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REVISION OF THE AUSTRALIAN BATFLIES

(Diptera: Streblidae and Nycteribiidae)[1]

By **T. C. Maa**[2]

Abstract. Results of a study of about 5,000 batflies from various parts of Australia raise the total number of species and subspecies of that Subcontinent from 20 to 33. Of these forms, 24 are at present unknown elsewhere, 9 occur also in New Guinea (3 of them even further westward) and 1, also in New Caledonia. None of the 9 genera involved is endemic and all except *Archinycteribia* are widespread over the Old World tropics and subtropics. The fauna is essentially, insofar as the batflies are concerned, an extension of the Oriental Region. It probably had established itself long before the separation of Australia from the Sunda-Papuan land mass, from which the faunal elements seem to have derived (or have had connection with) mainly via the Torres Strait. The antiquity of the fauna is evidenced partly by the high endemism and partly by the significant diversity among the numerous *Basilia* species which are parasitic largely on endemic vespertilione and nyctophiline bats. The faunal composition in the northernmost parts of the Subcontinent is markedly richer than and different from that of the southernmost, but no clear-cut dividing line between the north and south can be drawn. This paper is mainly a revision of the various taxa, but also contains discussions on zoogeography and host relationships, and remarks on the status of *Nycteribia elongata* Rudow, *N. varipes* Rudow, *N. oceanica* Speis. (nec Bigot) and *N. brevicauda* Musgr. The ♂ of *Basilia musgravei* Theod. is described for the first time; *N. spinosa* Theod. is sunk as a synonym of *N. alternata* Maa; *Trichobius parasiticus* Gerv., *Strebla vespertilionis* Fabr., *Leptocyclopodia macrura* Speis. and *Nycteribia bakeri* Scott are deleted from the Australian faunal list. For comparison, certain details, largely based upon topotypes, are illustrated for *Brachytarsina minuta* Jobl., *Br. amb. amboinensis* Rndn., *Br. amb. surcoufi* Falc., *Ascodipteron speiserianum* Muir, *Penicillidia progressa* Muir, *Nycteribia all. allotopa* Speis. and *N. par. parilis* Wk. New species and subspecies described are *Brachytarsina verecunda, Br. mackeani, Br. amboinensis uniformis, Ascodipteron archboldi, Cyclopodia s. sycophanta* (New Guinea), *C. sycophanta euronoti, Basilia techna, B. hamsmithi, B. aitkeni, B. barbarae, B. nodulata, B. transversa, Penicillidia setosala* (also New Guinea), *P. tectisentis, Nycteribia allotopa meridiana* and *N. parilis vicaria.*

Prior to 1925, the batflies or Streblidae and Nycteribiidae of Australia have hardly been collected and studied. Since then they have attracted much attention and interest from mammalogists, speleologists and parasitologists, thus resulting in a large quantity of material being collected. At present, a total of about 5000 specimens from 32 species of bats and from about 280 different localitites is found in different institutions and collections. As early as 1871, Rudow described 2 new batflies, of which the true systematic status remains uncertain. Their type localities were not recorded, but from the host data, it might be surmised that they are possibly of Australian origin. Aside from

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those dubious records, these ectoparasites were first definitely recorded and described from Australia by Speiser (1901) and Rainbow (1904), respectively. Subsequently more new species were described by Muir (1912), Musgrave (1925, 1927) and Theodor (1959, 1967), and synoptic keys including Australian forms were provided by Jobling (1951), Paramonov (1951) and Theodor (1967). Up to the present, about 230 specimens of 20 species have been recorded in literature from that Subcontinent. In this paper, the number of species and subspecies is brought up to 33 (including 15 new ones), new keys and illustrations are presented and the zoogeography and host relationships are briefly discussed. As shown by the gazetteer, maps and discussions under different species, flies from frugivorous and cave-dwelling bats have been rather adequately surveyed in the eastern coastal areas. More intensive exploration of other bats and other areas will certainly not only reveal additional interesting flies, but also fill the distributional gaps and clarify the host relationships etc. of the known forms.

Materials

During the course of this study, all existing types as well as most of the previously recorded specimens of the species here dealt with have been re-examined. Sources of fresh materials and abbreviations of the institutions and collections involved are listed below.

AM=Australian Museum, Sydney (through courtesy of C. N. Smithers).
AMNH=American Museum of Natural History, New York (J. G. Rozen Jr., H. M. Van Deusen).
ANIC=Australian National Insect Collection, Commonwealth Scientific and Industrial Research Organisation, Canberra (D. H. Colless, J. L. McKean).
Bishop=B. P. Bishop Museum, Honolulu.
BVP=B. V. Peterson collection, Ottawa.
GNV=Museo di Storia Naturale, Genova (D. Guiglia).
MCZ=Museum of Comparative Zoology, Harvard University, Cambridge, Mass. (H. E. Evans).
NMV=National Museum of Victoria, Melbourne (A. Neboiss).
NSWA=New South Wales Department of Agriculture, Rydalmere (C. E. Chadwick).
QDM=Queensland Museum, Brisbane (E. C. Dahms).
QIMR=Queensland Institute of Medical Research, Brisbane (R. Domrow).
SAM=South Australian Museum, Adelaide (P. Aitken, E. Hamilton-Smith).
SKB=Senckenbergische Naturforschende Gesellschaft Natur-Museum und Forschungs-Institut, Frankfurt-am-Main (R. zur Strassen).
SPH=University of Sydney School of Public Health and Tropical Medicine (B. Dew, B. McMillan).
UQD=University of Queensland, Brisbane (T. E. Woodward).
WAM=Western Australian Museum, Perth (L. E. Koch).

Holotypes of the new forms are deposited mainly in Australian institutions; paratypes, when available, will be distributed to institutions both in Australia and abroad. The collectors' names and dates are given in the gazetteer and are not repeated under each species.

Terminology

The terminology employed in this paper is designed only for convenience of descriptions and is largely adapted from Jobling (1951) and Theodor (1967). Most of the terms are explained in the drawings and only a few need further explanations. The notopleurite refers to the posterior part of the L-shaped plate bearing notopleural setea and lying at the side of the notum; the small tergal plate (absent in a few species) lying shortly before the ♀ anal segment is interpreted as tergite 6; the laterite 1 is that termed by Theodor as "post-spiracular sclerite," the genital deckplate is the same as "basal plate" (in Nycteribiidae) and "bogenförmiger Sklerit" (in Streblidae)[3] of Theodor, the pre- and postgenital plates are the same as "ventral" and "dorsal genital plates" of Theodor respectively. The legs are described as if they are fully stretched out and lying perpendicular to the body trunk, hence the anterior surface of leg 1 refers to its inner surface of authors, the same of leg 3 refers to the outer surface of authors, the width of the legs refers to their width in profile. The aedeagus and paramere are described from their lateral view; the clasper, from its ventral view (unless otherwise stated), thus when its apex is curved toward the dorsal surface of the insect, it is termed decurved rather than recurved. Relative measurements in keys and descriptions are all at the magnification of 50 micrometric units = 1 mm and are taken from slides selected at random. Measurements of the thoracic sternal plate, femora and tibiae, due to flattening after KOH treatment, may be slightly different from those based on alcohol-preserved specimens. The length of different tarsomeres are taken along their dorsal median line.

