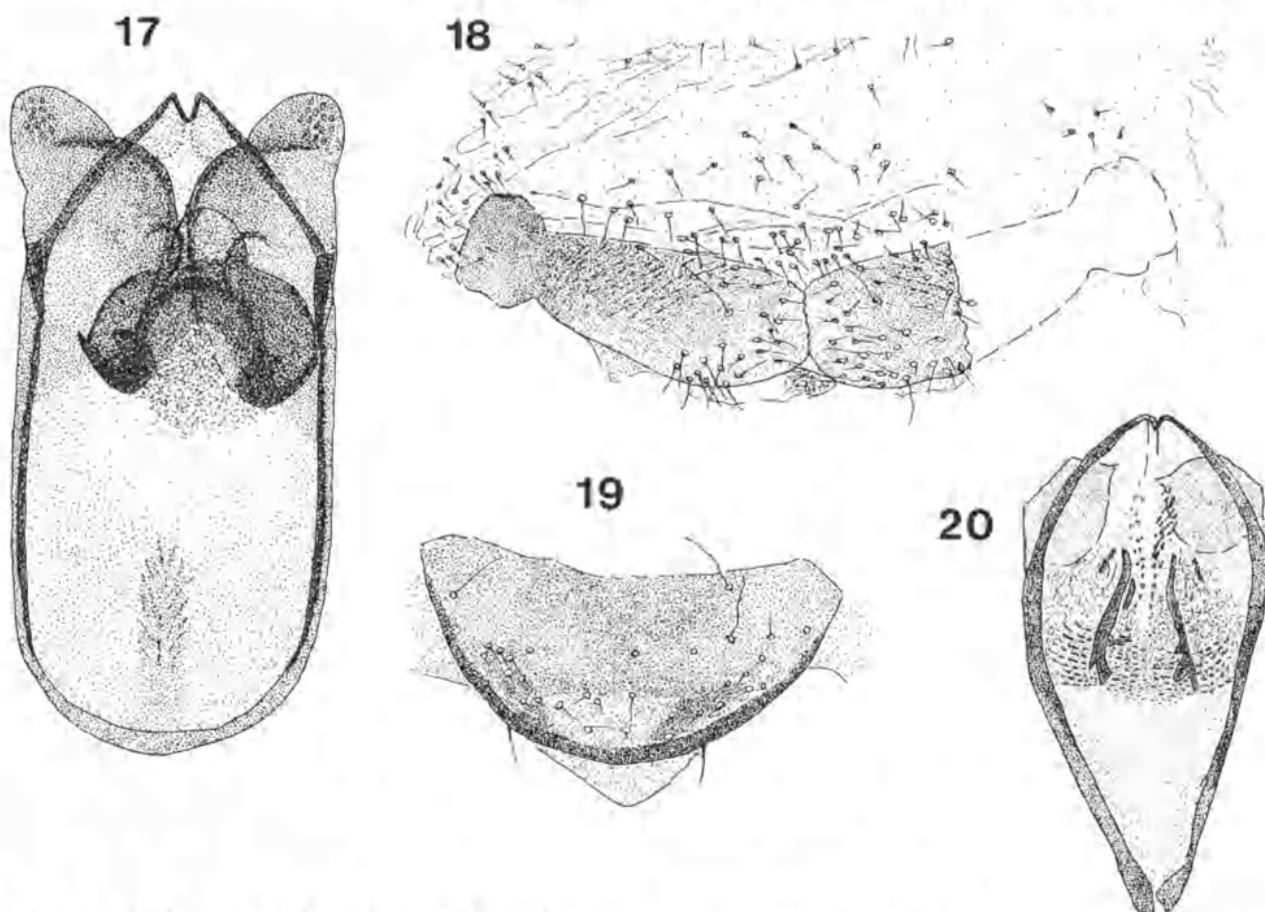
Peripsocus hollowayi sp. n.

Male

Coloration (in alcohol): Head very dark brown except for a paler area between ocellar tubercle and antenna base, narrowing laterally to proximity of

compound eye and epistomial suture and a similar pale narrow stripe from this area towards back of head on each epicranial plate. Postclypeal stripes hardly discernible (might be more easily seen on paler specimens?). Labrum coloured as head. Antennae dark brown. Maxillary palps dark brown. Eyes black. Ocellar tubercle very dark brown. Mesothoracic notum very dark brown, lacking pale median stripe; lateral lobes each with a narrow paler mark running from scutellum to lateral margin near wing base; a pale spot where parapsidal sutures converge. Coxae dark brown. Legs pale brown. Fore and hind wings hyaline with dark brown veins. Abdomen pale, terminal structures very dark brown, the large, broad phallosome clearly visible through paler integument of abdomen.

Morphology: Median epicranial suture very distinct, as is epistomial suture. Length of flagellar segments: f_1 : 0.56 mm; f_2 : 0.40 mm. Eyes only moderately large, small for a male. IO/D: 1.7; PO: 0.88. Lateral ocelli large, anterior ocellus much smaller. Measurements of hind leg: F: 0.62 mm; T: 1.28 mm; t_1 : 0.28 mm; t_2 : 0.14 mm; rt: 2:1; ct: 15, 0. Fore wing length: 3.3 mm; width: 1.2 mm. Hind wing length: 2.5 mm; width: 0.8 mm. Pterostigma fairly shallow, hind angle not pronounced, shallowly rounded. Epiproct (Fig. 19) heavily



FIGS. 17-20. *Peripsocus hollowayi* sp. n. 17. Phallosome. 18. Hypandrium. 19. ♂ Epiproct. 20. *Peripsocus hickmani* Phallosome.

sclerotized, with semicircular hind margin very strongly sclerotized and a small posterior median membranous extension with rounded hind margin. Paraproct well sclerotized with large, circular trichobothrial field. Hypandrium (Fig. 18) (damaged in preparation) with median emargination, lightly sclerotized except for a broad, well-sclerotized medially interrupted band parallel with hind margin. Phallosome (Fig. 17) well sclerotized, broad, rounded anteriorly; external parameres broad; internal parameres distally fused, ending in a pair of blunt processes. Sclerifications of penial bulb heavy, symmetrically arranged.

Material Examined: SOUTH AUSTRALIA, 1 ♂ (holotype), ex cypress pine, Alligator Gorge Rd., near Mt. Remarkable, Flinders Ranges, 17.vi.1979, G. A. Holloway. Paratype: 1 ♂, Germein Gorge, Flinders Ranges, 11.5 km E Pt. Germein, 7.vi.1979, G. A. Holloway.

Holotype and paratype in the Australian Museum.

Discussion: *Peripsocus hollowayi* is a large species with dark head and thorax and hyaline wings. The broad phallosome, with broad, external parameres and two short posterior processes with heavily sclerotized penial bulb sclerifications is characteristic and distinguishes it from all other species.

Peripsocus hickmani New

Peripsocus hickmani New, 1973, *J. Aust. ent. Soc.* 12: 341, Figs 5, 7-10.

When this species was described from Victoria (New 1973, p. 341, Figs 5, 7-10) male material was not available. The males in the present material permit description of that sex here.

Male

Coloration (in alcohol): As female (New 1973, p. 341).

Morphology: Length of body: 2.2 mm. Median epicranial suture very clearly defined. Lengths of flagellar segments: f_1 : 0.40 mm; f_2 : 0.30 mm. Antennae shorter than in female. Eyes fairly large, larger than in female but only just reaching level of vertex. IO/D: 1.2; PO: 0.81. Measurements of hind leg: F: 0.44 mm; T: 0.92 mm; t_1 : 0.20 mm; t_2 : 0.12 mm; rt: 1.7:1; ct: 16, 0. Fore wings as in female (New 1973, Fig. 7). Fore wing length: 2.8 mm; width: 1.1 mm. Hypandrium simply rounded behind, not medially emarginate, a broad, lightly sclerotized band parallel with margin, slightly interrupted in midline. Phallosome (Fig. 20) similar to that of *P. tillyardi* New (1973, Fig. 12) but broader; sclerifications of penial bulb symmetrical.

Material Examined: SOUTH AUSTRALIA, 1 ♂, 1 ♀, Yalata, 131°45'E, 31°30'S, 20.ix.1978, M. S. and B. J. Moulds, 3 ♂, 6 ♀, 18 km N Ardrossan, 8.v.1980, G. and J. Holloway.

Discussion: The male phallosome of *P. hickmani* resembles that of *P. tillyardi* in general form but differs in being wider in relation to length and in having the external parameres almost as wide as long, whereas in *P. tillyardi* they are more elongate, distinctly longer than wide.

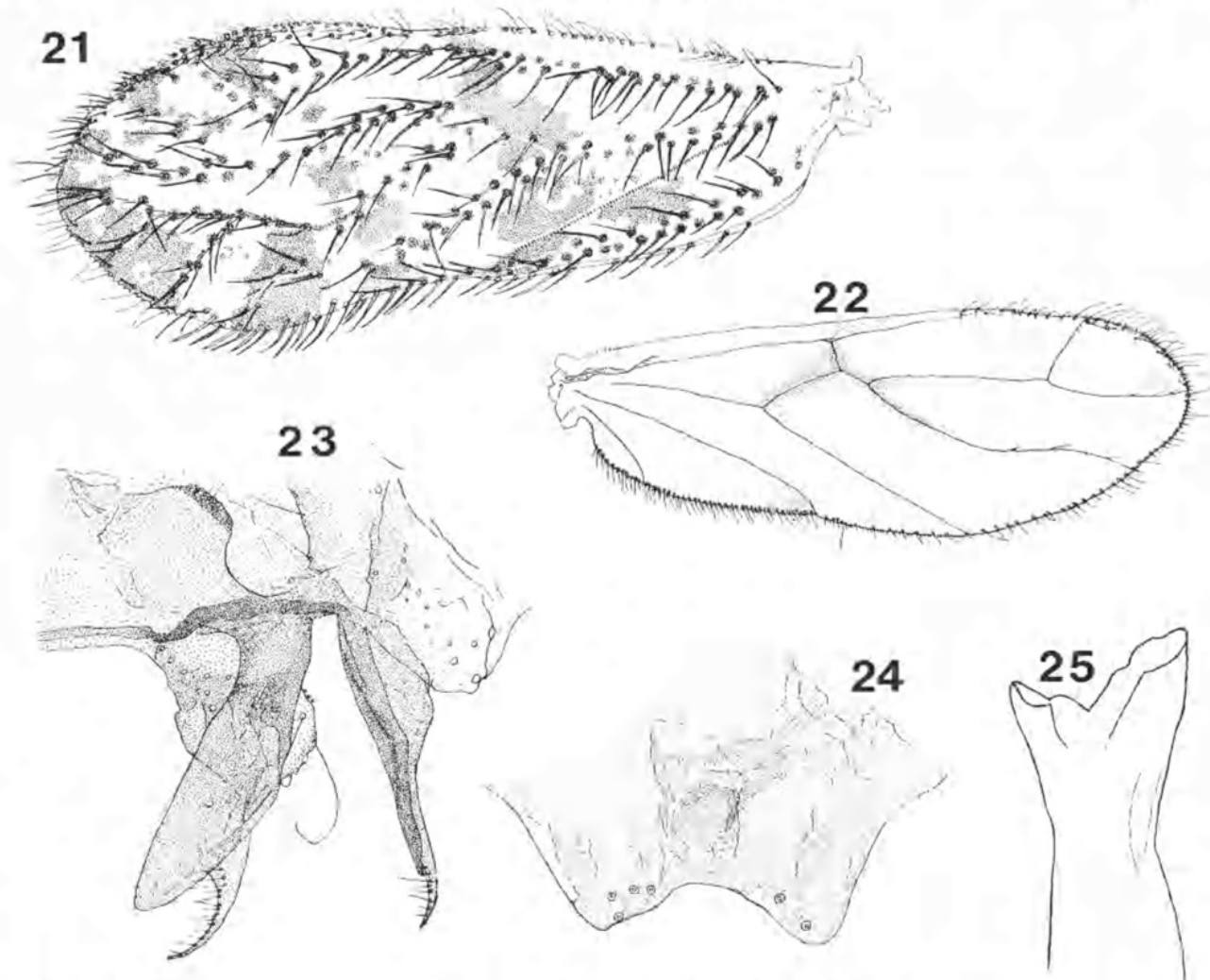
Family PSEUDOCAECILIIDAE

Cladioneura punctata sp. n.

Female

Coloration (in alcohol): Head ivory, with very faint suggestion of median brown band from vertex to labrum and very pale greyish patch mesad of each compound eye. Median epicranial suture not obviously coloured. Antennae pale brown, a small section at the distal end of each flagellar segment paler. Eyes black. Ocellar tubercle very dark brown, conspicuous against otherwise pale head. Labrum brown. Maxillary palps pale, tip of fourth segment very dark brown. Mesonotum with dark brown antedorsum and lateral lobes; parapsidal sutures pale. Metanotum with lateral lobes brown. Pleura mainly brown. Coxae brown basally, pale distally. Femora pale, without dark bands. Tibiae pale. Tarsi brown. Claws black. Fore wings (Fig. 21) hyaline with dark brown markings. Hind wings hyaline with a faint infuscation adjacent to basal section of Rs and M between separation from Cu₁ and fusion with Rs. Abdomen pale with a few spots on each segment; the dorsum of the ninth tergite, in particular, has an irregular row of darker, larger spots which are conspicuous. Epiproct and paraprocts are pale.

Morphology: Length of body: 2.5 mm. Median epicranial suture distinct, anterior arms less conspicuous. Head, except anteclypeus and genae, with strongly developed erect setae, those on postclypeus shorter and finer than most of those on vertex. Lacinia (Fig. 25). Length of flagellar segments: f_1 : 0.40 mm; f_2 : 0.28 mm. Eyes fairly small, not reaching level of vertex. IO/D: 2.9; PO: 0.7. Ocelli large, anterior ocellus about as large as lateral ocelli. Measurements of hind leg: F: 0.52 mm; T: 0.96 mm; t_1 : 0.28 mm; t_2 : 0.14 mm; rt: 2:1. Ctenidobothria absent. Fore wing length: 2.3 mm; width: 0.9 mm. Fore wing (Fig. 21) with veins evanescent in many places; strong setae arise in two rows mostly alongside rather than on veins. Cu₂ without setae. Hind wing length: 1.8 mm; width: 0.7 mm. Veins sparsely setose only in distal part of wing (Fig. 22). Epiproct almost semicircular with small setae on posterior half and a series of strong setae along



FIGS. 21-25. *Cladioneura punctata* sp. n. 21. ♀ Fore wing. 22. ♀ Hind wing. 23. Gonapophyses. 24. Subgenital plate. 25. ♀ Lacinia.

posterior part of margin. Paraproct simply rounded behind, setose in posterior half with strong posterior marginal setae. Trichobothrial field of about 9 trichobothria, poorly defined. Subgenital plate (Fig. 24) posteriorly bilobed, each lobe with a few strong marginal setae, variable in number (holotype with four on right lobe and two on left). Gonapophyses (Fig. 23).

Male

Unknown.

Material Examined: SOUTH AUSTRALIA. ♀ (holotype), 15 km N Ardrossan, 8.v.1980, G. and J. Holloway. Paratypes: 2 ♀, as holotype. 1 ♀, 16 km S Minlaton, 7.v.1980, G. and J. Holloway.

Holotype and paratypes in the Australian Museum.

Discussion: *Cladioneura punctata* differs from *C. pulchripennis* Enderlein in details of wing pattern, fore wing development and shape of the tip of the lacinia. In *C. punctata* the most conspicuous wing colour difference is the absence of pigment over most of cell M_3 adjacent to the areola postica and

the presence of a spot in cell R_5 at the basal quarter. The wings in *C. punctata* are relatively short and broad being only 2.3 mm long for a body size of 2.5 mm, whereas in *C. pulchripennis* the fore wings approach 3.0 mm for the same body size. The lacinia is broader at the apex in *C. punctata*. The gonapophyses are similar but differ a little in proportions. In *C. punctata* the marginal setae of the subgenital plate are in two groups whereas in *C. pulchripennis* the four setae are more evenly spaced across the hind margin. *C. pulchripennis* is the only other species in the genus.

Family ELIPSOCIDAE

Pentacladus eucalypti Enderlein

Pentacladus eucalypti Enderlein, 1906. *Zool. Jb.* 23: 408; Pl. 23, Fig. 7.

Material Examined: SOUTH AUSTRALIA. 2 ♂, Ravine des Casoars, Kangaroo Is., 28.x.1951, G. F. Gross.

This species has been recorded from New South Wales, Tasmania, Victoria and Queensland.

***Propsocus pallipes* (McLachlan)**

Psocus pallipes McLachlan, 1866. *Trans. ent. Soc.* 3 ser. 5: 349.

Propsocus pallipes (McLachlan). McLachlan, 1866. *Trans. ent. Soc.* 3 ser. 5: 352.

Tricladus froggatti Enderlein, 1906. *Zool. Jb.* 23: 410; Pl. 23, Fig. 6.