Drawings, Keys

Unless otherwise stated in captions, all drawings in this paper were made with the aid of a camera lucida, and each traced from a single microscopic slide (slide number given at side of drawing). Consequently, a certain degree of intraspecific variation and technical errors must be allowed. With some sclerites, such as the tergite 1 and ♂ synsternite 5+6, due to the strong convexity of their surface, it is not always possible to show the correct proportion of length vs width. The ♀ postgenital plate, particularly in *Basilia*, often lies on a vertical or nearly vertical plane. In such a case, it cannot be properly drawn from slides (unless after being separately dissected out), and is, therefore, indicated in the drawings as if it has no definable posterior margin (fig. 165, 175 etc.). On the other hand, the ♀ abdominal plates are usually so poorly demarcated from the neighboring membrane that they often have to be corrected or modified by comparison with alcohol-preserved specimens. The keys, all except that to nycteribiid genera, are designed to facilitate determinations as well as to show phylogenetic affinities of the taxa involved. Internal genitalic characters, for practical reasons, are avoided as far as possible. To ensure certainty of determinations and to save unnecessary redescriptions of known forms, 2 or more characters are employed in each couplet. Generally the

3. As mentioned by Theodor (1954, *In* E. Lindner, Die Flieg. d. pal. Reg. **66b**: 3), the homology of this plate in Streblidae is uncertain. It is somewhat ribbon-like, curved in profile, lies at the left side of the insect and bridges the anus to the base of the left paramere.

most convenient or most conspicuous (not necessarily the most fundamental) one is placed at the beginning of a couplet.

Table 1. Preferred hosts, extralimital distribution etc. of Australian batflies.

Species	Specimens previously recorded	New material examined ♂	♀	Preferred hosts	Extralimital distribution
Brachytarsina verecunda n. sp.	4	62	51	*Rhinolophus*	
Br. mackeani n. sp.	—	3	—	*Hipposideros*	
Br. amboinensis uniformis n. ssp.	2±	137	173	*Miniopterus*	
Raymondia sp.	—	2	3	*Rhinolophus*	
Ascodipteron archboldi n. sp.	—	—	10	*Hipposideros*	
As. australiense Muir	1	—	10	*Miniopterus*	
Cyclopodia albertisii Rndn.	76+	195	160	*Pteropus*	New Guinea, Palau Is., Kei Is., Goram
C. australis Theod.	15	324	243	*Pteropus*	
C. sycophanta euronoti n. ssp.	—	3	4	*Syconycteris*	
Archinycteribia actena Speis.	—	4	1	*Dobsonia*	New Guinea etc.
Basilia techna n. sp.	—	15	15	*Taphozous*	
B. longispinosa Musgr.	8	2	8	*Nycticeius*	
B. multispinosa Musgr.	11	18	12	*Pipistrellus*	
B. hamsmithi n. sp.	—	13	23	*Myotis*	
B. aitkeni n. sp.	—	2	6	*Nycticeius*	
B. barbarae n. sp.	7	33	42	*Vespadelus*	
B. falcozi Musgr.	36	24	22	*Chalinolobus*	
B. halei Musgr.	7	14	20	(?) *Vespadelus*	
B. nodulata n. sp.	—	1	—	? ?	
B. brevicauda Musgr.	3	13	22	*Nyctophilus*	
B. musgravei Theod.	3	52	75	*Vespadelus*	
B. troughtoni Musgr.	16	18	37	*Chalinolobus*	
B. burrelli Musgr.	2	6	5	*Chalinolobus*	
B. transversa n. sp.	—	—	1	(?) *Vespadelus*	
Penicillidia oceanica Bigot	17	500	494	*Miniopterus*	New Caledonia
P. setosala n. sp.	—	2	6	*Miniopterus*	New Guinea
P. tectisentis n. sp.	—	64	54	*Miniopterus*	
P. vandeuseni Maa	1	96	98	*Miniopterus*	New Guinea
Phthiridium torresi Theod.	2	—	—	*Hipposideros*	New Guinea
Ph. curvatum Theod.	1	53	34	*Rhinolophus*	New Guinea
Nycteribia allotopa meridiana n. ssp.	—	8	13	*Miniopterus*	
N. parilis vicaria n. ssp.	19	473	477	*Miniopterus*	
[*N. bakeri* Scott	1	—	—	*Miniopterus*	New Hebrides]
N. alternata Maa	13—	345	336	*Miniopterus*	New Guinea
Total	245±	2482	2454		

Note: For *Cyclopodia albertisii*, few previous records did not give the exact number of specimens; for *Nycteribia alternata* there were apparently a few repeated records based on the same specimens; and for *Brachytarsina amboinensis uniformis*, some records were repetitious while others did not give exact numbers of specimens involved.

Bibliographies

For brevity, the bibliography under each species or subspecies is complete only for Australian records. The bibliography at end of this article is arranged chronologically in order to demonstrate historical trends of studies in Australian batflies. All articles included, with exception of those by Ratcliffe (1931), Bearup & Lawrence (1947), Hughes (1960) and Domrow (1958, 1961, 1963), are devoted to taxonomy.

Family **STREBLIDAE** Kolenati 1863

In addition to the genera and species enumerated below, Speiser (1902 b: 338) listed 1 specimen each of *Strebla vespertilionis* Fabricius (Streblinae) and *Trichobius parasiticus* Gervais (Trichobiinae), labelled "Australia 1880", in the Hungarian Nat. Mus. As pointed out by him, these 2 specimens must have been mislabelled. These subfamilies, genera and species are confined to the New World and have to be deleted from the Australian faunal list.

Key to Australian Genera of Streblidae

1. Wing-veins all well sclerotized and pigmented, marginal areas of wings with a number of setulae (microtrichia); tarsomeres 1-4 together about as long as 5 which is markedly enlarged and triangular in outline; body always normal, free-moving, ectoparasitic and with non-caducous wings in both sexes, ♂ thorax, ♀ labial theca and labella all normal; sexual dimorphism inconspicuous except in abdomen. Nycteriboscinae 2

   Wing-veins very weakly sclerotized or represented by faint colorless concave or convex lines, no setulae on wing-membrane; tarsomeres 1-5 all slender, similar to one another in length and shape; body either maggot-like, wingless, practically legless, invaginated entirely in a pouch formed by basal abdominal membrane and encysted in tissues of host, *or*, when with fully developed wings-legs and free-moving, then ♂ thorax strongly compressed bilaterally, ♀ labial theca enormously enlarged, as long as or longer than thorax, ♀ labella modified into strongly toothed blades; sexual dimorphism exceedingly strong in head and thorax as well as abdomen. Ascodipterinae.....**Ascodipteron**

2. Head capsule in dorsal view as long as wide and only 1/3 as wide as thorax; postvertex and eyes present; humeral area broadly rounded, humeral callus indistinct; surface of mesepisternum convex, evenly covered with setae of varied length; vein R_1 as slender as R_{2+3}, latter distinctly curved at apex, alula well developed, with 15± marginal setae; mesosternum anteriorly roundly produced at middle, metasternum about as long as wide, its anterior margin forming 90° angle at middle.....**Brachytarsina**

   Head capsule in dorsal view clearly transverse, ca 2/3 as wide as thorax; postvertex and eyes absent; humeral area angulately produced, forming distinct humeral callus; surface of mesepisternum depressed, largely bare, modified for reception of femur 1 in repose; vein R_1 ca 2× as wide as R_{2+3}, latter not curved at apex, alula poorly developed, at most with 1 apical seta; mesosternum anteriorly angulately produced submedially, metasternum ca 1/2 as long as wide, its anterior margin forming 135° angle at middle.....**Raymondia**

Genus **Brachytarsina** Macquart 1851

This genus is related to, and is similar in wing venation and tarsal structure to *Raymondia*. In addition to the characters mentioned in the key, it differs from the latter

genus in having the body more richly setose, the head capsule convex dorsally and ventrally, no concavities on the head and mesepisternum for the reception of coxae 1 and femora 1 respectively, the antennal arista with few branches at apical 1/2 or 1/3, the thorax almost spherical, veins R_1 and R_{+3} distinctly curved.