Tricladellus froggatti (Enderlein). Enderlein, 1909. *Stettin. ent. Ztg.* 70: 273.

Material Examined: SOUTH AUSTRALIA, 1 ♂, 15 km SW Tailem Bend, 13.v.1980. G. and A. Holloway.

Originally described from Adelaide, this species is known from New South Wales, Tasmania, Queensland and Western Australia. It has not yet been recorded from Victoria but it seems likely that it will be found there.

***Spilopsocus masseyi* New**

Spilopsocus masseyi New 1971. *J. Aust. ent. Soc.* 10: 226, Figs. 7-13.

Material Examined: SOUTH AUSTRALIA, 1 ♂, Port Elliot, 13.v.1980, G. and J. Holloway. 1 ♂, Seal Bay, Kangaroo Island, 2-4.xii.1977, D. K. McAlpine and M. A. Schneider. 1 ♀, 40 km W. Nullarbor, 130°29'E, 31°28'S, 29.ix.1978, M. S. and B. J. Moulds.

This species is recorded from Tasmania, New South Wales and Victoria.

***Spilopsocus ruidis* Smithers**

Spilopsocus ruidis Smithers, 1963. *Pacific Ins.* 5 (4): 894, Figs. 19-25.

Material Examined: SOUTH AUSTRALIA, 1 ♂, Yalata, 131°45'E, 31°30'S, 29.ix.1978, M. S. and B. J. Moulds.

Spilopsocus ruidis has previously been recorded only from New South Wales.

Family PHILOTARSIDAE***Austropsocus sinuosus* (Banks)**

Zelandapsocus sinuosus Banks, 1939. *Bull. Mus. comp. Zool. Harv.* 85: 441, Fig. 12.

Austropsocus sinuosus (Banks). Thornton and New, 1977. *Aust. J. Zool. Suppl. ser.* 54: 28, Figs. 99-104.

This species was originally described from South Australia (Mt. Lofty Range) but is not represented in the present material.

***Haplophallus guttatus* (Tillyard)**

Philotarsus guttatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 181, Fig. 8.

Philotarsopsis delicatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 182, Fig. 9.

Philotarsus greyi Edwards, 1950. *Pap. R. Soc. Tasm.* 1949: 116, Figs. 68-75.

Haplophallus greyi (Edwards). Smithers, 1963. *J. ent. Soc. Qd.* 2: 60.

Haplophallus guttatus (Tillyard). Smithers, 1969. *Rec. Canterbury Mus.* 8: 322, Figs. 158-162.

Material Examined: SOUTH AUSTRALIA, 1 ♂, 15 ♀, 40 km E Nullarbor, 131°15'E, 31°25'S, 29.ix.1978, M. S. and B. J. Moulds. 1 ♂, 7 ♀, 3 km E Nundroo, 132°30'E, 31°50'S, 29.ix.1978, M. S. and B. J. Moulds. 1 ♂, 1 ♀, Myponga, H. M. Hale.

Haplophallus guttatus has been recorded from many localities in New South Wales, Victoria, Western Australia and Tasmania. It is also known from Queensland and was originally described from New Zealand.

***Haplophallus bundoorensis* New**

Haplophallus bundoorensis New, 1971. *J. Aust. ent. Soc.* 10 (1): 25, Figs. 1-10.

Haplophallus capitulatus Smithers, 1972. *Aust. Zool.* 17 (1): 19, Figs. 12-17.

Material Examined: SOUTH AUSTRALIA, 9 ♂, 5 ♀, 6 km W Kapunda, 18.vi.1979, J. Holloway. 2 ♂, 50 km WNW Ceduna, 28.iv.1978, M. S. and B. J. Moulds.

H. bundoorensis is known from Victoria, Queensland and South Australia.

***Haplophallus medialis* Thornton and New**

Haplophallus medialis Thornton and New, 1977. *Aust. J. Zool. Suppl. ser.* 54: 13, Figs. 26-32, 36.

Material Examined: SOUTH AUSTRALIA, 7 specimens ex *Eucalyptus obliqua* dry sclerophyll forest, Naracoorte Cave Reserve, 25.x.1958, G. F. Gross.

This species was previously recorded from New South Wales, A.C.T., Victoria and South Australia.

***Haplophallus sinus* Thornton and New**

Haplophallus sinus Thornton and New, 1977. *Aust. J. Zool. Suppl. ser.* 54: 20, Figs. 60-68.

Material Examined: SOUTH AUSTRALIA, 1 ♂, Mt. Alma, 12 km SW Victor Harbor, 12.v.1980,

G. and J. Holloway. 1 ♂, 10 km N Goolwa, 13.v. 1980, G. and J. Holloway. 3 ♂, 1 ♀, ex *Casuarina*, Mt. Gambier, 23.v.1981, G., J. and A. Holloway. 1 ♂, Yourambulla Caves, 6 km SW Hawker, 18.v. 1981, G. and J. Holloway.

H. sinus is known previously from only one New South Wales locality.

***Aaroniella rawlingsi* Smithers**

Aaroniella rawlingsi Smithers, 1969. *Rec. Canterbury Mus.* 8: 324, Figs. 163-168.

Aaroniella pallida New, 1971. *J. Aust. ent. Soc.* 10 (1): 29, Figs 11-21.

Material Examined: SOUTH AUSTRALIA. 1 ♂, Mt. Gambier. 23.v.1981, G., J. and A. Holloway.

Originally described from New Zealand this species has been recorded from Victoria, New South Wales, Australian Capital Territory and Western Australia.

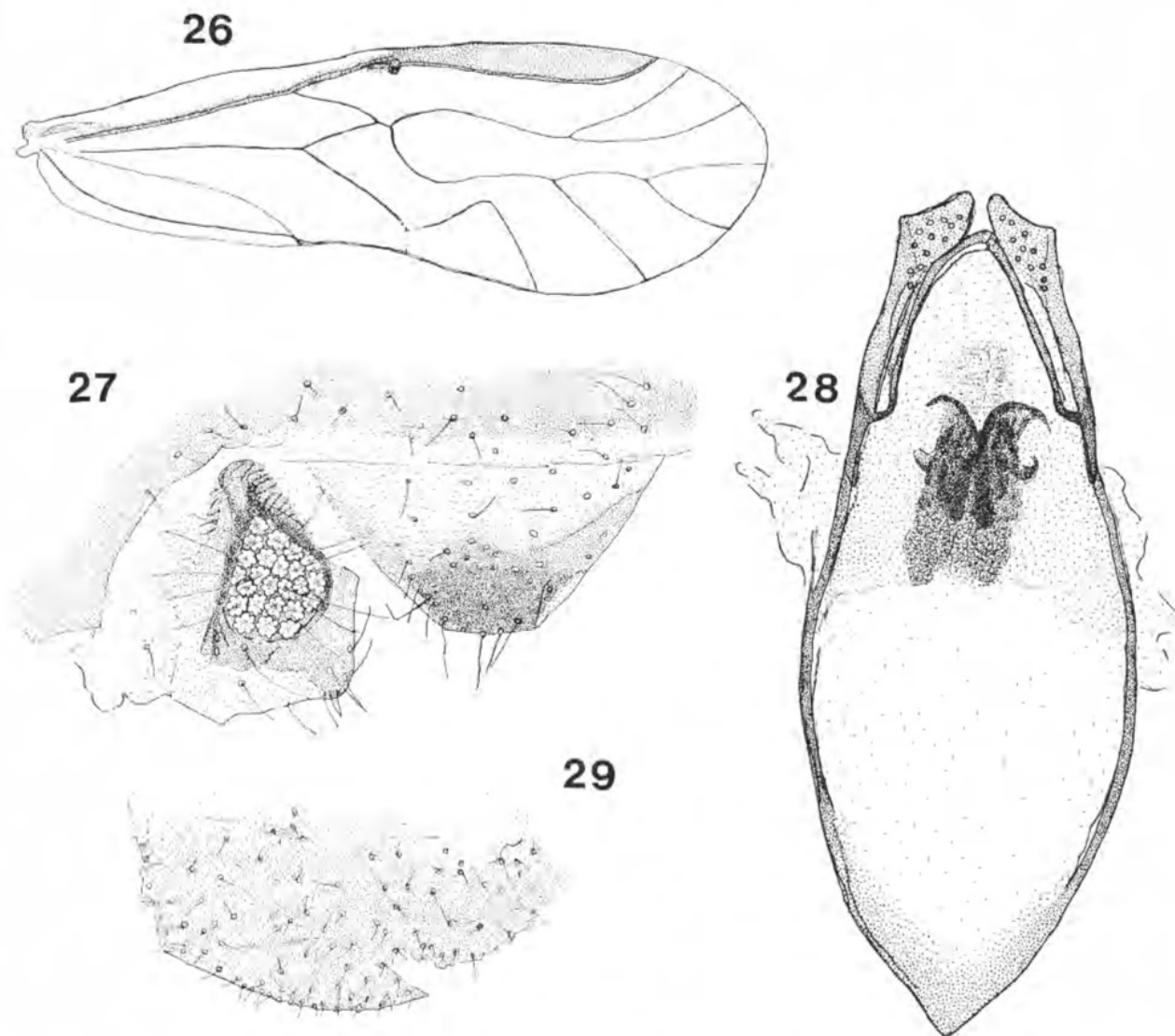
Family MESOPSOCIDAE

***Mesopsocus reticulatus* sp. n.**

Male

Coloration (in alcohol): Head brown, very slightly darker on either side of median epicranial suture and dorsad of compound eyes, lacking the discrete spotting usual in the genus. Median epicranial suture dark brown. Postclypeus brown, anteclypeus pale. Labrum and genae brown. Antennae brown. Eyes black. Ocellar tubercle a little darker than surrounding area. Maxillary palps with all four segments brown. Mesonotum brown, parapsidal sutures pale brown. Pleura brown, a reddish mark laterally on hind part of mesopostnotum. Legs brown. Fore wings (Fig. 26) hyaline, veins and pterostigma brown. Abdomen pale, terminal structures brown.

Morphology: Length of body: 2.2 mm. Median epicranial suture distinct, anterior arms absent.



FIGS. 26-29. *Mesopsocus reticulatus* sp. n. 26. ♂ fore wing. 27. ♂ Epiproct and paraproct. 28. Phallosome. 29. Hypandrium.

Head small, finely pubescent; vertex arched. Sculpturation of head on vertex and frons consisting of a well defined polygonal pattern of raised ridges, that on postclypeus of a series of irregular, fine, transverse ridges. Postclypeus not exceptionally bulbous but reflexed anteriorly so that the anteclypeus is somewhat set back. Posterodistal row of sensilla on anterior margin of labrum made up of three placoid sensilla and two trichoid sensilla almost in a straight line. Anterodistal row of four sensilla. Lengths of flagellar segments (in mm.): f_1 : 0.39; f_2 : 0.23; f_3 : 0.21; f_4 : 0.19; f_5 : 0.14; f_6 : 0.14; f_7 : 0.12; f_8 : 0.10; f_9 : 0.09; f_{10} : 0.08; f_{11} : 0.08. Antennae fairly short, tip mucronate. Total length: 1.81 mm. Eyes fairly large, somewhat protruding but not reaching level of vertex. IO/D: 2.0; PO: 0.86. Ocelli large. Pedicel with two conical sensilla; first flagellar segment with one sensillum with minute point at basal quarter. Fourth and tenth flagellar segments each with a similar sensillum at distal end. Sixth flagellar segment apparently lacks a sensillum. Legs slender. Measurements of hind leg: F: 0.47 mm; T: 1.00 mm; t_1 : 1.19 mm; t_2 : 0.07 mm; t_3 : 0.08 mm; rt : 2.7:1:1.1; ct : 10, 0, 0. Fore wing length: 3.5 mm; width: 1.25 mm. Fore wings (Fig. 26) with long, narrow pterostigma, R_1 gently curving. Rs before junction with M slightly curved; fusion with M fairly short. Radial fork about as long as stem. Cu_{1a} slightly curved before rounded apex of areola postica so that basal side of areola postica is slightly concave. Hind wing length: 2.6 mm; width: 0.8 mm. Cu_2 and IA not strongly curved near wing margin. Four minute setae on margin between R_{2+3} and R_{4+5} , readily visible only at magnification greater than about 50 \times . Epiproct (Fig. 27). Paraproct (Fig. 27). Hypandrium (Fig. 29). Phallosome (Fig. 28) narrowing anteriorly and posteriorly with bluntly pointed anterior end to phallic frame. Penial bulb with strong, symmetrical sclerifications. Aedeagal arch narrow, slightly angled distally. External parameres broad apically, with conspicuous extension but obliquely truncate distally.

Material Examined: SOUTH AUSTRALIA, ♂ (holotype), Germein Gorge, Flinders Range, 11.5 km E. Pt. Germein, 17.vi.1979, G. A. Holloway.

Holotype in the Australian Museum.

Discussion: *Mesopsocus reticulatus* is the first species of the family to be reported from Australia; the genus has previously been recorded from Africa, Europe, Asia and North and South America.

Most species have a distinctive and striking head pattern made up of spots and stripes on the vertex and have the more or less clearly defined postclypeal stripes so characteristic of many psocopterans. *Mesopsocus reticulatus* obviously differs at first sight in lacking this patterning. The head is almost uni-

formly brown. The antennae are unusually short and the truncate form of the apex of the external parameres and the clearly defined, symmetrical sclerifications of the penial bulb differ in those species in which these structures have been described.

Unfortunately only one specimen, a male, is available; it is possible that the female, as in many other species of *Mesopsocus*, is apterous.

Family PSOCIDAE

Lasiopsocus michaelseni Enderlein

Lasiopsocus michaelseni Enderlein, 1907. *Fauna S.W. Aust.* (1) 3: 234, Figs 1-5.

Blaste (*Lasiopsocus*) *michaelseni* (Enderlein). Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.

Material Examined: SOUTH AUSTRALIA. 2 ♂, 3 nymphs, Pooginook Cons. Park, 15.vi.1979, G. A. Holloway. 1 ♂, 2 km E Parilla, 23.vi.1979, G. A. Holloway. 4 ♂, 5 ♀, 5 nymphs, 4 km E Pinnaroo, 14.v.1980, G. A. and J. Holloway. 2 ♂, 5 ♀, Pandappa Res., 20 km E Terowie, 16.v.1979, G. A. Holloway.

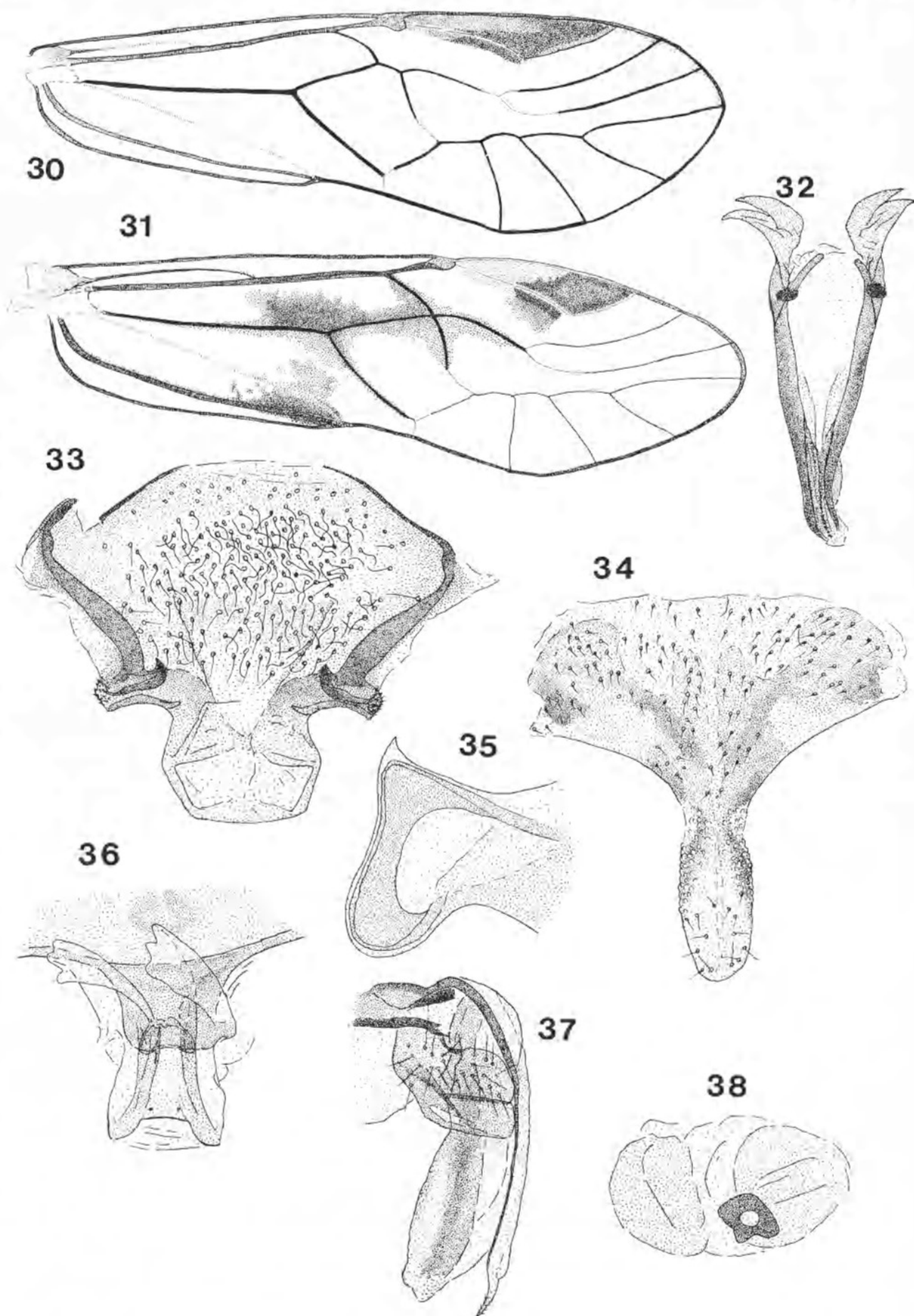
L. michaelseni is one of the largest Australian psocids with a wing length of up to about 7 mm. It was originally described from Western Australia. The record from New South Wales (Muogamarra Nature Reserve) (Smithers 1977) is in error and the specimen referred to there belongs to *L. simulatus* Smithers.

Three of the females from Pandappa Reserve are brachypterous, the wings reaching only to the end of the abdomen. Enderlein (1907) gives wing lengths of 7.0 mm (♂) and 4.7 mm (♀). With the shortening of the wings venational aberration has occurred to the extent that the fusion of Rs and M in the fore wing is shortened so that these veins meet in a point or are even joined by a crossvein. A similar reduction in the length of fusion occurs of Cu_{1a} and M to the point that these veins do not meet at all so the areola postica is free and the discoidal cell open.

Lasiopsocus dicellus sp. n.

Male

Coloration (in alcohol): Head pale, but brown as follows: a double row of irregular confluent spots adjacent to each compound eye, across back of vertex and on either side of median epicranial suture; a broad spot on frons anterior to ocelli; a line in position of anterior arms of epicranial suture from ocelli to antenna base; a ring around antenna base; a mark below compound eye on gena; postclypeal stripes and the labrum. Median postclypeal stripes closer and darker than lateral stripes. Ocellar tubercle black. Scape and pedicel brown; flagellum very



FIGS. 30-38. *Lasiopsocus dicellus* sp. n. 30. ♂ Fore wing. 31. ♀ Fore wing. 32. Phallosome. 33. Hypandrium. 34. Subgenital plate. 35. Ninth tergite, postero ventral apophysis. 36. ♂ Epiproct. 37. Gonapophyses. 38. ♀ Ninth sternite.

dark brown. Eyes black. First and second maxillary palp segments pale, third brown, fourth dark brown. Dorsum of mesothorax dark, shiny brown, a little paler where parapsidal sutures meet. Fore legs pale brown except for darker apex of tibia and tarsal segments. Meso- and meta-thoracic legs similar but coxae dark brown. Fore wings (Fig. 30) hyaline, without extensive pattern; pterostigma brown; veins dark brown. Hind wings hyaline; veins brown. Abdomen pale, terminal structures very dark brown.

Morphology: Length of body: 4 mm. Median epicranial suture distinct; anterior arms not evident but usual position indicated by brown line. Antennae fine, bearing long setae, those of first flagellar segment up to more than five times longer than width of segment. Eyes fairly large, not reaching level of vertex. IO/D: 1.9; PO: 0.83. Ocelli large. Apex of lacinia divided into two slightly denticulate lobes, the outer strongly divergent; lacinia narrowed just basad of apical division. Measurements of hind leg: F: 1.04 mm; T: 2.04 mm; t_1 : 0.60 mm; t_2 : 0.20 mm; rt: 3:1; ct: 22, 2. Fore wing length: 5.0 mm; width: 1.6 mm. Pterostigma long, narrow. Stigmaphys shallow, dome-shaped. M before fusion with Cu_{1+2} curved to give a concave outer margin to discoidal cell; curved section of vein somewhat evanescent as are R_{2+3} and R_{4+5} beyond separation. IA fairly thick. An occasional tiny seta present on veins. Hind wing length: 3.7 mm; width: 1.1. Hind wing margin with a few fine, short setae between R_{2+3} and R_{4+5} near wing apex. Epiproct (Fig. 36) sclerotized with a sinuous hind margin. A complex basal structure arises from epiproct where it is attached to ninth tergite. This consists of a posteriorly directed plate which lies above epiproct, the plate is posteriorly bilobed and strengthened along each side by a sclerotized strip, the strips curving away somewhat from each other behind. From the base of the plate arise two erect, elongate, apically 3-lobed strap-like apophyses (twisted in illustration) which are more heavily sclerotized dorsally than ventrally. Paraprocts with very strong, median sclerotized strengthening bar, a large, almost circular trichobothrial field distad of which the paraproct is extended into a medio-dorsally directed tapering bar subtended by a ventrally placed, lightly sclerotized lobe. These lobes are curved inwards and lie behind the distal part of the hypandrium. The eighth sternite sclerotized in distal part only, adjacent to base of hypandrium. Hypandrium (Fig. 36) distally upturned to end in a broad lobe with transverse posterior margin. Ninth tergite extended posteroventrally on each side into a distally broadened lobe with a heavily sclerotized margin. The broadened end is acute dorsally but broadly rounded ventrally (Fig. 35). Phallosome (Fig. 32)

with external parameres joined anteriorly, narrow, rodlike, diverging posteriorly, each with a pair of strongly developed, outwardly curved distal teeth. Near the end of each paramere arises a small projection, probably representing the remnants of the internal parameres.

Female

Coloration (in alcohol): As in male but with parapsidal sutures pale, legs darker and with distinct wing pattern in various shades of brown (Fig. 31). This is in strong contrast to the hyaline male fore wing.

Morphology: Length of body: 5.2 mm. Eyes small. IO/D: 2.7; PO: 0.84. Lacinia as in male. Measurements of hind leg: F: 1.2 mm; T: 2.1 mm; t_1 : 0.5 mm; t_2 : 0.25 mm; rt: 2:1; ct: 21, 2. Fore wing length: 5.0 mm; width: 1.6 mm. R strongly developed. Rs and M fused for a short length. Discoidal cell as in male. Hind wing length: 3.8 mm; width: 1.2 mm. Marginal setae as in male but a little more strongly developed. Paraproct broadbased, narrower posteriorly, well sclerotized with small circular trichobothrial field. Subgenital plate (Fig. 34). Gonapophyses (Fig. 37) with finely pointed ventral valve, dorsal valve blunt-ended, spiculate near end. Sclerification of ninth sternite (Fig. 38) simple, ring-like.

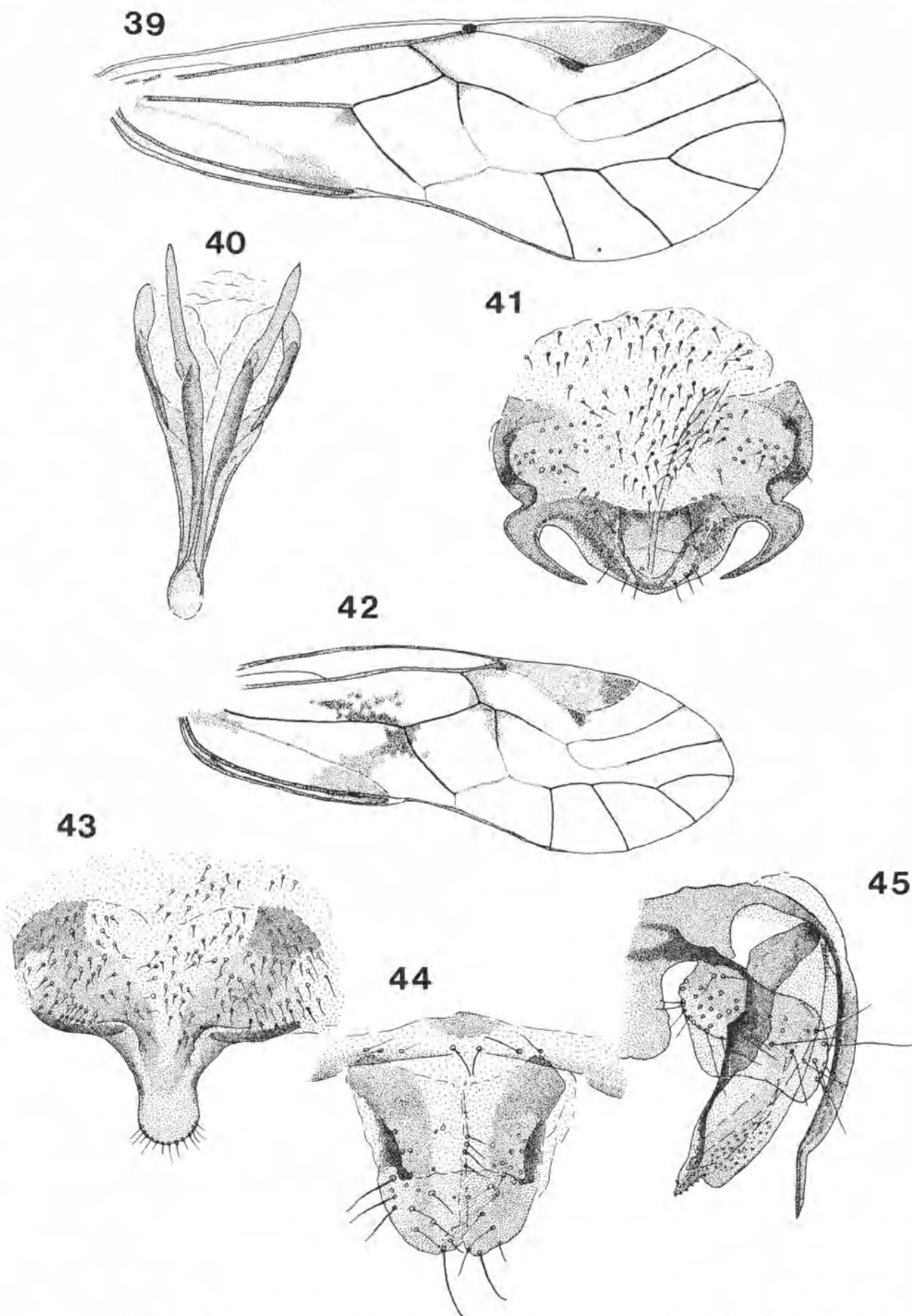
Material Examined: SOUTH AUSTRALIA. 1 ♂ (holotype), 1 ♀ (allotype), Pandappa Res., 20 km. E Terowie, 16.vi.1979. G. A. Holloway. Paratypes: 12 ♂, 6 ♀, data as holotype; 2 ♂, 1 ♀, 4 km NW Murray Bridge, 22.v.1981, G. J. and A. Holloway.

Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Lasiopsocus dicellus* differs from *L. michaelsoni* in being much smaller and darker, with a fore wing length of only 5.0 mm compared with 7.0 mm for *L. michaelsoni*. The wing setae are reduced to an occasional small seta, not easily seen. The proportions of the complex structures associated with the male epiproct are different although the distinctive structures are similar in general form and arrangement. The phallosome differs in proportions of the parts. The eighth sternite of the male is sclerotized only in a narrow band adjacent to the base of the hypandrium and the sternite is thus much less heavily and extensively sclerotized than in other genera of the Amphigerontiinae, to which subfamily *Lasiopsocus* belongs.

The female of *L. michaelsoni*, as well as being much larger than that of *L. dicellus*, does not have the extensive dark wing markings characteristic of *L. dicellus*.

Males of *L. dicellus* are very similar to those of *L. simulatus* Smithers but differ slightly in propor-



FIGS. 39-45. *Blastoceros* sp. n. 39. ♂ Fore wing. 40. Phallosome. 41. Hypandrium. 42. ♀ Fore wing. 43. Subgenital plate. 44. ♀ Epiroct. 45. Gonapophyses.

tions of the phallosome and the structures associated with the epiproct. The posterior lobe of the hypandrium has a transverse hind margin in *L. dicellus* but is more rounded in *L. simulatus*. The female of *L. simulatus* is not known.

Blaste macrops sp. n.

Male

Coloration (in alcohol): Head pale with brown markings as follows: a wide band consisting of irregular, sometimes confluent spots adjacent to compound eyes, across vertex and on either side of median epicranial suture (these areas leave only a small part of epicranium clear); a broad band from eye through antenna base and across anterior part of postclypeus to meet band from other side; from the broad band, another runs from between eye and antenna base towards the ocellar triangle. Postclypeus pale with rows of faint spots in positions usually occupied by postclypeal stripes; spots darker in anterior third. Labrum dark brown. Genae pale with dark mark below eye. Antennae brown. Eyes black. Ocelli circled with black. Maxillary palps progressively darker from pale base to dark brown fourth segment. Meso-thoracic antedorsum dark brown except for a small spot on each anterolateral angle and one at junction of parapsidal furrows; dorsal lobes dark brown, broadly pale adjacent to parapsidal furrows and fore wing base; scutellum pale. Metathorax with pale antedorsum and brown dorsal lobes. Femora pale, irregularly marked with pale brown; tibiae pale proximally, becoming dark brown distally; tarsi dark brown. Fore wings (Fig. 39) hyaline, marked in shades of brown. Hind wings hyaline with a pale brown area in distal angle of Cu_2 . Abdomen pale, with irregular brown, segmentally arranged markings; terminal structures dark brown.

Morphology: Length of body: 2.8 mm. Median epicranial suture distinct, anterior arms evanescent. Upper region of head somewhat expanded to form lobes on which the eyes are carried so that top of head is broadened; vertex medially depressed. Length of flagellar segments: f_1 : 0.85 mm; f_2 : 0.90 mm. Antennae slender with fine pubescence. Eyes fairly large, very prominent, carried on upper lateral head extensions, inner margins diverging strongly behind when seen from above. IO/D: 2.1; PO: 0.90. Ocelli large, but ocellar tubercle not very prominent. Measurements of hind leg: F: 0.83 mm; T: 1.9 mm; t_1 : 0.6 mm; t_2 : 0.15 mm; rt: 4:1; ct: 26, 4. Legs long and slender. Fore wing length: 4.5 mm; width: 1.7 mm. Sc curves distally to meet R. Rs and M fused for a length. Discoidal cell concave, i.e. M curved. M_1 curves, arched towards wing margin, reaching margin just anterior to wing apex.

Hind wing length: 3.4 mm; width: 1.1 mm. Microtrichia of wing membrane a little larger in cell Cu_2 than elsewhere. Epiproct rectangular with rounded hind angles. Paraproct heavily sclerotized in basal half, lightly so in distal half; trichobothrial field large and circular, posterior projection small and pointed. Hypandrium (Fig. 41). Phallosome (Fig. 40) with parameres apically separate and tapering, divergent.

Female

Coloration (in alcohol): As male but with a pale median line on mesothoracic antedorsum and more extensive fore wing markings (Fig. 42).

Morphology: Length of body: 3.7 mm. Head much larger than in male, shaped as in male, eyes unusually prominent for a female. Antennae fine. IO/D: 2.5; PO: 0.82. Measurements of hind leg: F: 0.82 mm; T: 1.8 mm; t_1 : 0.55 mm; t_2 : 0.15 mm; rt: 3.6:1. Fore wing length: 3.7 mm; width: 1.3 mm. Venation as in male but M_1 reaches wing margin at wing apex. Hind wing length: 2.8 mm; width: 0.9 mm. Epiproct (Fig. 44) heavily sclerotized laterally, less so medially with hind margin slightly emarginate medially. Subgenital plate (Fig. 43) well sclerotized. Gonapophyses (Fig. 45).

Material Examined: SOUTH AUSTRALIA. 1 ♂ (holotype), 1 ♀ (allotype), 25 km E Peake, 23.vi.1979, G. A. Holloway. Paratypes: 3 ♀, 1 ♂, Germein Gorge, Flinders Ra., 11.5 km E Pt. Germein, 17.vi.1979, G. A. Holloway. 1 ♀, 2 km E Parilla, 23.vi.1979, G. A. Holloway. 1 ♂, Pandappa Res., 20 km E Terowie, 6.vi.1979, G. A. Holloway.