The genus is widespread in warmer parts of the Old World, containing about 30 described species which may be placed in 5 species-groups, each more or less confined to a certain family of bats. The Australian forms fall into 2 groups which are characterized in the key, couplet 1.

Key to Australian Brachytarsina Species

1. Head capsule in dorsal view triangular, strongly narrowed posteriorly; upper 2/3 of mesepisternum with similar setae as on mesepimerum; width of scutum distinctly less than distance from anterior prescutal to posterior scutellar margin; dorsal tibial setae as long as or longer than profile tibial width; lateral margin of metasternum about as long as trochanter 2; dorsal connexivum of abdomen laterally fenced by 3-5 columns of bristles, interspace of laterite 2 and sternite 2 bare, ♂ surstylus ca 2 × as long as wide, ♀ sternite 10 with 3 rows of ordinary setae, no spines. Group Amboinensis; on *Miniopterus* bats....**amboinensis uniformis**

   Head capsule in dorsal view posteriorly rotundate, hardly narrowed; mesepisternum clearly more weakly setose than mesepimerum, largely covered with very short fine setae, only 1-2 columns of long ones arranged on and near upper margin; width of scutum subequal to distance from anterior prescutal to posterior scutellar margin; dorsal tibial setae only 1/3 to 1/2 as long as profile tibial width; lateral margin of metasternum only 1/2 as long as trochanter 2; dorsal connexivum of abdomen laterally fenced by single column of bristles, interspace of laterite 2 and sternite 2 richly setose, ♂ surstylus shorter than wide. ♀ sternite 10 with 2 rows of ordinary setae plus 4-7 rows of short spines. Group Minuta; on rhinolophid bats.....2

2. Wing (fig. 11) with only few setulae on apical cells, veins R_{4+5} and M_{1+2} hardly divergent at apices; anterior mesosternal lobe narrow; dorsal surface of femur 3 with 2 columns of outstandingly robust macrosetae; postvertex (fig. 8) at most 1.5 as long as wide; aedeagus plus its apodeme (fig. 16) ca 3/4 as long as wing; ♀ unknown (but in the very closely related species from New Guinea, ventral connexivum with pair of anterolateral patches of outstandingly long setae, lateral connexivum with patch of very short spines near middle). On *Hipposideros*.....**mackeani**

   Wing (fig. 4) with fairly numerous setulae on apical cells, veins R_{4+5} and M_{1+2} distinctly divergent at apices; anterior mesosternal lobe wide; dorsal surface of femur 3 with 3–4 columns of moderately robust macrosetae; postvertex (fig. 1) ca 2 x as long as wide in dorsocaudal view of head; aedeagus plus its apodeme (fig. 13) hardly more than 1/2 as long as wing; ♀ ventral and lateral connexiva lacking such patches of long setae and short spines. On *Rhinolophus*.....**verecunda**

Brachytarsina verecunda Maa, new species Fig. 1–7, 12–14.

Nycteribosca minuta (misidentifications, nec Jobl., 1934): Jobl., 1936: 178, rec. — Jobl. (pt.) 1951: 236, key. — Param. (pt.), 1951· 760, key, rec.

Previous Records. 2 specim. (Jobl. 1936), ex *Rhinolophus megaphyllus*, Cape York. 1 ♂, 1 ♀ (Param. 1951), no host, Myola.

New Material. 62 ♂♂, 51 ♀♀. Holotype ♀ in Aust. Nat. Ins. Colln.

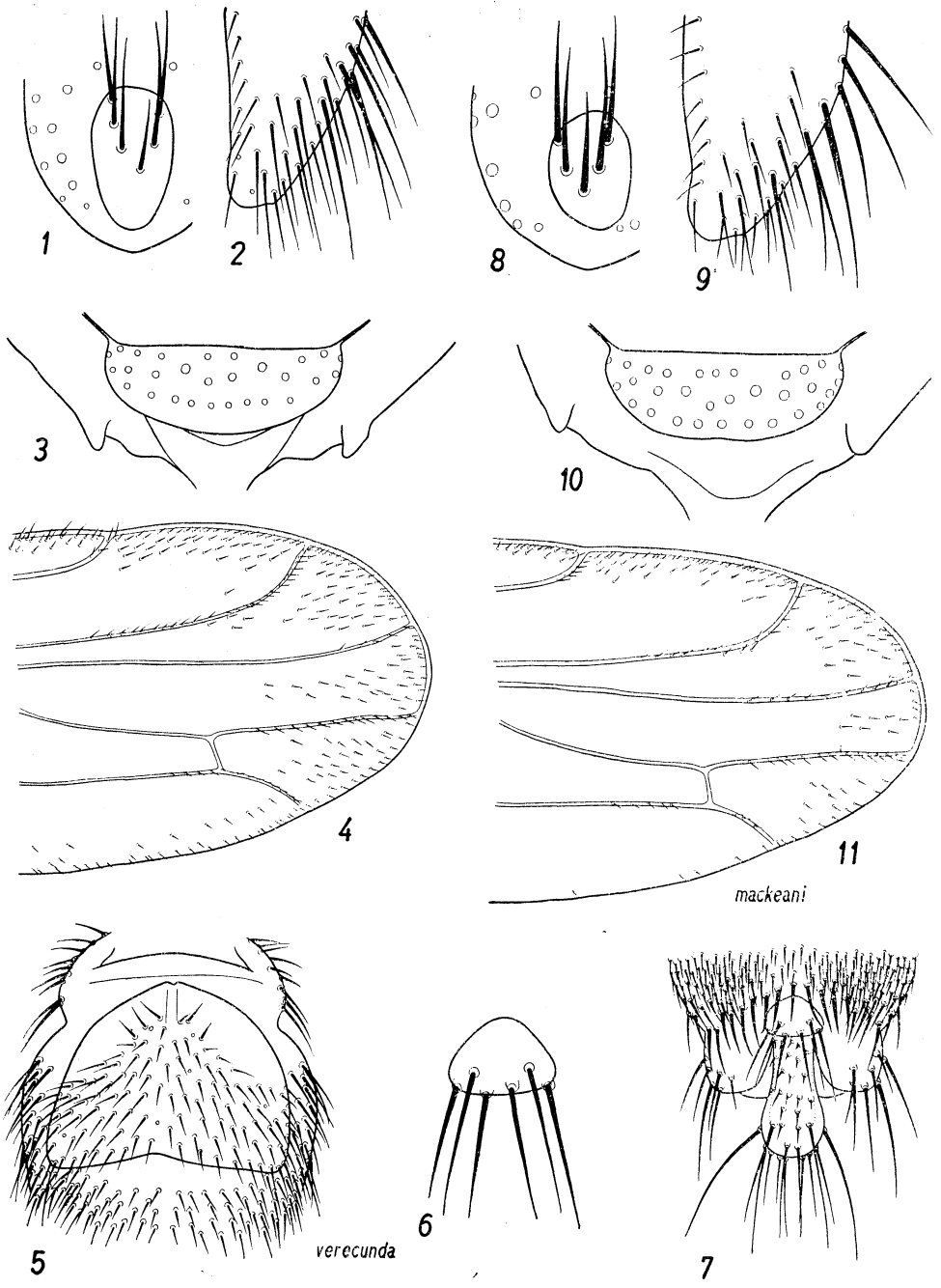


Fig. 1-11. *Brachytarsina.* ♂ Postvertices and vicinities (1, 8), apices of ♂ femora 1, posterior surface (2, 9), ♂ scutella and vicinities (3, 10), ♂ wing-apices (4, 11), ♀ abdominal base, ventral view (5), ♀ sternite 7 (6), ♀ abdominal apex, ventral view (7). Fig. 1-7, *Br. verecunda* n. sp., slides ♯ 1165 (♂) and 1166 (♀); fig. 8-11, *Br. mackeani* n. sp., slide ♯ 1167. Each figure drawn to same scale as its counterpart.