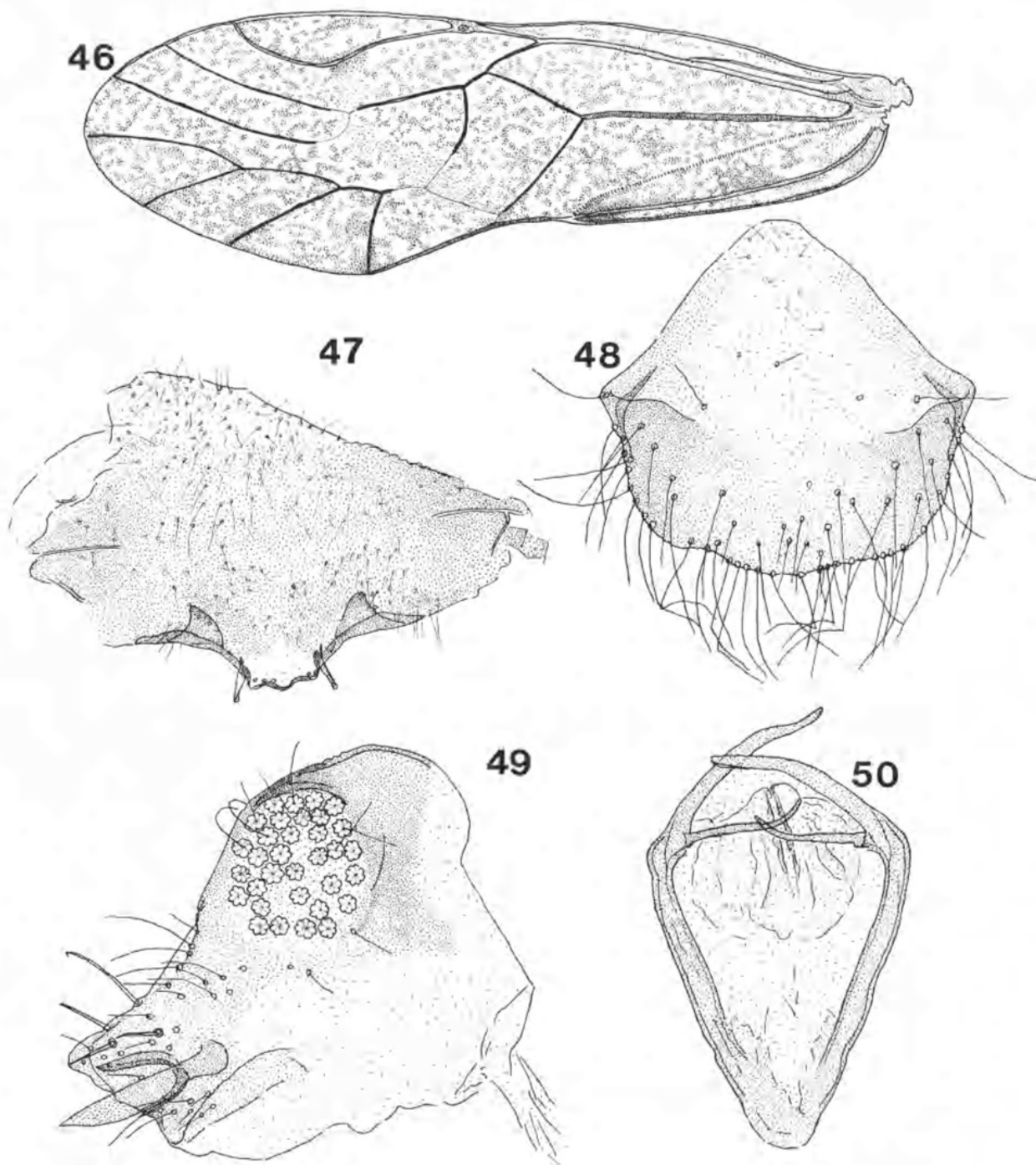
Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Blaste macrops* belongs to a group of species in which the male hypandrium is rounded, with a pair of lateral, incurved, posteriorly projecting processes and a phallosome in which both inner and outer parameres are elongate, joined anteriorly, with the inner parameres free behind, tapering towards end. The eyes in both sexes are prominently placed on short dorsolateral extensions of the head capsule and there is usually sexual dimorphism in wing pattern with females having somewhat more extensive and often darker markings than males. The group includes *B. fulcifer* Smithers (Tasmania), *B. fuscilla* New (Western Australia), *B. lunulata* New (Western Australia) and *B. tillyardi* Smithers (New Zealand, New South Wales and South Australia). *B. panops* Smithers (Tasmania) may also be considered as belonging to this group although wing pattern dimorphism is not pronounced and the

male hypandrium lacks the curved processes; the phallosome, however, is very similar to that of *B. falcifer*, as is the shape of the epiproct.

Only the most obvious differences between the species are given here. Perusal of the descriptions and illustrations will provide an indication of the characteristic differences in proportions and shapes of genitalic structures as well as wing pattern differences by which the species can be distinguished.

Both *B. falcifer* and *B. panops* have a distinct mark between the ends of R_{4+5} and M , i.e. near the wing apex which is lacking in *B. macrops*. In *B. lunulata* males (females not known) there are extensive wing markings in cell Cu_2 ; the band of colour across the wing from pterostigma to areola postica is broad and continuous; M , $Rs + M$ and the edges of the discoidal cell are bordered with brown and the median cells and cell R_5 each apically have



FIGS. 46-50, *Blastomus magnifica* sp. n. 46, ♂ Fore wing. 47. Hypandrium. 48. ♂ Epiproct. 49. ♂ Paraproct. 50. Phallosome.

extensive brown markings. These markings are far more extensive than in *B. macrops* (Fig. 39). In *B. tilyardi*, probably the nearest known relative to *B. macrops*, the hypandrial processes are shorter and stouter and the inner parameres posteriorly incurved. In female *B. macrops* there are irregular marks in cell R adjacent to M which are absent from female *B. tilyardi* and *B. furcilla*. Males of *B. furcilla* differ from males of *B. macrops* in having a triangular flap arising from the base of the epiproct (New 1974, Fig. 17).

The generic limits of *Blaste* and its nearest relatives are in need of revision on a world basis and when this is done it seems likely that *B. macrops* and similar species will be defined as a distinct generic group.

***Blaste magnifica* sp. n.**

Male

Coloration (in alcohol): Head brown with dark brown markings. A double row of irregular, confluent spots adjacent to compound eyes, across back of vertex and adjacent to median epicranial suture. Frons with triangular patch with pale centre anterior to ocellar tubercle. Epistomial suture very dark brown. Areas of top of head not occupied by the spotting described above are mostly occupied by brown which does not quite reach the spots. A very dark band runs from compound eye to antenna base. Genae with an irregular mark below compound eye and two small marks above base of mandible. Postclypeal stripes dark and clearly defined. Anteclypeus dark in basal half, pale in distal half. Labrum pale brown with dark brown proximal border. Scape, pedicel pale brown and basal half of first flagellar segment pale brown, remainder of flagellum brown. Eyes black. Ocellar tubercle black. Maxillary palp with third and fourth segments dark brown, otherwise pale. Thorax distinctively marked, being very dark chocolate brown with only parapsidal furrows and a narrow median line between dorsal lobes pale, the line between the dorsal lobes extending for a short distance onto hind part of antedorsum. Pleura mostly dark brown. Femora irregularly marked in various shades of brown, darkest at distal end. Tibiae brown, darker at each end. Tarsi brown. Fore wings (Fig. 46) hyaline, densely speckled brown. Hind wings hyaline, faintly tinged with grey. Abdomen pale with a few brown marks; terminal structures dark brown.

Morphology: Length of body: 3.8 mm. Upper angles of head produced a little so that the eyes are very prominently held on short, thick "stalks". Median epicranial suture very distinct, anterior arms absent. Vertex slightly lower in middle than laterally, thus accentuating eye prominence. Postclypeus almost square when viewed from front of head; not

very prominent. Lengths of flagellar segments: f_1 : 1.16 mm; f_2 : 1.04 mm. Antennae very fine, with long setae, some as long as seven times flagellar diameter. Eyes large, prominent on cephalic extensions, upper margins high above level of vertex. IO/D: 1.4; PO: 0.94. Ocelli large on prominent tubercle; epicranial plates concave on either side of ocellar tubercle, thus accentuating tubercle prominence. Measurements of hind leg: F: 1.12 mm; T: 2.64 mm; t_1 : 0.68 mm; t_2 : 0.14 mm; rt : 5; lt : 29, 2. Legs long, thin, with very spiny tibiae. Femora narrow, parallel sided. Fore wing length: 6.5 mm; width: 2.1 mm. Sc meets R distally, Rs and M fused for a length. Discoidal cell incurved on distal margin. Cu_{1a} and M fused for a length; basal and second sections of Cu_{1a} at a slight angle to one another. Hind wing length: 4.8 mm; width: 1.6 mm. Rs and M fused for a short length. Margin glabrous. Epiproct (Fig. 48). Paraproct (Fig. 49). Hypandrium (Fig. 47). Phallosome (Fig. 50).

Female

Unknown.

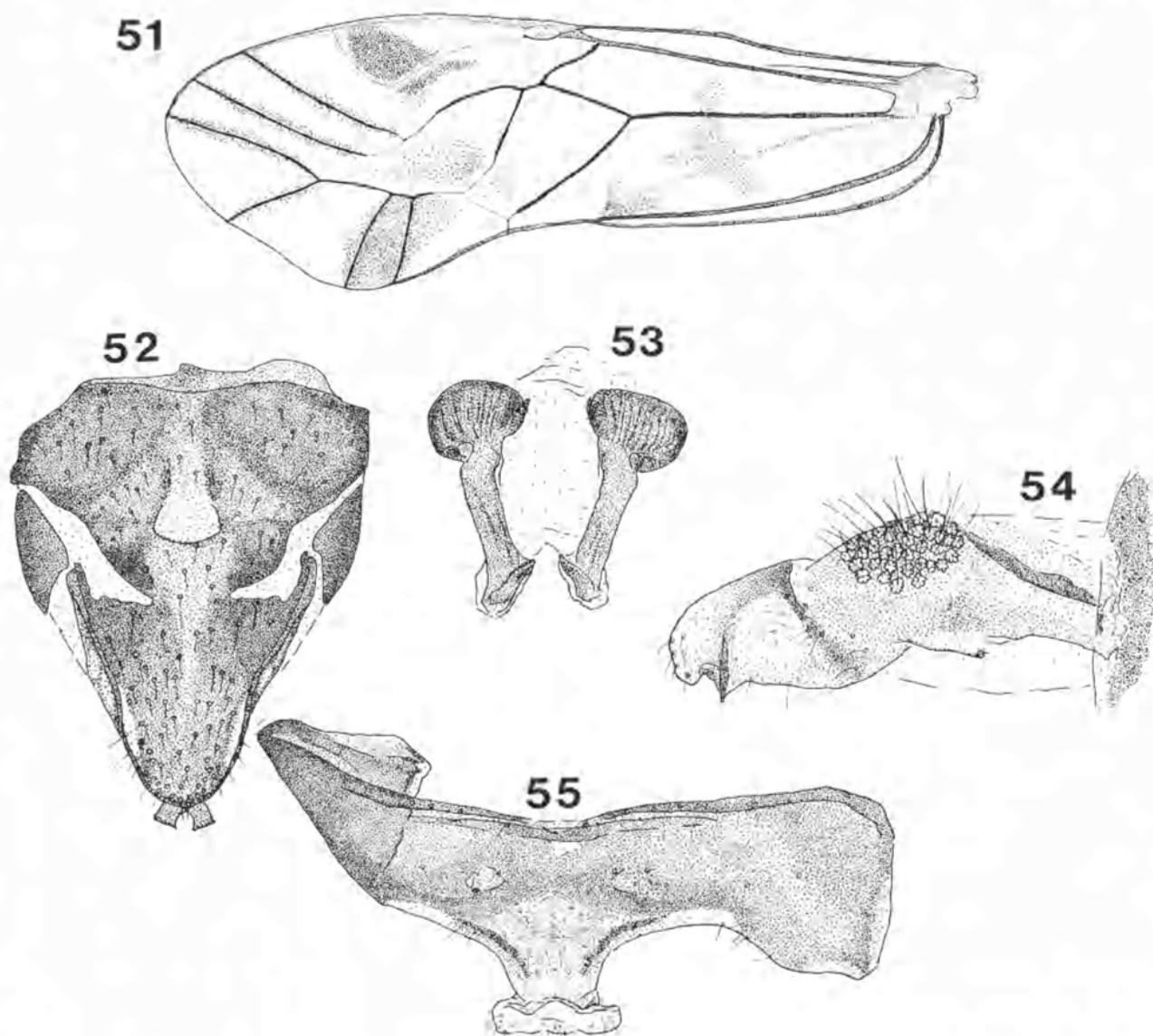
Material Examined: SOUTH AUSTRALIA, ♂ (holotype), Pooginook Park, 15.vi.1979, G. A. Holloway. Paratype: ♂, as holotype.

Holotype and paratype in the Australian Museum. *Blaste magnifica* is a very distinctive, large and easily recognized species. It is the only species in the genus in which the wing is mottled with an overall pattern of small, irregularly confluent spots. The hypandrium is distinctive, with an unusual hind border which is medially sclerotized and carries two small projections, one on each side of the midline. The phallosome is also of unusual form for the genus. As in the case of the group of species associated with *B. macrops*, mentioned above, it may be necessary to recognize this species in a separate genus when the large genus *Blaste* is revised.

***Blaste angusta* sp. n.**

Male

Coloration (in alcohol): Head pale brownish with dark brown, irregular, confluent spots adjacent to compound eyes, across vertex and adjacent to median epicranial suture. A narrow brown band surrounds antenna base. Postclypeal striations dark brown. A brown ovoid patch with pale centre lies anterior to ocellar triangle just posterior to epistomial suture. Genae pale with two small spots below eye. Antennae brown, a little paler in basal four segments than more distally. Maxillary palps pale basally, fourth segment very dark brown. Mesothoracic antedorsum dark brown; parapsidal furrows broadly pale; scutellum pale; a posterior lateral pale line on each dorsal lobe. Femora pale brown, dark



FIGS. 51-55. *Blastocryptus angusta* sp. n. 51. ♂ Fore wing. 52. Hypandrium. 53. Phallosome. 54. ♂ Paraproct. 55. Epiproct and ninth tergite.

along dorsal and lateral surfaces. Tibiae pale brown, a little darker at each end. Tarsi dark brown. Fore wing (Fig. 51) hyaline with markings in various shades of brown. Hind wings hyaline, a brown spot at wing base. Abdomen pale with slightly darker, irregular, segmentally arranged markings in basal two thirds; distal third occupied by the almost black, extensively sclerotized terminal structures; eighth sternite extensively and very heavily sclerotized.

Morphology: Length of body: 3.0 mm. Median epicranial suture very distinct but anterior arms absent. Median part of epistomial suture sinuous. Length of flagellar segments: f_1 : 0.80 mm; f_2 : 0.64 mm. Flagellar setae about three times as long as flagellar width. Eyes large, inner margins divergent behind when seen from above and just reaching level of vertex. IO/D: 1.9; PO: 1.0. Measurements of hind leg: F: 0.80 mm; T: 1.80 mm; t_1 : 0.56 mm; t_2 : 0.20 mm; rt: 2.8:1; ct: 27, 1. Fore wing length:

4.0 mm; width: 1.4 mm. Fore wing (Fig. 51) with broad pterostigma, with round hind angle and R_1 curved to give a concave pterostigma basad of hind angle. R_s and M fused for a very short length, Sc ends free in costal cell, runs very close to R . Third median cell very narrow, M_3 and distal sections of Cu_{1+2} almost parallel but relationship varies somewhat in the four fore wings available for study. Apex of areola postica fairly broad. Hind wing length: 3.0 mm; width: 1.1 mm. R_s and M fused for a fairly long length. Ninth tergite (Fig. 55) very heavily sclerotized, extended posteriorly in the middle to which extension is attached the small lobed epiproct. Paraproct (Fig. 54). Eighth sternite very heavily sclerotized. Hypandrium (Fig. 52). Phallosome (Fig. 53).

Female

Unknown.

Material Examined: South Australia ♂ (holotype), 10 km SW Renmark, 15.vi.1979, G. A. Holloway. Paratypes: 1 ♂, as holotype. 1 ♂, Telowie Gorge, 10 km SE Pt. Germein, 20.v.1981, G. and J. Holloway. 1 ♂, W end of Horrock's Pass, 19.v.1981, G. and J. Holloway.

Holotype and paratypes in the Australian Museum.

Discussion: *Blaste angusta* is an easily recognized species. It is so far the only known Australian species of *Blaste* in which cell M_2 in the fore wing is narrow as well as being well pigmented. The parameres, distally broadened into a rough knob, are characteristic.

Ptycta umbrata New

Ptycta umbrata New, 1974. *J. Aust. ent. Soc.* 13: 297, Figs. 38-44.

Material Examined: SOUTH AUSTRALIA. 2 ♂, 1 ♀, 2 km W Williamstown, 8.v.1980, G. and J. Holloway. 3 ♂, 11 n., Wilmington, Flinders Range, 6.v.1980, G. and J. Holloway. 1 ♀, Alligator Gorge Rd., near Mt. Remarkable, Flinders Range, 17.vi.1979, G. Holloway. 1 ♀, 6 km W Kapunda, 18.vi.1979, G. Holloway. 1 ♀, 25 km E Peake, 23.vi.1979, G. Holloway. 3 ♂, 1 ♀, Telowie Gorge, 10 km SE Pt. Germein, 20.v.1981, G., J. and A. Holloway. 3 ♀, Germein Gorge, 19.v.1981, G. and J. Holloway.

This species has previously been recorded only from Victoria.