Ex *Rhinolophus megaphyllus:* 60 ♂♂, 45 ♀♀, in 19 lots, Ashford Cave, Bonalbo Colliery, Bullio Cave, Cliefden, Cooktown, Drum Cave, Humidicrib Cave, Iron Range, Rivertree, Rockhampton, S. Johnston Stn., Tanja Gold Mine, Temagog Cave, Timor Caves, Wee Jasper, Willi-Willi Cave.

Ex "bat" 2 ♂♂, 6 ♀♀, Dayboro, Eacham Lake, Long I., Myola, Woolooga.

HABITAT. A cave-dwelling species. Evidently confined to *Rhinolophus megaphyllus* (Rhinolophidae: Rhinolophinae); widely spread over tropical and subtropical zones of the Subcontinent, at present known from Queensland (Cooktown, Dayboro, Eacham Lake, Iron Range, Long I., Myola, S. Johnston Stn., Woolooga) and New South Wales (Ashford Cave, Bonalbo, Cliefden, Drum Cave, Humidicrib Cave, Rivertree, Tanja Gold Mine, Temagog Cave, Timor Caves, Wee Jasper, Willi-Willi Cave). The southernmost record is from near Bega (ca 36° 40′ S). This is further south than *Br. amboinensis uniformis* n. ssp. is found.

AFFINITIES. This species is chiefly characterized by the chaetotaxy on the ♀ lateral connexivum and the shape of ♀ sternite 10. For convenience, it may be recognized by the unusually long postvertex, relatively more numerous wing-setulae in combination with relatively slender setae on laterovertex and dorsal surface of femora. Differences from true *minuta* Jobl. (Solomon Is.) (fig. 18-19) are, in addition to the aforementioned, body size slightly larger, veins R_{4+5} apically distinctly divergent from M_{1+2}, aedeagus and parameres longer, hindmost-row spines on ♀ ventral connexivum much weaker. Differences from *mackeani* are given in the key. The name *verecunda* (Latin, modest, shy) refers to the concealed diagnostic criteria (postvertex, lateral connexivum, sternite 10) which are hardly observable in shrivelled specimens.

Description. ***Body*** (in alcohol) ca 2.2 mm long. ***Head*** with less robust setae than in ***mackeani.*** Postvertex (fig. 1) oboval, fairly large, ca 3 × as long as wide in dorsocaudal view of head, anterior 1/2 with 5± setae, posterior 1/2 bare, lying on posterior slope of head and not meeting occipital margin which is very deeply notched at middle, somewhat in V-shape. Labial theca slightly longer than wide, widest near base, lateral margin gently curved. ***Thorax*** slightly shorter than wide (33× 38, length measured from anterior prescutal to posterior scutellar margin). Setae on lower 1/2 of mesepisternum and on metasternum as dense as but very slightly stouter and darker than those on mesosternum; setae along upper margin of mesepisternum almost even in length, slightly less robust than those on mesepimerum. Relative lengths of prescutum, scutum and scutellum 17: 10.5: 5.5; scutellum (fig. 3) posteriorly evenly broadly rounded. Thoracic squama conical, similar in shape in dorsal and lateral views. Anterior mesosternal lobe broader than in ***mackeani.*** Wing (fig. 4) 1.9-2.3 mm long, vein R_{4+5} apically distinctly divergent from M_{1+2}, wing-setulae fairly extensive, alula subacute at apex. ***Legs:*** Apical 1/3 of anterior surface of femur 1 (fig. 2) with fairly stout setae, dorsal surface of femur 3 with 3-4 columns of macrosetae which are only slightly longer, stouter than other dorsal setae. ***Abdomen*** of ♂ (fig. 12) with only 1 column of moderately fine long setae below bristle-fence on each side. Genitalia (fig. 13-14) moderately long, right paramere more curved and left paramere blunter at apex than in ***mackeani,*** aedeagus plus its apodeme 1.16 mm long (i.e., only ca 1/2 as long as wing). ***Abdomen*** of ♀ (fig. 5-7): Sternite 2 as figured, sternite 7 triangular, with 2 and 4 setae in 2 rows, sternite 10 gently widened apicad, with 2 rows of setae and 5-7 rows of short spines. Proctiger elongate, widest near midlength, lateral margin gently curved. Hindmost-row spines on ventral connexivum moderately robust, straight in ventral view, decurved at apices, several times as long as those of anterior rows; setae on anterior part of lateral connexivum more than 2 × as long as on sternite 2 and gradually becoming shorter on approaching abdominal apex; setae on ventral

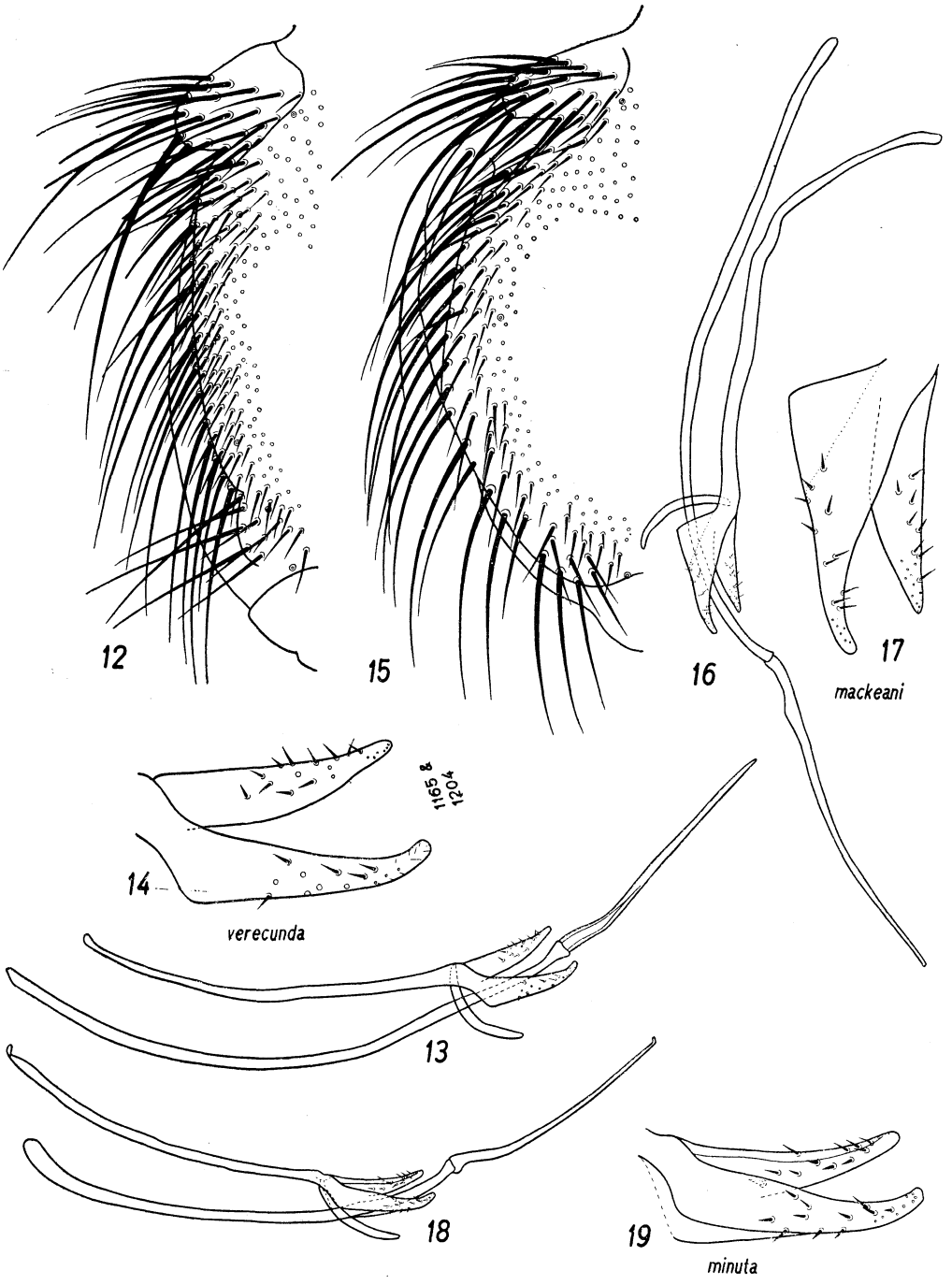


Fig. 12-19. *Brachytarsina,* ♂ ♂ Abdomens, lateral view (12, 15), genitalia (13, 16, 18), parameres, more enlarged (14, 17, 19). Fig. 12-14, *Br. verecunda* n. sp., slide ♀ 1165; fig. 15-17, *Br. mackeani* n. sp., slide ♀ 1167; fig. 18-19, *Br. minuta* Jobl., Solomon Is.: Malaita, Dala, ex *Hipposideros* sp., slide ♀1199. Each figure drawn to same scale as its counterpart.

connexivum, except those of hindmost row, all about as long and fine as on sternite 2. Other characters as in *mackeani*.

Brachytarsina mackeani Maa, new species Fig. 8-11, 15-17.

MATERIAL. 2 ♂♂ including holotype, ex *Hipposideros diadema*, Lankelly Ck.; 1 ♂, same host, Kuranda. Holotype in Aust. Mus., Sydney.

HABITAT. Most probably confined to *Hipposideros* (Rhinolophidae: Hipposiderinae) and to northern Australia. In New Guinea, *H. diadema* is parasitized by a closely related but obviously different undescribed species.

AFFINITIES. This species is probably one of the largest and most outstanding of the Group Minuta. Insofar as the ♂ sex is concerned, the criterion for its recognition is with the unusually long aedeagus. Less important characters are the shape of postvertex, scutellum, mesosternum and thoracic squama, the distribution of wing-setulae, the apical divergence of veins R_{4+5} and M_{1+2}, the chaetotaxy of femora etc. The species is named after Mr John L. McKean of Canberra with the spelling *Mc* changed to *Mac* following Int. Code Zool. Nomen., Recommendation D 21 (a).

Description. *Body* (in alcohol) 2.2 mm long. *Head* not darker than other parts of body, in dorsal view weakly narrowed caudad, in lateral view distinctly shorter than high and with posterior part hardly more raised than anterior part. Eye prominent, very small. Mediovertex narrow; postvertex (fig. 8) fairly large, ca 1.5 as long as wide, with 3-6 setae, posteriorly not strongly sloping downward and not meeting occipital margin which is moderately notched at middle; laterovertex with strong setae. Postgena rather uniformly covered with fine small setae on surface and with fairly strong ones on margins; occiput with few small setae. Arista less than 1/2 as long as head, apical 1/2 with few branches. Labial theca hardly longer than wide, (in contracted or shrivelled specimens, often much longer than wide), widest near base, gradually narrowed apicad, lateral margin gently curved; labella very short. *Thorax* shorter than wide, 33×40 (length measured from anterior prescutal to posterior scutellar margin), evenly covered with setae of varied length and robustness, 1 pair of outstandingly long erect setae on prescutum near its anterior margin, 1 pair of such setae on scutum and 2 pairs on scutellum. Setae on lower 3/4 of mesepisternum as short, fine and pale as those on meso- and metasterna and distinctly shorter and finer than on mesepimerum; setea on upper margin (posterior 1/2) and posterior margin (upper 1/2) of mesepisternum distinctly longer, more erect and more robust than elsewhere on that sclerite and about as long and robust as on mesepimerum; setae on mesosternum similar in density, length and robustness to those on metasternum. Relative lengths of prescutum, scutum and scutellum 17.5: 10: 5.5; prescutum anteriorly gently emarginate at middle, scutum posteriorly gently descending, lacking deep transverse groove immediately before posterior margin; scutellum (fig. 10) short, median 1/3 of its posterior margin almost straight, surface moderately convex, with 3, sometimes 4, rows of setae, 2nd row containing afore-mentioned 2 pairs of outstandingly long erect setae. Thoracic squama conical, broader and apically blunter in dorsal than in lateral view; calypter with 7 ± setae in 2 rows. Anterior mesosternal lobe narrow, not notched at middle; lateral margin of metasternum strongly curved, shorter than 1/2 of trochanter 2. *Wing* (fig. 11) 2.2-2.5 mm long, with few setulae on surface, veins R_1 and R_{2+3} both distinctly curved toward C at apices, R_{4+5} and M_{1+2} weakly divergent to each other on approaching wing-margin, 1st abscissa of M_{1+2} straight or very weakly curved, 2 × as long as *rm*, alula narrowly rounded at apex. *Legs* moderately robust; femora moderately richly setose, anterior surface of femur 1 (fig. 9) with fine setae at apical 1/3, bare at basal 2/3, dorsal surface of femur 3 with 9 ± macrosetae which are distinctly longer and heavier than other dorsal setae and are arranged in 2 columns, with only 1-2 minor setae lined between these 2 columns; dorsal setae of tibia 3 ca 1/3 as long as profile tibial

width; tarsomere 5 of hindleg slightly shorter than wide, apical margin with 2 pairs of major setae, those of inner pair much heavier than and ca 1.5 as long as of outer pair. *Abdomen* of ♂ (fig. 15) typical for the genus; dorsal connexivum fenced by single column of bristles on each side; sternite 2 with uniform short fine setae on surface, anterolateral area bare, posterolateral marginal and submarginal setae longer, heavier than discal ones which are hardly longer in average than on ventral connexivum. Lateral connexivum with few long setae near sternite 2 and immediately below aforementioned bristle-fence of dorsal connexivum, elsewhere (including interspace between laterite 2 and sternite 2) uniformly covered with short fine setae similar to these on ventral connexivum. Pygidium in lateral view ca 1.5 as long as high, with rather sparse slender setae; surstylus slightly shorter than wide, with 3 setae. Genitalia (fig. 16-17) very long; right paramere weakly curved, blunt at apex; left one straight, acute at apex; aedeagus plus its apodeme 1.45 mm long, i.e., nearly 3/4 as long as wing. ♀ unknown.