Ptycta glossoptera New

Ptycta glossoptera New, 1974. *J. Aust. ent. Soc.* 13: 302, Figs. 58-64.

Material Examined: SOUTH AUSTRALIA. 6 ♂, 24 n., Pandappa Res., 20 km E Terowie, 16.vi.1979, G. A. Holloway. 1 ♀ (macropterous), 2 ♀ (brachypterous), 1 n., 2 km E Parilla, 23.vi.1979, G. A. Holloway. 1 ♀ (brachypterous), 1 n., 10 km SW Renmark, 15.vi.1979, G. A. Holloway. 1 ♂, Pooginook Park, 15.vi.1979, G. A. Holloway.

This species has previously been recorded from Victoria.

Ptycta longipennis sp. n.

Male

Coloration (in alcohol): Head greyish with brown markings. A double row of spots adjacent to compound eyes, across back of head and adjacent to median epicranial suture, a mark along anterior arms of suture which broadens toward lateral ends; an ovoid spot anterior to ocellar tubercle. Base of antenna surrounded by a narrow brown band. Postclypeal stripes narrow. Antenna dark brown. Maxillary palps pale, fourth segment very dark brown,

almost black. Mesonotum dark brown, sutures, median antedorsal stripe and posterolateral edges of lateral lobes pale. Legs pale, tarsi brown. Fore wing (Fig. 56) hyaline, with a faint general tinge of brown and slightly darker brown areas as in figure. Abdomen pale, irregularly marked with brown; terminal structures dark brown.

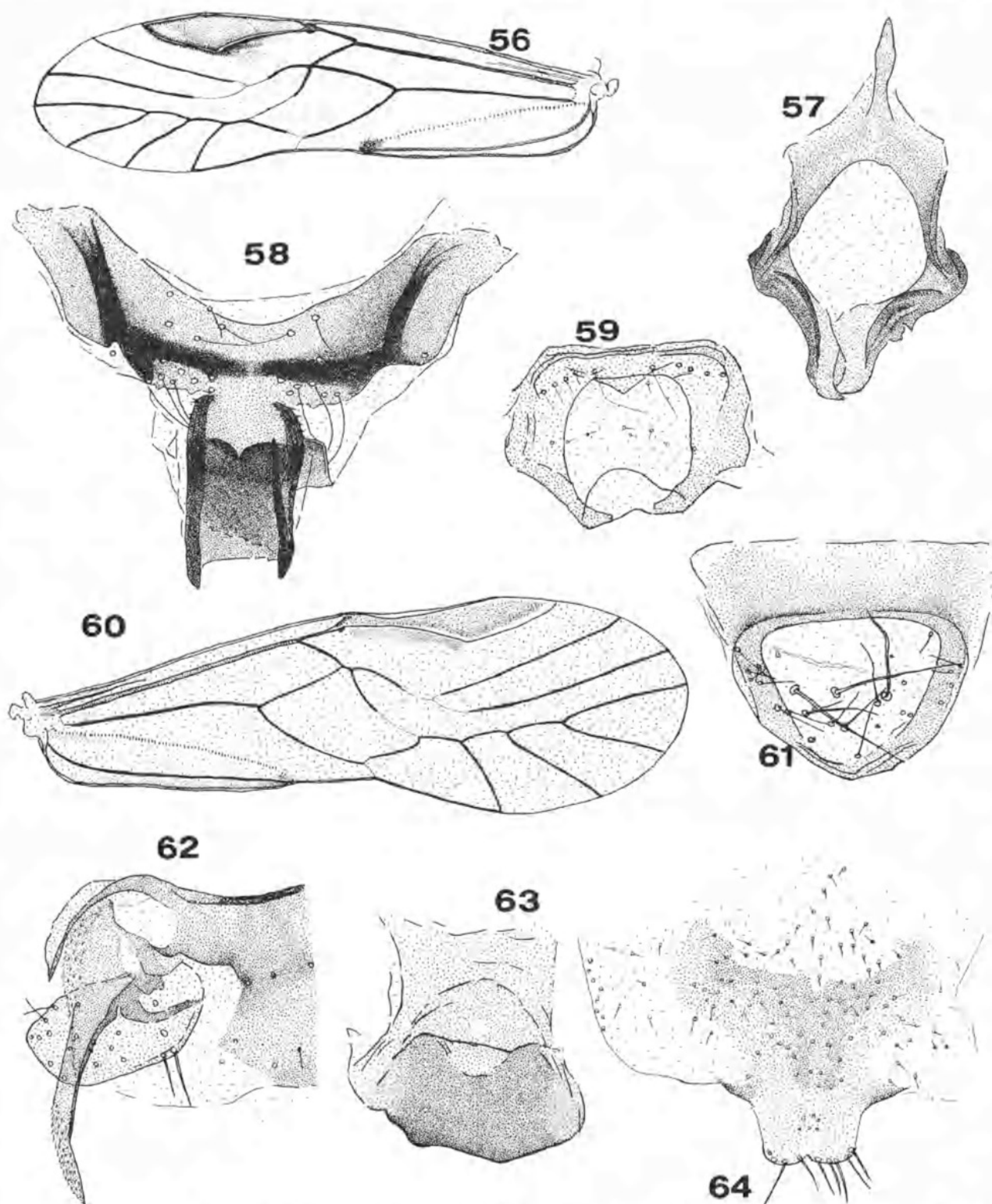
Morphology: Length of body: 2.3 mm. Median epicranial suture distinct; anterior arms evanescent but position marked by dark stripe. Lengths of flagellar segments: f_1 : 0.76 mm; f_2 : 0.74 mm. Eyes large, reaching above level of vertex, IO/D: 1.3; PO: 0.91. Measurements of hind leg: F: 0.68 mm; T: 1.60 mm; t_1 : 0.50 mm; t_2 : 0.12 mm; rt: 4.2:1; ct: 30, 3. Fore wing length: 4.0 mm; width: 1.3 mm. Fore wings relatively long and narrow. Sc ending free in costal cell. Pterostigma fairly narrow but hind angle clearly evident. Rs and M fused for a short length. Discoidal cell broad, distal section of M and Cu_1 bordering cell both curved distally towards wing apex. Basal section of Cu_{1a} slightly sinuous almost in a line with second section. Hind wing length: 3.2 mm; width: 0.9 mm. Rs and M fused for a long length. A few marginal setae between R_{2+3} and R_{4+5} . Epiproct (Fig. 59) lightly sclerotized, bordered with slightly more heavily sclerotized band of variable width. The posterior median part is folded back in figure. Hypandrium (Fig. 58) slightly asymmetrical with a lateral, sclerotized extension of the dorsally curved, median, straplike band near the distal end. Phallosome (Fig. 57) with a long posterior median extension.

Female

Coloration (in alcohol): As in male. Wings (Fig. 60) slightly darker.

Morphology: Length of body: 2.6 mm. Lengths of flagellar segments: f_1 : 0.60 mm; f_2 : 0.60 mm. Eyes smaller than in male, not quite reaching level of vertex. IO/D: 1.7; PO: 0.82. Measurements of hind leg: F: 0.56 mm; T: 1.36 mm; t_1 : 0.40 mm; t_2 : 0.13 mm; rt: 3:1; ct: 25, 1. Fore wing length: 3.6 mm; width: 1.0 mm. Venation (Fig. 60) as in male. Hind wing length: 2.7 mm; width: 0.8 mm. Epiproct (Fig. 61). Subgenital plate (Fig. 64). Gonapophyses (Fig. 62) with short ventral valve; dorsal valve tapering to point, distally slightly curved upwards; spiculate in distal third. Sclerite of ninth sternite (Fig. 63) simple, lightly sclerotized.

Material Examined: SOUTH AUSTRALIA. ♂ (holotype), ♀ (allotype), Germein Gorge, 19.v.1981, G. and J. Holloway. Paratypes: 1 ♂, 1 ♀, Telowie Gorge, 10 km SE Pt. Germein, 20.v.1981, G. and J. Holloway. Holotype, allotype and paratype in the Australian Museum.

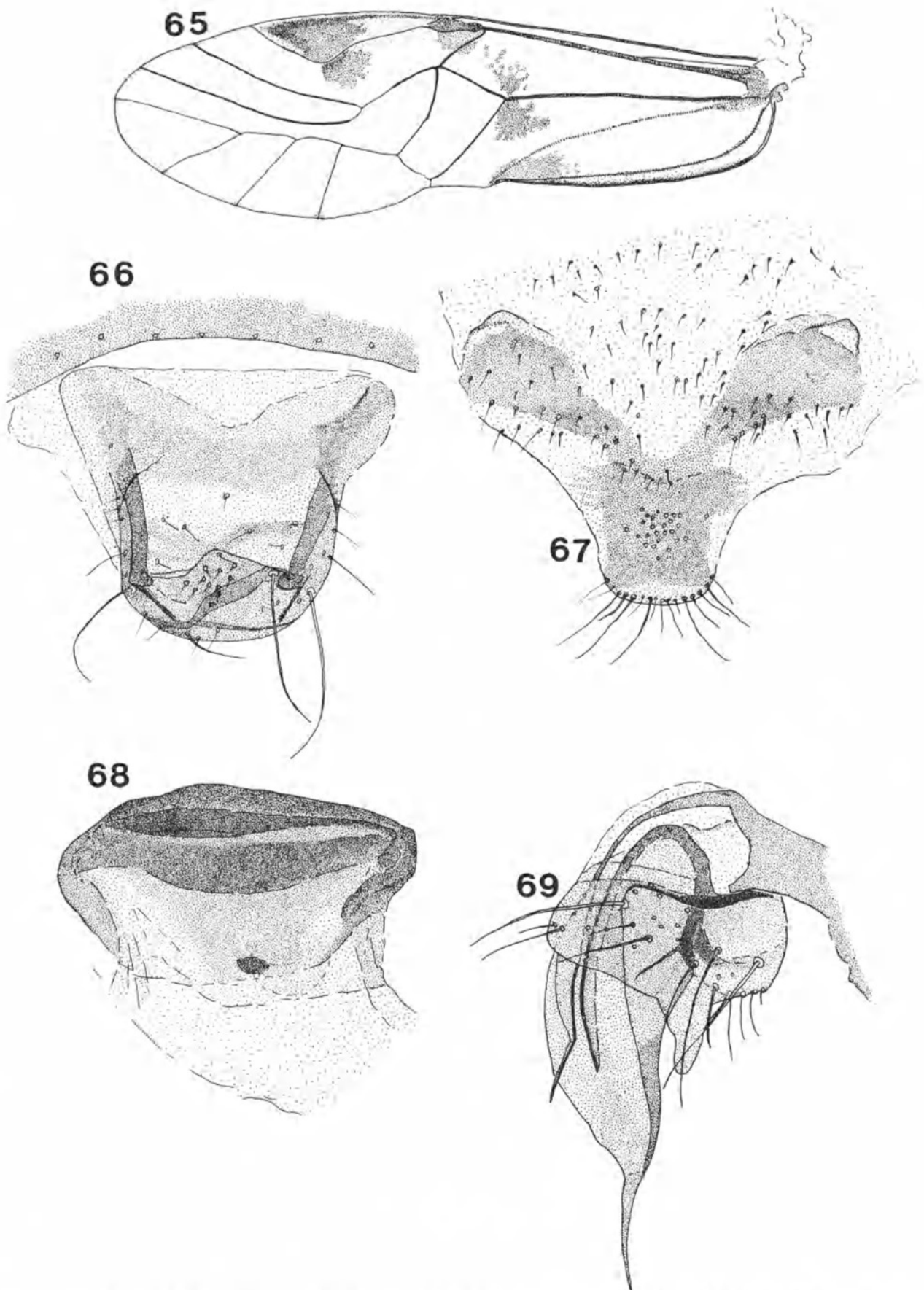


FIGS. 56-64, *Ptycta longipennis* sp. n. 56, ♂ Fore wing. 57. Phallosome. 58. Hypandrium. 59. ♂ Epiproct. 60. ♀ Fore wing. 61. ♀ Epiproct. 62. Gonapophyses. 63. ♀ Ninth sternite. 64. Subgenital plate.

Discussion: *Ptycta longipennis* is very similar to *P. muogamarra* Smithers, from New South Wales. It is, however, larger and there are distinct differences in several anatomical features. In the male the distal median extension of the phallosome is longer and the median strap-like upcurved part of the hypandrium is more nearly symmetrical. In the female the external valve of *P. longipennis* is broader and,

although reduced in a similar way, the ventral valve is more robust. In *P. glossoptera* the hypandrium is strongly asymmetrical and in the other Australian species the hypandrium bears a variety of spines and projections.

Females of *P. emarginata* New, *P. glossoptera* New, *P. improcera* New, *P. picta* New and *P. umbrata* all have some darker brownish marks on the fore



FIGS. 65-69. *Ptycta hollowayae* sp. n. 65. ♀ Fore wing. 66. ♀ Epiproct. 67. Subgenital plate. 68. ♀ Ninth sternite. 69. Gonapophyses.

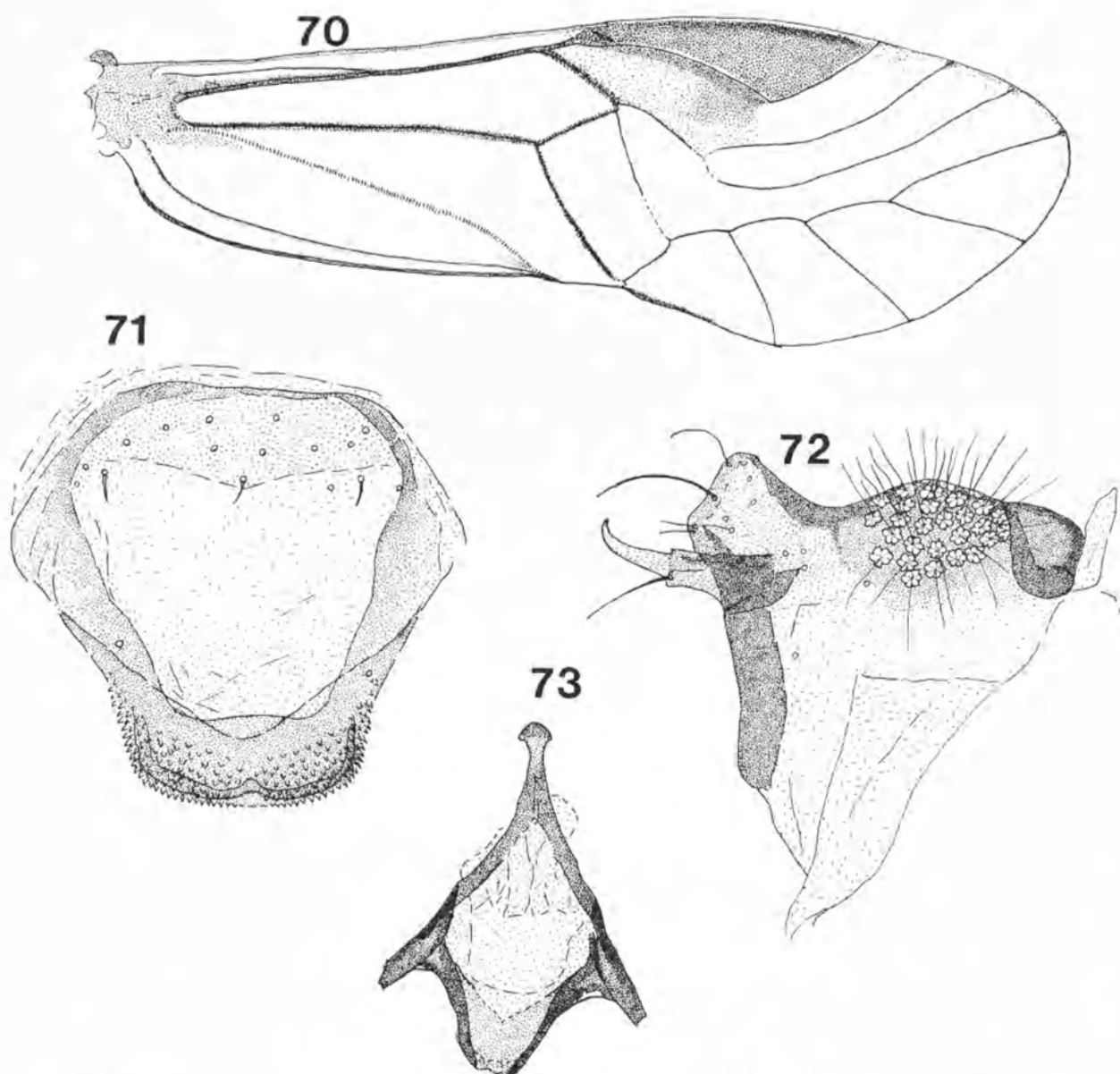
wings. The female of *P. cornigera* is not known but the male does not have obvious dark marks. *P. longipennis* differs from *P. hollowayae* sp. n. (described below) in lacking the rugose areas along the distal border of the epiproct and in not having an apical thickening to the posterior median process of the phallosome; phallosome shape also differs in that the phallic frame is much narrower in *P. hollowayae* and has an anteriorly projecting apophysis on each side at the posterior third of the frame. The fore wing of the female of *P. hollowayae* has an interrupted, irregular brown band from stigmapophysis to nodulus. In *P. hollowayae* the dorsal valve of the gonapophyses is broad and the ventral valve not shortened to the extent that it is in *P. longipennis*.