Brachytarsina amboinensis uniformis Maa, new subspecies Fig. 20-25.

Nycteribosca amboinensis (misidentifications, s. str., nec Rondani): Kess., 1925: 24, rec. — Jobl., 1951: 233, key, rec. — Param., 1951: 760, key, rec.

Previous Records. Unnumbered specim. (Kess. 1925), ex *Miniopterus schreibersii*, "Queensland"; 1 specim. (Jobl. 1951), ex *M. schreibersii*, Chillagoe. 2 specim. (Param. 1951), no host, Biloela. Jobling (1951: 235) mentioned that it has been previously recorded from Myall Lakes, ex *M. schreibersii* but I can not find earlier reference for that record.

New Material. 137 ♂♂, 173 ♀♀. Holotype ♀, Possession I., in Aust. Mus., Sydney.

Ex *Miniopterus:* 101 ♂♂, 141 ♀♀, in 49 lots, Mt Amos, Ashford Cave, Avalon, Back Ck. Mine, Bamaga, Bannockburn Oval, Belfery Cave, Bonalbo Colliery, Bramston Beach, Canungra, Carrai Cave, Chillagoe Caves, Drum Cave, Elizabeth Bay House, Endless Cave, Fig Tree Cave, Goondi, Grill Cave, Helen's Hill, Herberton, Ingham, Kalumburu, Kempsey, Kuranda, Lindeman I., Mareeba, N. Sydney Rly. Tunnel, Possession I., Prospect Tunnel, Rise & Shine Mine, Rockhampton, Samford, Thursday I., Warragamba Dam, Whitsunday I., Willi-Willi Cave, Yessabah Cave.

Ex *Vespadelus pumilus:* 1 ♀, Viator Cave. Ex *Rhinolophus megaphyllus:* 4 ♂♂, 2 ♀♀, S. Johnston Stn., Willi-Willi Cave. Ex "bat": 12 ♂♂, 28 ♀♀, Biloela, Brisbane, Cairns, Carrai Cave, Finch Hatton, Fitzroy Vale, Helen's Hill, Lankelly Ck. The ♀ from Cairns was determined by Musgrave as *Br. rouxi* Falc.!

Habitat. A cave-dwelling species. Evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae), of which 2 species, *M. schreibersii* and *M. australis* are involved and the former species may again be divided into 2 or 3 geographical races in Australia. Since original host determinations written on labels of specimens are rather confusing, I am leaving aside the specific names *schreibersii* and *australis*. It will be interesting to find out which of the *2 Miniopterus* species is more preferred. Widespread in tropical and subtropical zones of the Subcontinent, it is at present known from Queensland (Mt Amos, Biloela, Bramston Beach, Brisbane, Cairns, Canungra, Chillagoe, Finch Hatton, Fitzroy Vale, Goondi, Helen's Hill, Herberton, Ingham, Kuranda, Lankelly Ck., Lindeman I., Mareeba, Possession I., Rockhampton, Samford, S. Johnston Stn., Thursday I., Viator Cave, Whitsunday I.), New South Wales (Ashford Cave, Back Ck. Mine,

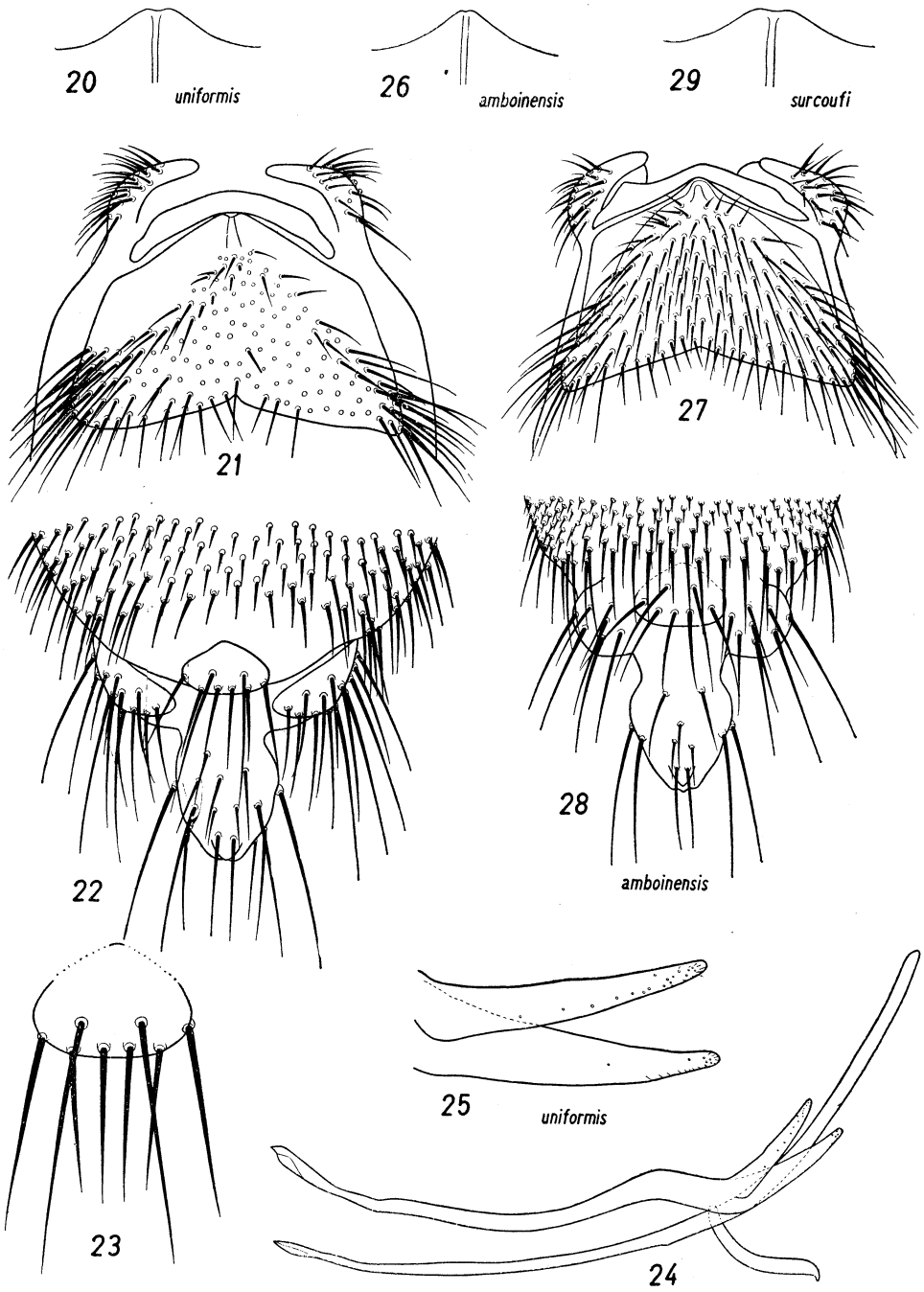


Fig. 20-29. *Brachytarsina.* Thoracic venter, anterior part (20, 26, 29), ♀ abdominal bases, ventral view (21, 27), ♀ abdominal apices, ventral view (22, 28), ♀ sternite 7 (23), ♂ genitalia (24), parameres, more enlarged (25). Fig. 20-25, ***Br. amboinensis uniformis*** n. ssp., slides ♯1159 (♂) and 1158 (♀); fig. 26-28, ***Br. a. amboinensis*** Rndn., Amboina: Liangikan Cave, slide ♯1160; fig. 29, ***Br. a. surcoufi*** Falc., New Caledonia: Boulouparis, slide ♯1164. Each figure drawn to same scale as its counterpart.