***Ptycta hollowayae* sp. n.**

Female

Coloration (in alcohol): Head and appendages very similar to *Ptycta emarginata* New but with post-clypeal striae not obsolete in midline and frons with a small dark circle in midline anterior to ocelli. Thoracic lobes dark brown but each broadly bordered with pale areas. Fore wings (Fig. 65) hyaline with very faint overall brown tinge and marked in shades of brown. Hind wings hyaline with very faint suggestion of brownish area behind end of Cu_2 .

Morphology: Length of body: 3.8 mm. Median epicranial suture distinct, anterior arms absent. Head broad across vertex, eyes large, just reaching level



FIGS. 70-73. *Ptycta hollowayae* sp. n. 70. ♂ Fore wing. 71. ♂ Epiproct. 72. ♂ Paraproct. 73. Phallosome.

of vertex. IO/D: 1.8; PO: 1.0. Ocelli large, anterior ocellus only little smaller than lateral ocelli. Length of flagellar segments: f_1 : 0.96 mm; f_2 : 0.76 mm. Measurements of hind leg: F: 0.92 mm; T: 2.0 mm; t_1 : 0.56 mm; t_2 : 0.20 mm; rt: 2.8:1; ct: 22, 4. Front femora noticeably broader than femora of middle and hind legs. Fore wing length: 4.4 mm; width: 1.4 mm. Fore wing with Rs and M meeting in a point, joined by a crossvein or fused for a very short length. Pterostigmal spurvein minute, hardly discernible. Fore wing glabrous. Hind wing length: 3.3 mm; width: 1.1 mm. About ten marginal setae between R_{2+3} and R_{4+5} . Epiproct (Fig. 66). Gonapophyses (Fig. 69). Dorsal valve broad with fairly long apical, pointed extension. External valve with distinct lobe lying adjacent to dorsal margin of dorsal valve. Subgenital plate (Fig. 67) with short, truncate, posterior lobe on the upper side of which near the posterior margin is a small, irregularly shaped thickening of the internal membrane. Y-shaped pigmented area with short, broad, "stem", the ends of the "arms" broad but somewhat apically divided. Sclerification of ninth sternite (Fig. 68) in form of an ovoid, very heavily sclerotized plate.

Male

Coloration (in alcohol): Head and appendages as in female but head markings reduced in accordance with greater eye size. Fore wings (Fig. 70). Hind wings hyaline.

Morphology: Length of flagellar segments: f_1 : 1.04 mm; f_2 : 0.84 mm. Antennae thicker than in female, finely pubescent. IO/D: 1.1; PO: 1.0. Eyes much larger than in female, reaching well above level of vertex with inner margins diverging posteriorly when viewed from above; emarginate posteriorly-medially above. Measurements of hind leg: F: 1.0 mm; T: 2.24 mm; t_1 : 0.60 mm; t_2 : 0.18 mm; rt: 3.3:1; ct: 27, 4. Fore wing length: 5.0 mm; width: 1.7 mm. Pterostigmal spurvein absent. Rs and M joined by a very short crossvein, in length only a little greater than vein thickness. Hind wing length: 3.7 mm; width: 1.3 mm. A few fine setae on margin between R_{2+3} and R_{4+5} . Epiproct (Fig. 71) lightly sclerotized with broad, thickened, marginal band of varying width; hind margin transverse; a basal, upstanding, broad-margined lobe partly overlies ninth tergite, the lobe medially slightly emarginate. Paraproct (Fig. 72). Hypandrium similar to that of *Ptycta glossoptera* (New 1974, Fig. 62). Phallosome (Fig. 73).

Material Examined: SOUTH AUSTRALIA. ♀ (holotype), ♂ (allotype), 15 km W Tailem Bend, 13.v.1980, G. and J. Holloway. Paratypes: 1 ♀, as holotype. 1 ♀, 18 km N Ardrossan, 8.v.1980, G. and

J. Holloway. 1 ♀, 1 km E Edithburgh, 7.v.1980, G. and J. Holloway.

Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Ptycta hollowayae* resembles *P. emarginata* New (♀ only known) and *P. glossoptera* New (both sexes known). It differs from both in being larger and the female has more extensive wing markings. The male of *P. hollowayae* differs from that of *P. glossoptera* in the form of the paraprocts and in proportions of the phallosome (although general shape is similar). The lateral projections are more pronounced in *P. hollowayae*. The epiproct and the hypandrium are similar in the two species. The anterior lobe of the epiproct appears to be folded back in the illustration given by New (1974, Fig. 64). In *P. cornigera*, *P. improcera* and *P. umbrata* the hypandrium bears spines and various processes which are not present in *P. hollowayae*. From *P. muogamarra* *P. hollowayae* differs in the form of proportions of the phallosome and in not having the ventral valve of the gonapophyses reduced. Comparison with *P. longipennis* has been made above.

Tanystigma tardipes (Edwards)

Clematostigma tardipes Edwards, 1950. *Pap. R. Soc. Tasm.* 1949: 95, Figs. 1-17.

Copostigma (*Clematostigma*) *tardipes* (Edwards). Smithers, 1967. *Aust. Zool.* 14 (1): 103.

Tanystigma tardipes (Edwards). Smithers, in press. *Aust. ent. Mag.*

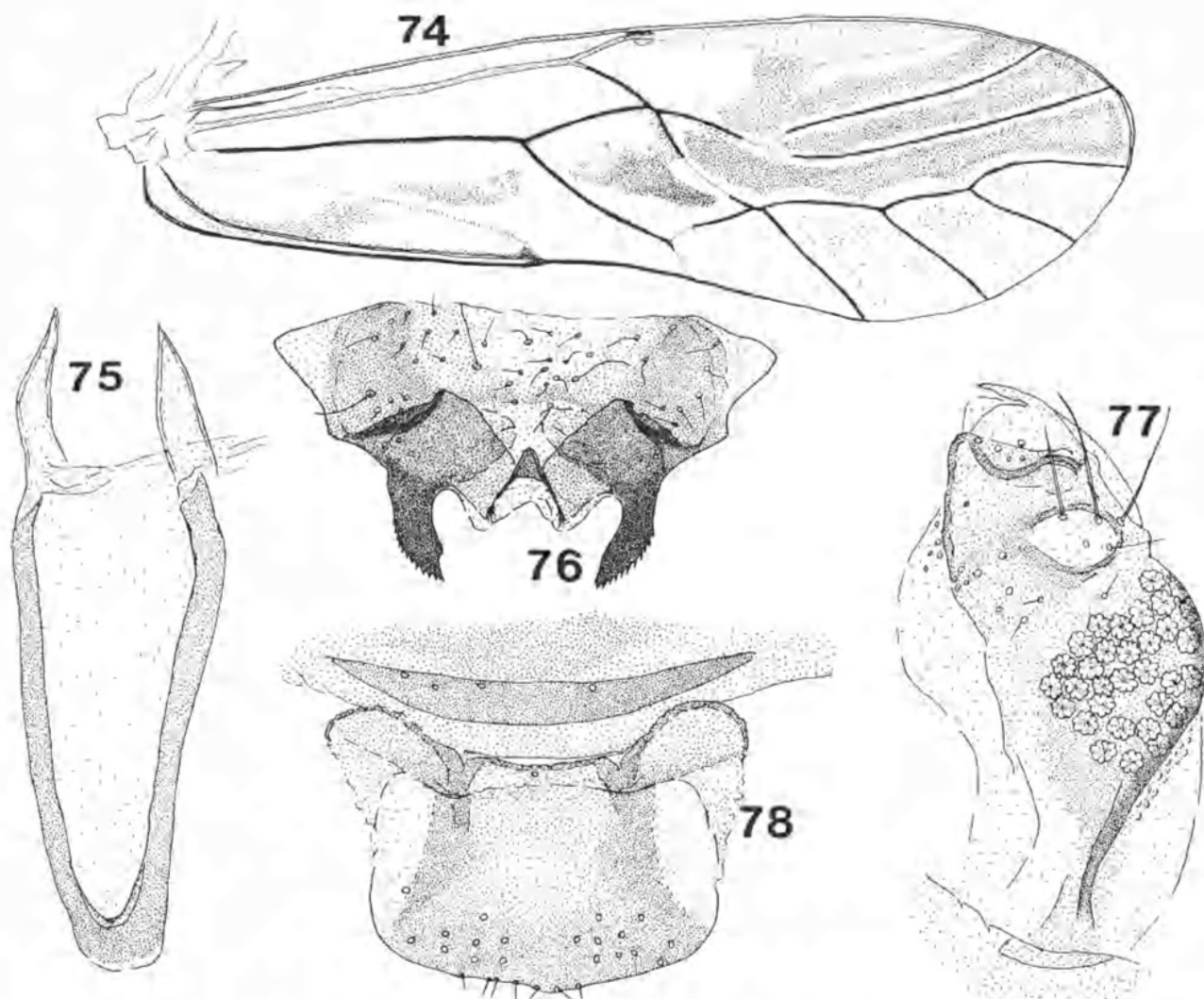
Material Examined: SOUTH AUSTRALIA. 1 ♂, 1 ♀, 12 km SE Port Wakefield, 8.v.1980, G. and J. Holloway. 1 ♂, 3 ♀, 1 n, 4 km S Moonta, 7.v.1980, G. and J. Holloway. 1 ♂, Port Elliot, 13.v.1980, G. and J. Holloway. 2 ♀, Wilmington, Flinders Ranges, 6.v.1980, G. and J. Holloway. 1 ♂, 2 ♀, 18 km N Ardrossan, 8.v.1980, G. and J. Holloway. 2 ♂, 2 ♀, 23 km E Tailem Bend, 13.v.1980, G. and J. Holloway. 1 ♂, 1 ♀, Telowie Gorge, 10 km E Pt. Gerniein, 20.v.1981, G. and J. Holloway. 4 ♂, 5 ♀, Farina, 17.v.1981, G. and J. Holloway.

T. tardipes was described from Tasmania and has been recorded from Victoria.

Tanystigma elongata sp. n.

Male

Coloration (in alcohol): Head pale grey-brown with dark brown markings. A double row of confluent spots adjacent to median epicranial suture, across back of vertex and adjacent to compound eyes; a spot between ocellar tubercle and epistomial suture; an irregular ring around antenna base; distinct postclypeal striations. Epicranial suture dark brown. Labrum pale brown. Genae grey-brown. Antennae dark brown. Eyes purplish. Ocellar

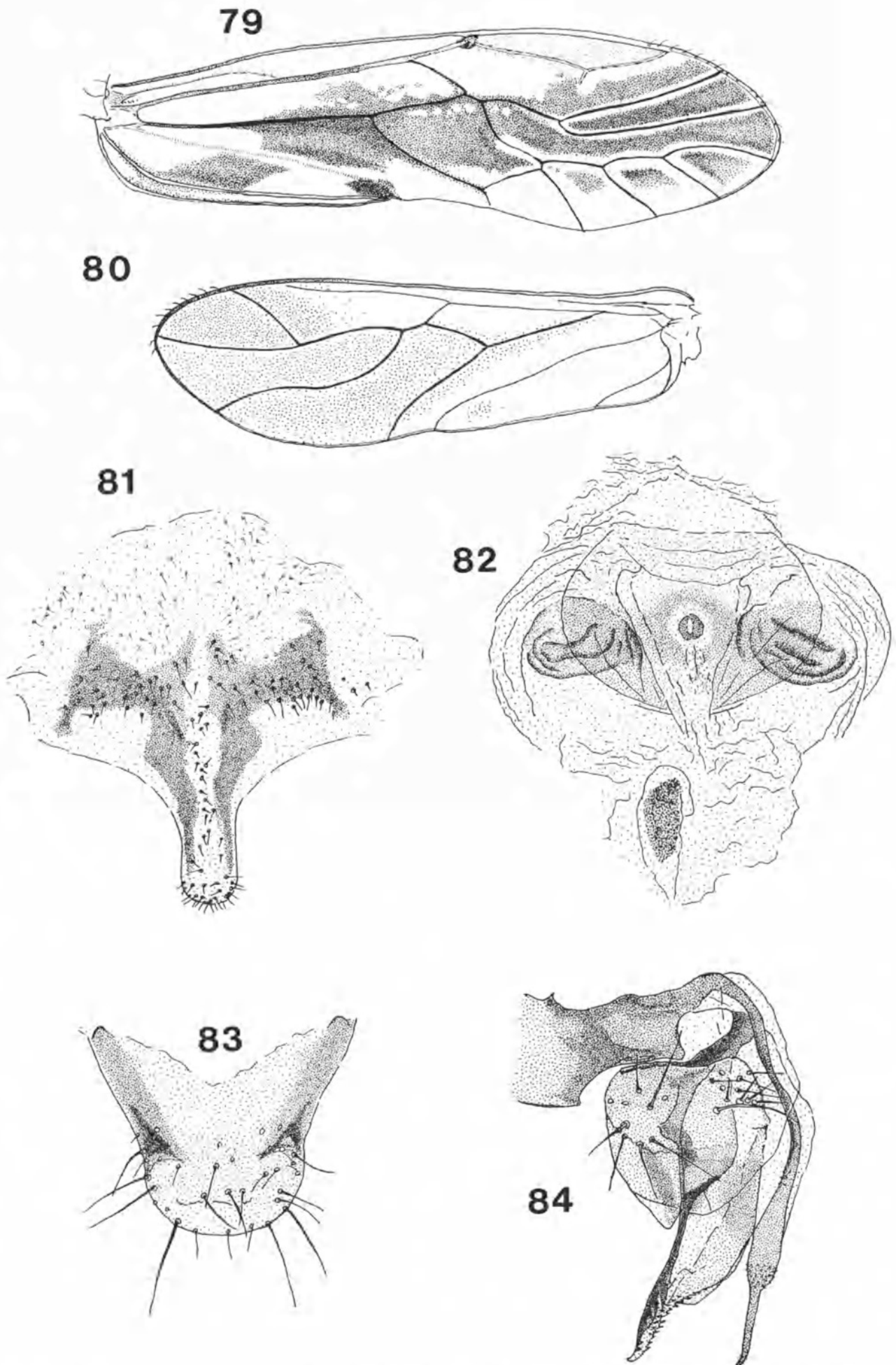


FIGS. 74-78. *Tanystigma elongata* sp. n. 74. ♂ Fore wing. 75. Phallosome. 76. Hypandrium. 77. ♂ Paraproct. 78. ♂ Epiproct.

tubercle dark brown. First and second maxillary palp segments very pale brown, third and fourth segments dark brown. Mesothoracic notum dark brown except for pale brown parapsidal sutures and posterior borders of dorsal lobes. Femora brown with darker apical band; tibiae pale brown, darker at each end; tarsi dark brown. Fore wings hyaline with brown pattern (Fig. 74). Hind wings hyaline, veins brown. Abdomen pale with irregular lateral segmentally arranged marks; terminal structures very dark brown.

Morphology: Length of body: 3.1 mm. Median epicranial suture distinct, anterior arms not evident. Epistomial suture sinuous, curved forwards in middle, anterior to anteocellar spot. Length of flagellar segments: f_1 : 0.90 mm; f_2 : 0.84 mm. Antennae fine, flagellar setae up to three times as long as flagellar diameter. Eyes large, reaching a little above level of vertex. IO/D: 1.2; PO: 1.0. Eyes slightly emarginate opposite antenna base. Measurements of hind leg: F: 0.76 mm; T: 1.80

mm; t_1 : 0.46 mm; t_2 : 0.20 mm; rt: 2.3:1; ct: 21, 4. Tarsal segments long, ctendia large. Fore wing length: 4.9 mm; width: 1.6 mm. Fore wing. Fore wing (Fig. 74) with Sc ending in R. R_1 almost straight basad of hind angle of pterostigma; R_1 almost straight between hind angle and wing margin. Pterostigmal spurvein obvious. Rs and M fused for a short length. Veins somewhat evanescent at forking of Rs, second half of Cu_{1n} , basal section of Cu_{1a} and the third quarter of outer margin of discoidal cell. Cu_{1n} and M fused for a very short length. Hind margin of wing near base thin, rugose. A few small, fine setae on wing margin from proximal end of pterostigma to wing apex. Hind wing length: 4.0 mm; width: 1.2 mm. Hind wing with Rs and M fused for a length. A few small marginal setae between R_{2+3} and wing apex. Epiproct (Fig. 78) well sclerotized, less so laterally, with a pair of small, erect basal lobes. Paraprocts (Fig. 77) with large field of trichobothria and a lightly sclerotized, setose dome between trichobothria and the apical spur. Apical spur broad-based with sharply pointed,



FIGS. 79-84. *Tanystigma elongata* sp. n. 79. ♀ Fore wing, 80. ♀ Hind wing, 81. Subgenital plate, 82. ♀ Ninth sternite, 83. ♀ Epiproct, 84. Gonapophyses.

curved apex. Posterior margin of ninth tergite strongly sclerotized in middle section, the sclerotization tapering laterally. Hypandrium (Fig. 76) very heavily sclerotized with two inwardly curved, posterior projections which are laterally serrate between the bases of which the hind margin of the hypandrium is medially emarginate and bears a small median, rounded ventral sclerite. Phallosome (Fig. 75, tilted in preparation) consisting of two elongate, narrow, basally fused, distally divergent external parameres each with pointed, apical sclerite.

Female

Coloration (in alcohol): Body coloration as in male but with a median pale brown line on antedorsum of mesothorax and abdomen distinctly banded with brown. Antennae as in male but scape, pedicel and first two flagellar segments very pale. Third maxillary palp segment pale in distal half. Labrum pale, darker medially. Legs as in male. Fore wings (Fig. 79) hyaline with pattern more extensive than in male. Hind wings (Fig. 80) with some very pale brown colour.

Morphology: Length of body: 3.5 mm. Length of flagellar segments: f_1 : 0.80 mm; f_2 : 0.80 mm. Antennae fine, flagellar setae about as long as flagellar diameter, that is, setae are relatively much shorter than in male. Eyes much smaller than in male, not reaching level of vertex. IO/D: 2.2; PO: 0.8. Anterior ocellus much smaller than lateral ocelli. Epistomial suture sinuous anterior to ocellar tubercle. Measurements of hind leg: F: 0.72 mm; T: 1.56 mm; t_1 : 0.38 mm; t_2 : 0.20 mm; rt: 1.9:1; ct: 19, 0. Ctenidia small. Fore wing length: 4.1 mm; width: 1.4 mm. Fore wing (Fig. 79) similar to that of male but pterostigma a little broader, with margin both basad and distal of hind angle very slightly sinuous. Spur vein obvious. Areola postica joined to media by a short crossvein. Marginal setae as in male, between base of pterostigma and wing apex. Epiproct (Fig. 83). Subgenital plate (Fig. 81) with long, rounded posterior lobe with broad, irregular median band without pigment. Gonapophyses (Fig. 84). Sclerifications of ninth sternite (Fig. 82).

Material Examined: SOUTH AUSTRALIA. ♂ (holotype), ♀ (allotype), 20 km SE Port Augusta, Horrocks Pass, 17.vi.1979, G. A. Holloway. Paratypes: 1 ♀, Mt. Ohlssen Bragge, Wilpena Pound, 18.v.1981, G. and J. Holloway. 4 ♀, Germein Gorge, 20.v.1981, G. and J. Holloway.

Holotype, allotype and paratypes in the Australian Museum.

Discussion: *Tanystigma elongata* is the only species of the genus in which there are extensive wing

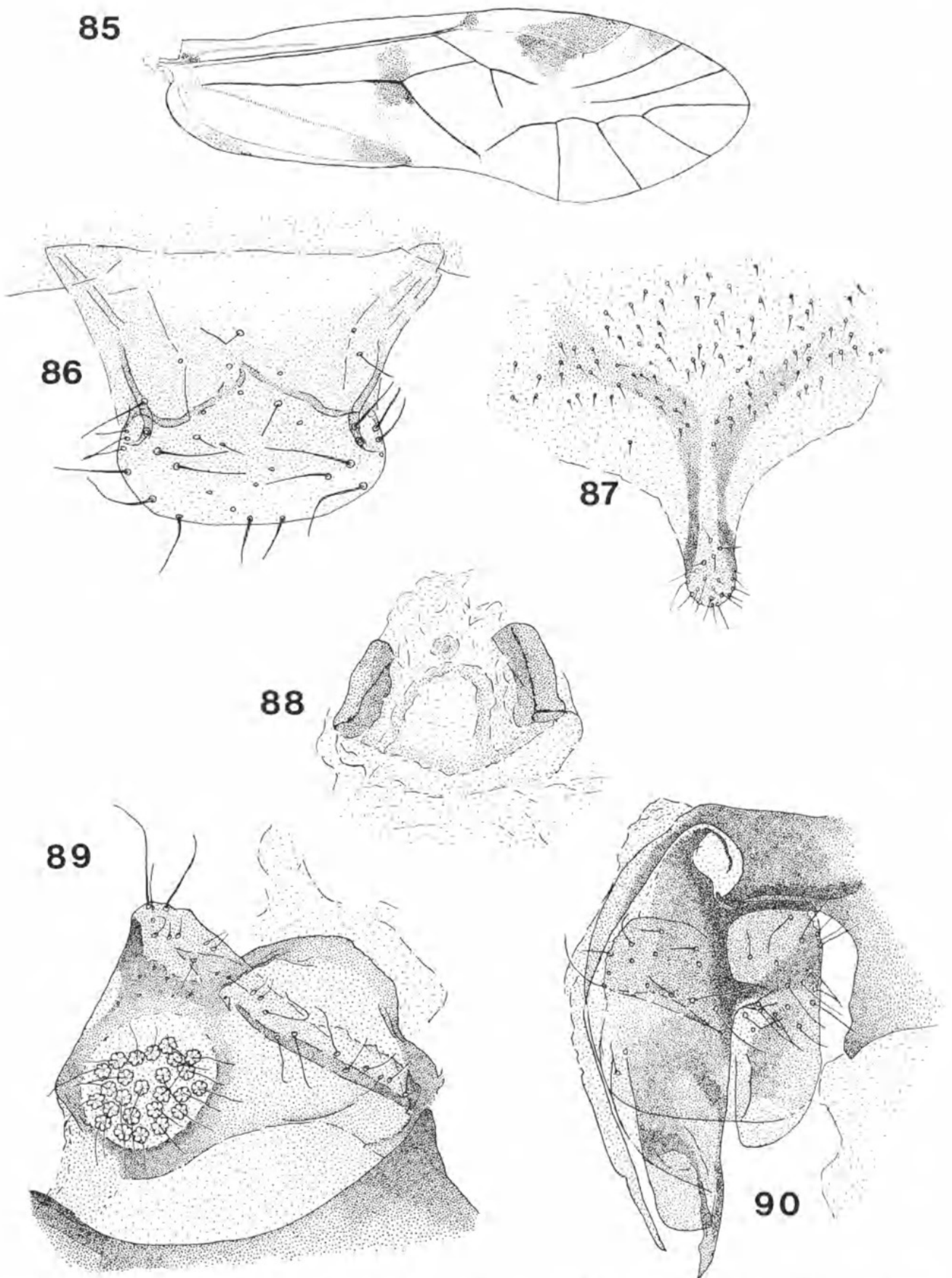
markings in cells R_1 , R_3 and R_5 , Cu_1 , Cu_2 and the discoidal cell. It is easily recognized on this feature.

Tanystigma bifurcata sp. n.

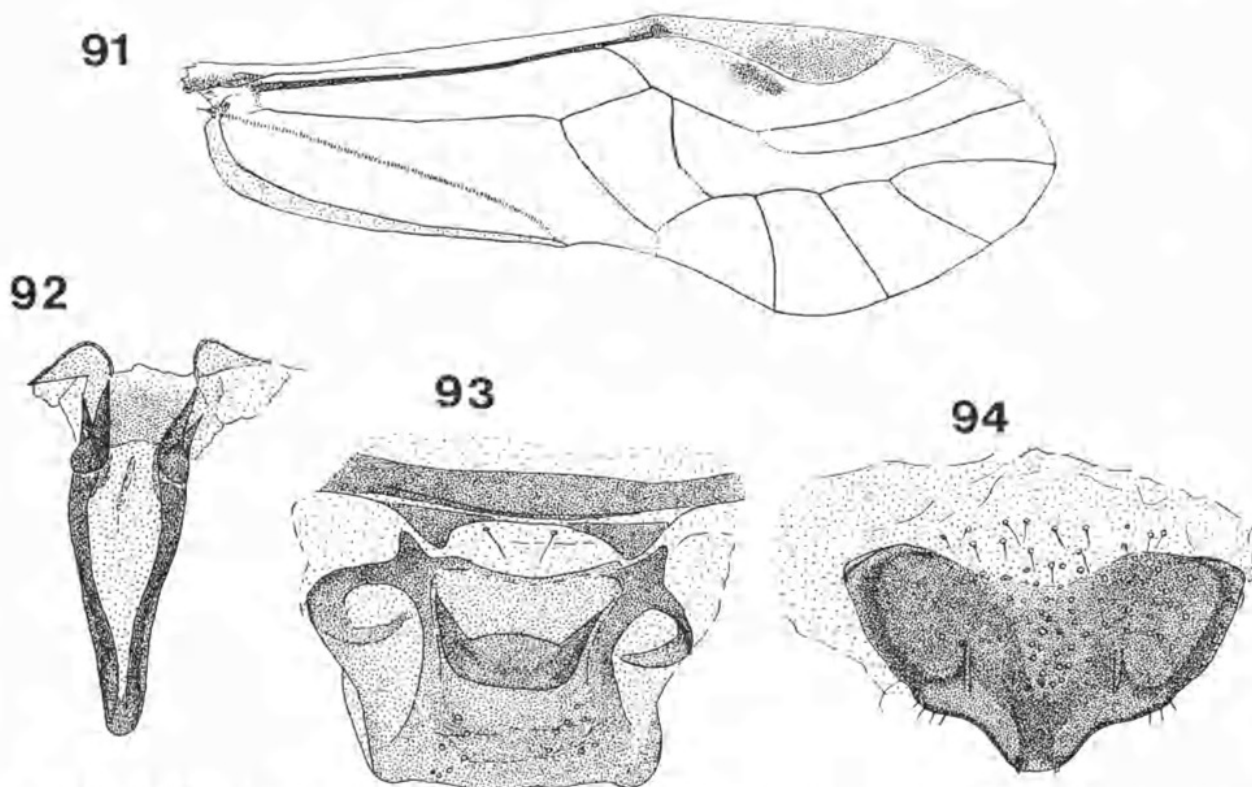
Female

Coloration (in alcohol): Head pale buff with dark brown spotting on either side of median epicranial suture, across back of vertex and adjacent to compound eyes. Area between epistomial suture and ocellar tubercle with ovoid brown mark enclosing a pale central spot. Postclypeus pale buff with fine parallel brown lines, very distinct, running forward from epistomial suture but not reaching anteclypeus. Labrum dark brown with median, anterior, semicircular pale area. Genae pale, not marked. Scape, pedicel and basal part of first flagellar segment brown, rest of antenna dark, almost black. Eyes black. Ocelli on very dark brown tubercle. First and second maxillary palp segments pale; third segment dark in basal half, dark distally; fourth segment dark brown. Mesothoracic notum dark brown with a median pale stripe; dorsal lobes with a small pale area near postero-lateral corner. Metanotum similar to mesonotum. Pleura dark brown with some paler areas. Coxae dark brown. Femora pale with some irregular brown marks and slight suggestion of preapical dark band. Tibiae pale brown. Tarsi brown. Fore wings (Fig. 85) hyaline with brown markings. Hind wings hyaline, with faint brownish patch behind distal end of Cu_2 .

Morphology: Length of body: 3.5 mm. Head with well rounded vertex. Median epicranial suture very distinct. Postclypeus fairly bulbous. Lengths of flagellar segments: f_1 : 0.64 mm; f_2 : 0.52 mm. Eyes fairly large. IO/D: 1.1; PO: 0.80. Lateral ocelli very large, anterior ocellus small. Measurements of hind leg: F: 0.66 mm; T: 1.44 mm; t_1 : 0.36 mm; t_2 : 0.16 mm; rt: 2.3:1; ct: 18, 1. Fore wing length: 4.1 mm; width: 1.40 mm. Subcosta well developed basally, straight, becoming evanescent in costal cell. Stigmopophysis well developed, dome shaped. R_1 beyond stigmopophysis fine, i.e. hind margin of pterostigma fine. Spur vein very small. Postpterostigmal mark indistinct as it is of same colour as pigmented area but can be recognized by difference in texture from base to hind angle of pterostigma. R_s and M fused for a length. R_s and branches of R_s evanescent near bifurcation, M between R_s and Cu_{1+2} strongly curved to give a concave outer margin to discoidal cell. Hind wing length: 3.2 mm; width: 1.0 mm. Sc evanescent in costal cell. R_s and M fused for a length. Wing margin between R_{2+3} and R_{4+5} with twelve well developed but short setae. Epiproct (Fig. 86). Paraproct (Fig. 89). Subgenital plate (Fig. 87). Gonapophyses (Fig. 90). Sclerifications of ninth sternite (Fig. 88).



FIGS. 85-90. *Tanystigma bifurcata* sp. n. 85. ♀ Fore wing. 86. ♀ Epiproct. 87. Subgenital plate. 88. ♀ Ninth sternite. 89. ♀ Paraproct. 90. Gonapophyses.



FIGS. 91-94. *Tanystigma bifurcata* sp. n. 91. ♂ Fore wing. 92. Phallosome. 93. ♂ Epiproct. 94. Hypandrium.

Male

Coloration (in alcohol): Body coloration as female. Fore wings (Fig. 91) hyaline. Hind wings hyaline without brownish area behind Cu_2 .

Morphology: Postclypeus not as bulbous as in female. Length of flagellar segments: f_1 : 0.80 mm; f_2 : 0.64 mm. Eyes very large, reaching just above level of vertex, IO/D: 1.0; PO: 0.94. Ocellar tubercle very well developed. Measurements of hind leg: F: 0.72 mm; T: 1.72 mm; t_1 : 0.44 mm; t_2 : 0.18 mm; rt: 2.4:1; ct: 18, 4. Legs long and thin. Fore wing length: 4.2 mm; width: 1.5 mm. Fore wing with indistinct pterostigmal spurvein but postpterostigmal mark well developed. M distad of separation from R_s strongly curved to give concave discoidal cell. Hind wing length: 3.1 mm; width: 1.1 mm. A few fine marginal setae between R_{2+3} and R_{4+5} . Epiproct (Fig. 93). Hind margin of ninth tergite well sclerotized with two small projections against which the epiproct articulates. Latero-ventral margin of ninth tergite on each side ends in a rounded apophysis. Hypandrium (Fig. 94). Phallosome (Fig. 92).

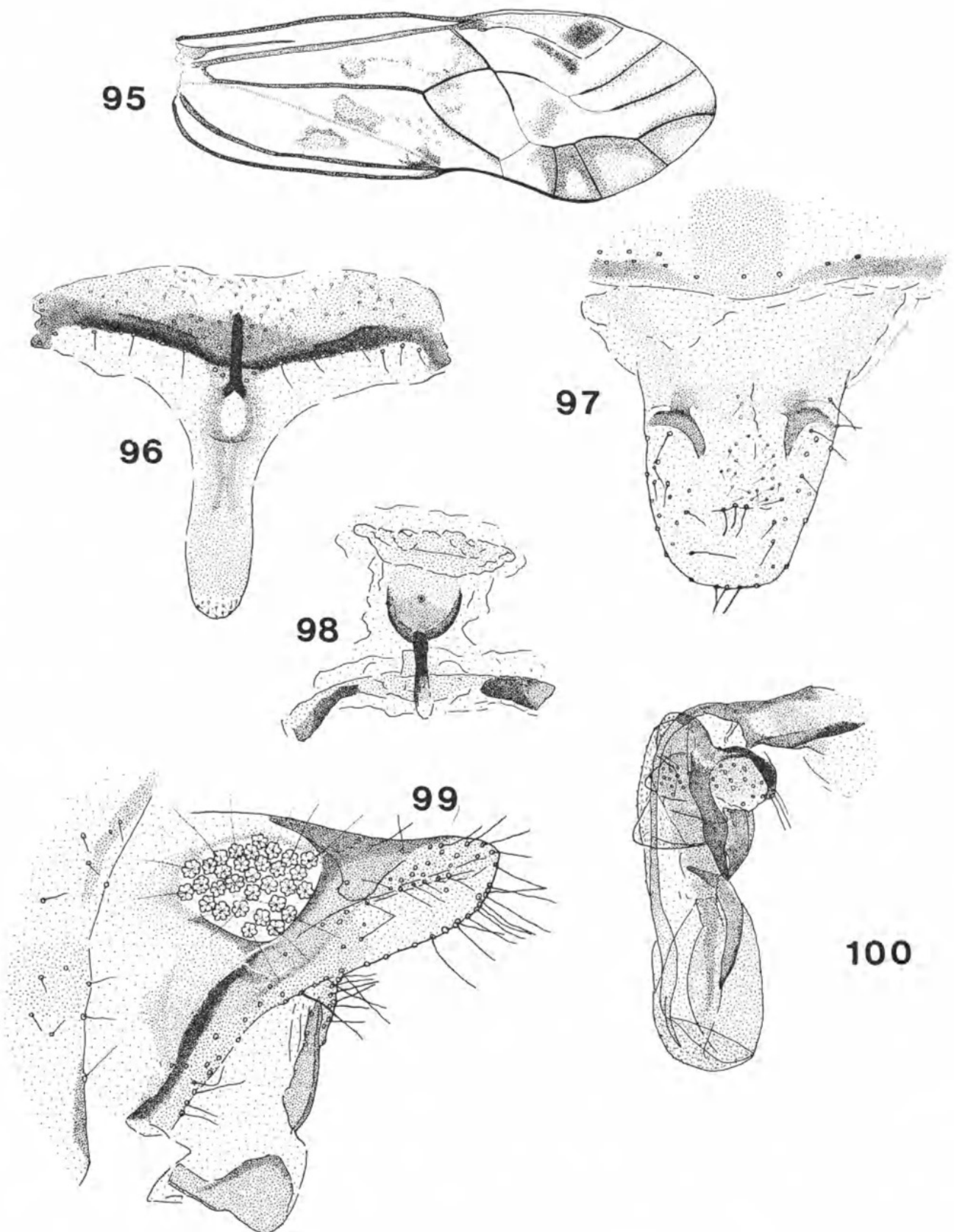
Material Examined: SOUTH AUSTRALIA. ♀ (holotype), ♂ (allotype), 18 km S Port Pirie, 7.v.1980, G. and J. Holloway. Paratypes: 7 ♀, 7 ♂, as holotype. 1 ♂, 1 ♀, 15 km N Port Broughton, 7.v.1980, G. and J. Holloway. 1 ♀, 4 km E Pinnaroo, 14.v.1980, G. and J. Holloway. 1 ♀, Alligator Gorge Rd., near Mt. Remarkable, Flinders Range, 17.vi.1979, G. A.