Bannockburn Oval, Belfery Cave, Bonalbo, Carrai Cave, Drum Cave, Endless Cave, Fig Tree Cave, Kempsey, Myall Lakes, Prospect Tunnel, Rise & Shine Mine, Sydney, Warragamba Dam, Willi-Willi Cave, Yessabah Cave) and Western Australia (Kalumburu). Probably the southernmost record of distribution is from Sydney, ca 34° S.

AFFINITIES. As a member of the Group Amboinensis, this subspecies is chiefly characterized by the apically equally narrow right and left parameres and almost uniformly short hindmost-row setae on ♀ ventral connexivum, for which the name *uniformis* is suggested. The subspecies can also be distinguished from *amboinensis* Rndn. (Amboina) (fig. 26-28), *surcoufi* Falc. (New Caledonia) (fig. 29), *pretiosa* Falc. (New Hebrides) and an undescribed form from New Guinea by the moderately broad (much broader than in topotypical *amboinensis*) anterior mesosternal lobe and relatively longer lateral margins of metasternum. The shape of postvertex, labial theca and scutellum, though convenient, is not a very constant character.

Description. ***Body*** (in alcohol) 3 1-3.7 mm long. ***Head*** not darker than other parts of body, in dorsal view strongly narrowed caudad, in lateral view distinctly shorter than high and with posterior part very strongly convex. Eye prominent. Mediovertex moderately wide; postvertex oval, small, with 6-9 setae, posteriorly meeting occipital margin which is hardly notched at middle. Postgena anteriorly setose, posteriorly bare; occiput with single row of small setae. Arista ca 2/3 as long as head, apical 1/2 branched. Labial theca about as long as wide, evenly distinctly narrowed apicad, with straight lateral margins; labella very short. ***Thorax*** longer than wide (51×46, length measured from anterior prescutal to posterior scutellar margin), evenly setose all over, dorsal setae rather uniform in length and robustness, ventral setae moderately small, slightly longer than interspaces of their basal punctures, setae on upper 2/3 of mesepisternum as long and robust as those on mesepimerum. Relative lengths of prescutum, scutum and scutellum 26: 16: 9; prescutum anteriorly gently emarginate at middle; scutum with deep broad transverse groove immediately before posterior margin; anterior margin of scutellum concavely curved, posterior margin moderately broadly rounded, surface strongly convex, with 6-8 setal rows. Thoracic squama conical, slightly shorter, blunter in dorsal than in lateral view; calypter with 8-10 setae in 3 series. Anterior mesosternal lobe (fig. 20) moderately broad, very weakly notched at middle; metasternum (pleurotrochantines) widest before midlength, with lateral margin as long as trochanter 2. ***Wing*** 2.7-3.1 mm long, vein R_{2+3} apically very gently curved, R_{4+5} and M_{1+2} hardly divergent toward wing-margin, lst abscissa of M_{1+2} straight, distinctly longer than ***rm***, setulae on wing-membrane extensive. ***Legs*** moderately robust, femora with very long dense setae, dorsal tibial setae as long as or slightly longer than profile tibial breadth; tarsomere 5 of hindleg dorsally with an apical row of setae which are subequal in length to one another. ***Abdomen*** of ♂ typical for the genus, lateral fence of dorsal connexivum composed of ca 5 (anteriorly) to 3 (posteriorly) columns of bristles; laterite 6 with ca 12 bristles (in 3 columns) and 4 small setae (in 1 column). Sternite 2 bare at anterolateral areas, median setae much shorter than lateral ones. Interspace of sternite 2 and laterite 2 bare, ventral connexivum covered with uniform short setae. Pygidium in profile distinctly shorter than high, lateral surface with fairly long setae, upper ones of which are stouter than lower ones. Genitalia (fig. 24-25) moderately long, left and right parameres apically similarly narrow and straight; aedeagus not definablel from its apodeme, their combined length 1.2 mm; surstylus ca 2 × as long as wide, with 2 setae, genital deckplate ribbon-like. ***Abdomen*** of ♀ (fig. 21-23) similar; ventral connexivum in engorged specimens with L-shaped bare stripe at each side, hindmost-row setae hardly longer than those of anterior rows; lateral connexivum posteriorly with 3-4 rows of moderately long setae. Sternite 7 triangular, with 6-12, usually 8-9, setae in 2 rows. Proctiger very gently narrowed apicad, weakly curved along lateral margin, with 4 dorsal setae and 1 pair of lateral setae; cercus with 3 setae; sternite 10 pyriform, with 2, 4 and 2 setae arranged in 3 rows, median setae of 2nd row shorter than lateral ones.

Genus **Raymondia** Frauenfeld 1855

This genus differs from *Brachytarsina* in having the body less richly setose, the head and thorax dorsoventrally compressed and with concavities at the sides of the occipital foramen and on the mesepisterna for the reception of coxae 1 and femora 1, respectively, the antennal arista with numerous branches from base to apex, veins R_1 and R_{2+3} almost entirely straight. (See also the generic key, couplet 2.) The genus differs from *Raymondioides* Jobl. (Ethiopian Africa) in having the palpi not turned over dorsal surface of the head, the costal vein not interrupted near the humeral vein, tibiae uniformly setose, without outstandingly long setae near apices, the tarsomere 1 of hindleg not elongate, the scutellum small, well defined from the scutum and posteriorly fringed with loosely arranged fine setae.

Widespread in the Old World tropics and subtropics, containing ca 20 described species which are mostly found in Ethiopian Africa and may be segregated into 4 species-groups, each more or less confined to a certain family of bats. The only Australian species belongs to a group typified by *pagodarum* Speis. (India etc.) and confined to Rhinolophidae.

Raymondia sp. (nr *pseudopagodarum* Jobling)

MATERIAL. 2 ♂♂, 3♀♀. Ex *Rhinolophus megaphyllus:* 2 ♂♂, 2 ♀♀, Iron Range. — Ex "bat". 1 ♀, Eacham Lake.

HABITAT. Cave-dwelling, evidently confined to *Rhinolophus* (Rhinolophidae: Rhinolophinae) and having a very limited range in Australia; at present known only from Cape York Penin., southward to 17° 20' S. The genus is new to Australia.

AFFINITIES. This species is probably undescribed and is close to *pseudopagodarum* Jobling (ex *Rhinolophus*, S. China and Burma to the Philippines). A direct comparison of the Australian specimens with topotypes of *pseudopagodarum* revealed that the former are slightly larger, head less strongly narrowed anteriorly and with weaker setae, and ♀ sternite 10 slightly shorter, broader in proportion. Unfortunately the material available is not suitable for detailed study, and the specimens are left unnamed.

Genus **Ascodipteron** Adensamer 1896

This genus is the sole representative of the subfamily Ascodipterinae which was considered by some workers to be of family-rank. The 2 sexes differ markedly both in habits and structure. The ♂ is free-living, with the head somewhat similar to that of *Raymondia*, the thorax strongly compressed bilaterally and the abdomen with 7 visible segments subequal in length to one another. The ♀ is endoparasitic. When newly emerged, it has fully developed wings and legs and its abdomen is largely membranous and stretched out normally. After encysted in tissues under the skin of a host bat, it becomes maggot-like, wingless, practically legless and with its entire body invaginated in a pouch formed by the basal abdominal membrane, leaving only the extreme apex of the abdomen and 3 pairs of spiracles open to the outside. The mouthparts in this sex are anomalous, with palpi entirely undefinable, the labial theca enormously en-

larged, heavily sclerotized and often strongly spinose, the labella modified into strongly toothed blades; the thorax, not as in ♂, is only slightly narrower than high in profile. The wings in both sexes have only 3 weakly sclerotized longitudinal veins, plus a few colorless faint depressed lines, no crossveins, no setulae on surface, no alula. The legs in both sexes are long, slender, tarsomeres all elongate and similar in length and shape to one another.