Holloway, 1 ♂, Overland Corner, 15.vi.1979, G. A. Holloway.

Holotypes, allotype and paratypes in Australian Museum.

Discussion: *Tanystigma bifurcata* is very similar to *Psocidus notialis* Smithers, described from Western Australia. In both species the pterostigmal spurvein is very small, the hypandrium is symmetrical and somewhat bilobed and the phallosome has apically divided external parameres. In all other species of *Tanystigma* the external parameres are not so divided. The female genitalia differ in details from those of other species of *Tanystigma* and the extent of wing marking is considerably greater than in females of *Ps. notialis*, *T. paulum* (Smithers) and *T. tardipes* (Edwards). It is similar to that of *T. dubium* (New) but that species lacks the dark mark at the wing margin in cell R_1 . *Ps. notialis* was not placed in *Tanystigma* when the latter genus was erected because of the bifurcation of the external parameres and the very small pterostigmal spurvein in both sexes. The discovery of *T. bifurcata*, however, indicates the inclusion of both in *Tanystigma*.

T. notialis (Smithers) *comb. nov.* and *T. bifurcata* do stand apart somewhat from the other species of the genus in having apically divided external parameres. They differ from each other in that *T. bifurcata* has a longer phallosome and the wing markings are less extensive in female *T. notialis* than they are in *T. bifurcata*. The statement made by me



FIGS 95-100, *Psocidus mouldsi* sp. n. 95. ♀ Fore wing. 96. Subgenital plate. 97. ♀ Epiproct. 98. ♀ Ninth sternite. 99. ♀ Paraproct. 100. Gonapophyses.

(Smithers, 1972) that "... *Ps. notialis* will probably be found to be congeneric with ...". *Clematostigma tardipes* Edwards and *C. maculiceps* Enderlein has not been supported by subsequent study of material of *C. maculiceps* (Smithers, 1983).

***Psocidus mouldsi* sp. n.**

Female

Coloration (in alcohol): The colour pattern of this species is very similar to that of the males of *Blaste angusta*, described above. The spotting on the head is finer and the spots quite discrete and the ovoid mark anterior to the ocellar triangle is very conspicuous. The terminal structures of the abdomen are dark, the subgenital plate being very conspicuous owing to the heavily sclerotized T-shaped area. Fore wing (Fig. 95) hyaline, marked in various shades of brown.

Morphology: Length of body: 4.0 mm. Brachypterous, fore wings not reaching end of abdomen. Lengths of flagellar segments: f_1 : 0.64 mm; f_2 : 0.52 mm. Eyes not reaching vertex level. IO/D: 3.4; PO: 0.83. Measurements of hind leg: F: 0.64 mm; T: 1.84 mm; t_1 : 0.48 mm; t_2 : 0.20; rt: 2.4:1; ct: 21, 2. Fore wing length: 3.4 mm; width: 1.3 mm. R_s and M fused for a very short length. Third median cell narrow and almost parallel sided. Hind wing length: 2.9 mm; width: 1.0 mm. R_s and M fused for a short length. Epiproct (Fig. 97) lightly sclerotized with two, small, curved sclerotized areas about half way along epiproct and midway between middle and lateral edge of epiproct. Paraproct (Fig. 99) with two internal accessory sclerites attached to paraproct by membrane (displaced in illustration). Subgenital plate (Fig. 96) with heavily sclerotized transverse bar basad of posterior lobe; posterior lobe long with unusual pattern of sclerotization and pigment, having an ovoid, less sclerotized area near base of lobe. Gonapophyses (Fig. 100) with long, acuminate ventral valve; dorsal valve broad, rounded behind, constricted at the middle and supported by longitudinal sclerifications; external valve with dorsal, well sclerotized, posteriorly directed lobe. Sclerifications of ninth sternite (Fig. 98) more complex than usual in the genus.

Male

Unknown.

Material Examined: SOUTH AUSTRALIA, ♀ (holotype), 40 km E Nullarbor, 131°15'E, 31°25'S, 29.ix.1978, M. S. and B. J. Moulds. Paratype: 1 ♀, as holotype. Holotype and paratype in the Australian Museum.

The genus *Psocidus* was erected by Pearman (1934) to hold a large assemblage of species which had been described in the genus *Psocus* Latreille

but which could not be retained in his restricted, redefinition of that genus, *Psocidus*, therefore, contains many unrelated species. With time it is hoped that they will be redistributed amongst present genera or logically placed in new genera. For the present *Psocidus* remains a "holding" genus.

The relationship of *Ps. mouldsi* and *Ps. parilla* sp. n. (described below) are not known. They both stand apart from other species of the family and it is hoped that when further material, including males, is forthcoming, their position will be clarified.

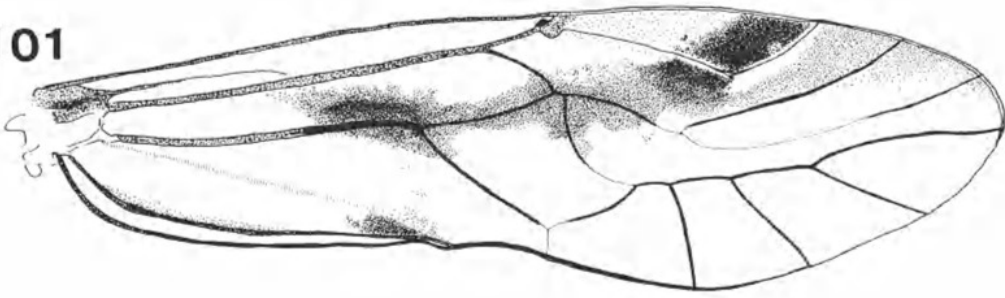
***Psocidus parilla* sp. n.**

Female

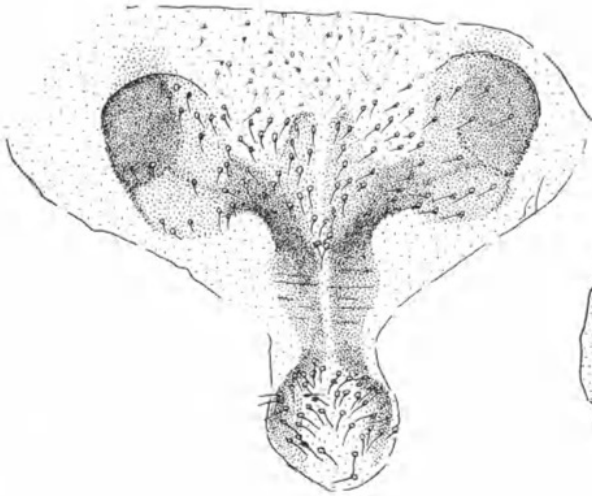
Coloration (in alcohol): Head pale grey-brown with a double row of brown, irregular, confluent spots adjacent to compound eyes, across back of vertex and on either side of median epicranial suture; an oval brown mark anterior to ocellar tubercle; tubercle brown; postclypeal striations brown; genae not marked. Labrum dark brown. Antennae almost black. Eyes black. Maxillary palp with dark third and fourth segments; first and second segments pale. Mesothoracic notum shiny dark brown with pale parapsidal furrows, pale line along postero-lateral parts of lateral lobes and hind half of mesoscutellum pale. Pleura dark shiny brown. Coxae dark brown. Femora brown, darker along anterior and posterior sides with some irregular darker dorsal marks in distal quarter. Tibiae pale brown, darker at each end. Tarsi dark brown. Fore wings (Fig. 101) hyaline with pattern in various shades of brown. Hind wings hyaline with pale brown patch in distal quarter of cell Cu_2 adjacent to vein Cu_2 but not in distal corner of cell. Abdomen pale with dorsal and lateral irregular, segmentally arranged marks. Terminal structures very dark brown.

Morphology: Median epicranial suture distinct, anterior arms evanescent. Epistomial suture sinuous in middle, curving away from ocellar triangle in middle section. Length of flagellar segments: f_1 : 0.92 mm; f_2 : 0.68 mm. Eyes fairly large. IO/D: 2.5; PO: 0.9. Ocelli large, anterior ocellus smaller than lateral ocelli. Measurements of hind leg: F: 0.84 mm; T: 1.92 mm; t_1 : 0.44 mm; t_2 : 0.14 mm; rt: 3:1; ct: 19, 3. Fore wing length: 4.7 mm; width: 1.4 mm. Fore wing (Fig. 101) with Sc ending in R about half way between wing base and base of pterostigma. R_1 basad of hind angle of pterostigma very slightly curved to give a slightly concave pterostigma, beyond apex slightly convex. R_s and M fused for a length, M and R_s and Cu_{1a} curved to give fairly strongly concave discoidal cell. Cu_{1a} fused with M for a length, Cu_{1a} sinuous basad of fusion; basal section of Cu_{1a} and apex of arcola postica at

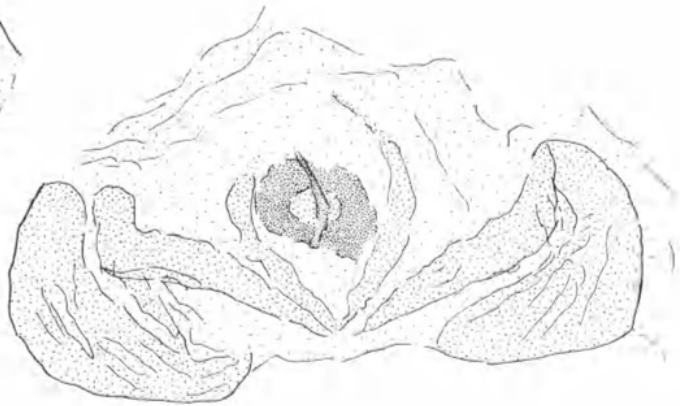
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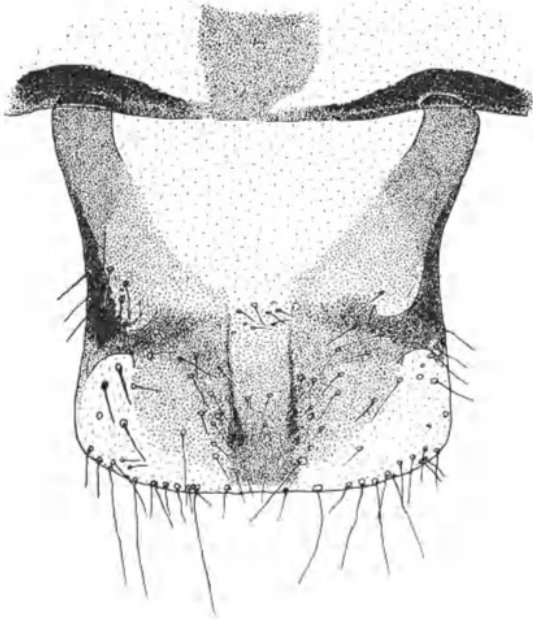
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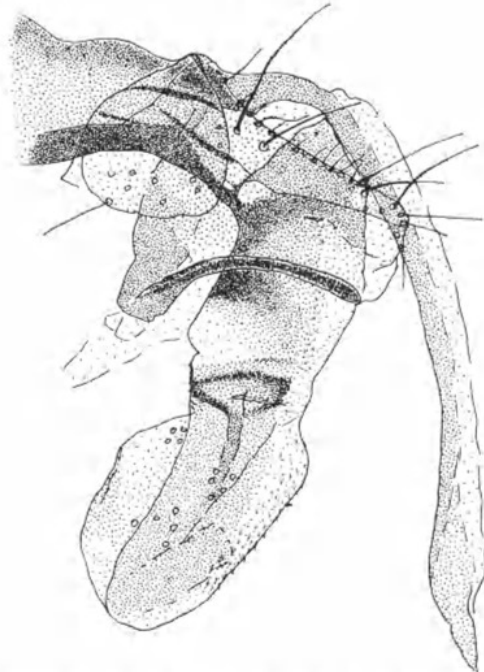
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104



105



FIGS. 101-105. *Psocidus parilla* sp. n. 101. ♀ Fore wing. 102. Subgenital plate. 103. ♀ Ninth sternite. 104. ♀ Epiproct. 105. Gonapophyses.

slight angle to one another. Fore wing glabrous. Hind wing length: 3.4 mm; width: 1.1 mm. Hind wing with Rs and M fused for a length. Costal cell near base broadened, the anterior margin slightly thickened and finely rugose in broad region. This part of costal margin would lie adjacent to a slight thickening of the hind margin of the fore wing in flight and these two structures probably assist in wing coupling. A few fine marginal setae between R_{2+3} and wing apex. Epiproct (Fig. 104). Subgenital plate (Fig. 102). Gonapophyses (Fig. 105). Sclerifications of ninth sternite (Fig. 103).

Male

Unknown.

Material Examined: SOUTH AUSTRALIA. ♀ (holotype), Pooginook, 5.vi.1979, A. Holloway. Paratypes: 2 ♀, as holotype, 2 ♀, 2 km E Parilla, 23.vi.1979, G. A. Holloway. 1 ♀, 4 km NW Murray Bridge, 22.v.1981, G. J. and A. Holloway.

Holotype and paratypes in the Australian Museum.

Discussion: See under *Psocidus mouldsi*.

Family MYOPSOCIDAE

Phlotodes australis (Brauer)

Psocus australis Brauer, 1865. *Ver. zool.-bot. Ges. Wien* 15: 908.

Psocus griseipennis McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 348.

Myopsocus griseipennis (McL.). McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.

Myopsocus novaezealandiae Kolbe, 1883. *Ent. Nachr.* 9: 145.

Psocus zelandicus Hudson, 1892. *Manual of New Zealand Entomology*, p. 107; Pl. XVI, Figs. 2, 2a.

Phlotodes griseipennis (McL.). Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910 (2): 67.

Myopsocus griseipennis (McL.) Edwards, 1950. *Pap. Proc. R. Soc. Tasm.* 1949: 104, Figs. 26-32.

Phlotodes australis (Brauer). Smithers, 1975. *Aust. ent. Mag.* 2 (4): 76.

Material Examined: SOUTH AUSTRALIA. 1 ♂ Belair, 28.ix.1935, H. Womersley.

This species has been recorded from all states except the Northern Territory.

Phlotodes hickmani (Smithers)

Myopsocus australis (Brauer). Hickman, 1934. *Pap. Proc. R. Soc. Tasm.* 1933: 85.

Myopsocus griseipennis (McL.). Edwards, 1950. *Pap. Proc. R. Soc. Tasm.* 1949: 104, Figs. 26-32.

Myopsocus hickmani Smithers, 1964. *Proc. R. ent. Soc. Lond. (B)* 33: 135.

Phlotodes hickmani (Sm.). Smithers, 1971. *J. Aust. ent. Soc.* 10 (1): 24.

Material Examined: SOUTH AUSTRALIA. 3 ♀, Morialta, 14.v.1940, H. Womersley. 6 ♀, Magill, 6.ii.1884, Tepper.

P. hickmani is known from Tasmania and Victoria.

ACKNOWLEDGEMENTS

I would like to thank Professor V. V. Hickman for material of Tasmanian species of Psocoptera for comparison with South Australian material; the several collectors who provided other material, especially Geoffrey, Janet and Andrew Holloway and Max and Barbara Moulds; Gordon Gross for arranging the loan of South Australian Museum material; the Director of the South Australian National Parks and Wildlife Service for permission for work to be done in areas under his jurisdiction; the Australian Research Grants Committee for providing funds in support of studies of the Psocoptera of the Melanesian arcs and possible source areas; and Martyn Robinson for preparing the illustrations to this paper.

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