Widespread in the Old World tropics and subtropics, the genus contains ca 15 described species, which may be placed in 5 or 6 species-groups. The Group Phyllorhinae occurs in both the Ethiopian and Oriental Regions and forms cysts in the upper and forearms as well as the urogenital area of *Hipposideros* bats, while the Group Speiserianum is endemic to the Oriental Region and forms cysts behind the ears of *Miniopterus* bats. Females of the 2 species (♂ unknown) enumerated below can easily be separated from each other by the host, site of cysts, body size, shape of labial theca, laterovertices and metasternum, and setal arrangement of abdominal apex (see fig. 30-

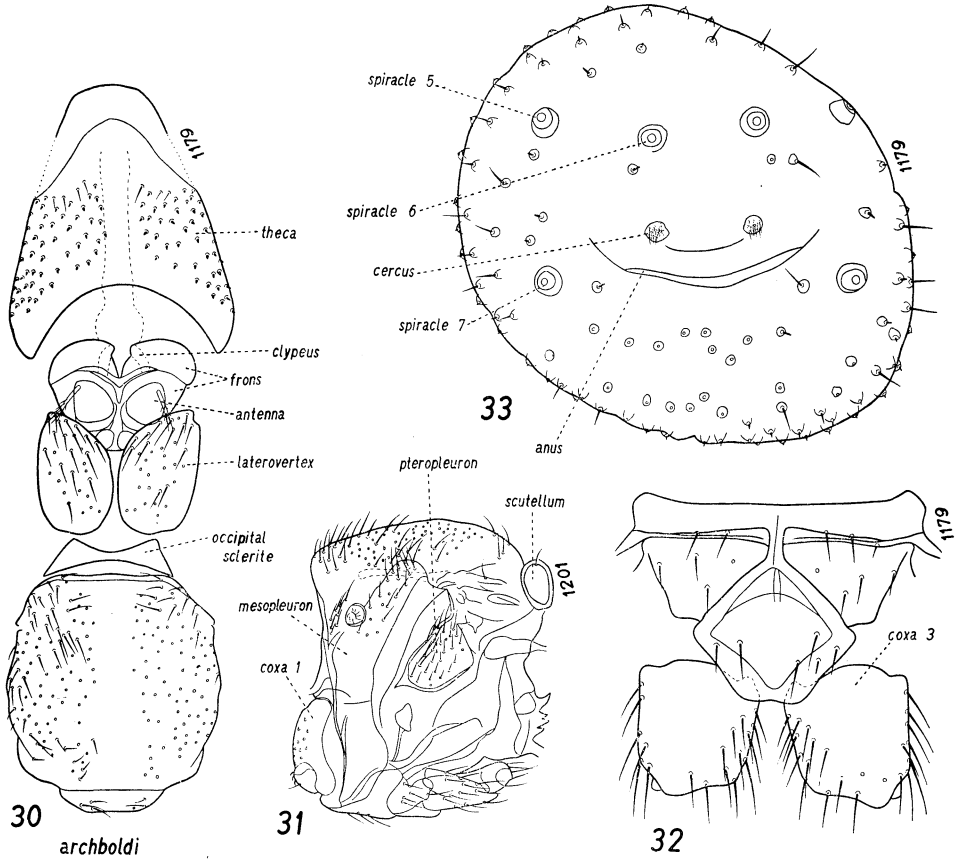


Fig. 30-33. *Ascodipteron archboldi* n. sp., encysted ♀. Head plus thorax, dorsal view (30), thorax, lateral view (31), thorax, ventral view (32), abdominal apex, caudal view (33).

39). A third Group, which forms cysts in the 3rd and 4th fingers of *Rhinolophus* bats, is expected to be found in Australia.

Ascodipteron archboldi Maa, new species Fig. 30-33.

MATERIAL. 9 encysted ♀♀. Ex *Hipposideros diadema:* 1 ♀, Gordon Mine; 8 ♀♀ including holotype, Chillagoe Caves. Holotype ♀ in Aust. Nat. Ins. Colln. An additional ♀ (same host, Kuranda) is tentatively referred here but is not included in the type series, see below.

HABITAT. Cave-dwelling, apparently preferring if not confined to *Hipposideros diadema* (Rhinolophidae: Hipposiderinae). Cysts usually formed in forearms, less often in upper arms of the host. The species is at present known only from Cape York Penin., southward to 17° 10' S.

AFFINITIES. This species is closely related to the type-species of the genus, *phyllorhinae* Adens. (ex *Phyllorhina* [*Hipposideros*] sp., Java). Differing from the latter chiefly in having both the labial theca and laterovertices much broader in proportion; and from 2 undescribed species ex *H. diadema* (i. e., the same host species as in *archboldi*), New Guinea and the Solomon Is. chiefly in the shape of the labial theca and metasternum, stronger peg-like spines on coxae 1 and the absence of such spines on mesopleura. The species is named after Mr Richard Archbold, sponsor of the Archbold Expeditions, Amer. Mus. Nat. Hist. (New York).

The above-mentioned single ♀ from Kuranda was found in the groin region, rather than in the upper or forearm, of the host. It differs from typical *archboldi* in the shape of lateroverticies and certain other details and may represent a closely related but distinct species or a case of exceptional individual variation. More material would be necessary to determine its true status.

Description. Encysted ♀. Entire body 4-6 mm long, obpyriform. *Head:* Labial theca 0.55 mm long, length along posterolateral margin distinctly smaller than width at posterior end; dorsal surface rather evenly covered with sparse peg-like spines, ventral surface with 4-5 pairs of longitudinal rugae, with similar peg-like spines and posteromedially with large triangular bare area; posterior margin in dorsal view moderately concave, in ventral view weakly bisinuate, in lateral view roundly produced near upper end; lower margin in profile very weakly concave. Labial vinculum with apical arms gently divergent, and slightly narrower than basal arm. Occipital sclerite narrow (transversely), anterolaterally angulately produced. Laterovertex wide, almost uniform in width, surface finely setose. Gena moderately wide, with 50 ± peg-like spines on upper 1/2. *Thorax:* Mesonotum 0.53 mm long, widest at midlength, finely setose; scutellum 1/2 as wide as mesonotum. Mesopleurum with pale fine setae, no peg-like spines; coxa 1 slightly narrower than sternopleurum, with few small peg-like spines; pteropleurum weakly narrowed ventrad, with fine setae. Meso- and metasterna finely setose, metasternum hardly shorter than wide; coxa 3 as long as wide. *Abdominal apex* ca 1.2 mm wide, anteriorly bordered by 2-3 (dorsal side) or 4-5 rings (ventral side) of fine setae which are ca 2-3 × as long as their respective basal papillae; no median setae between spiracles 6, nor between cerci; 1-2 setae at each side between spiracle 6 and cercus, and also between spiracle 5 and spiracle 7; diameter of cercus 2/3 as large as that of spiracles; anal and genital orifices clearly separated from each other. Alate forms unknown.

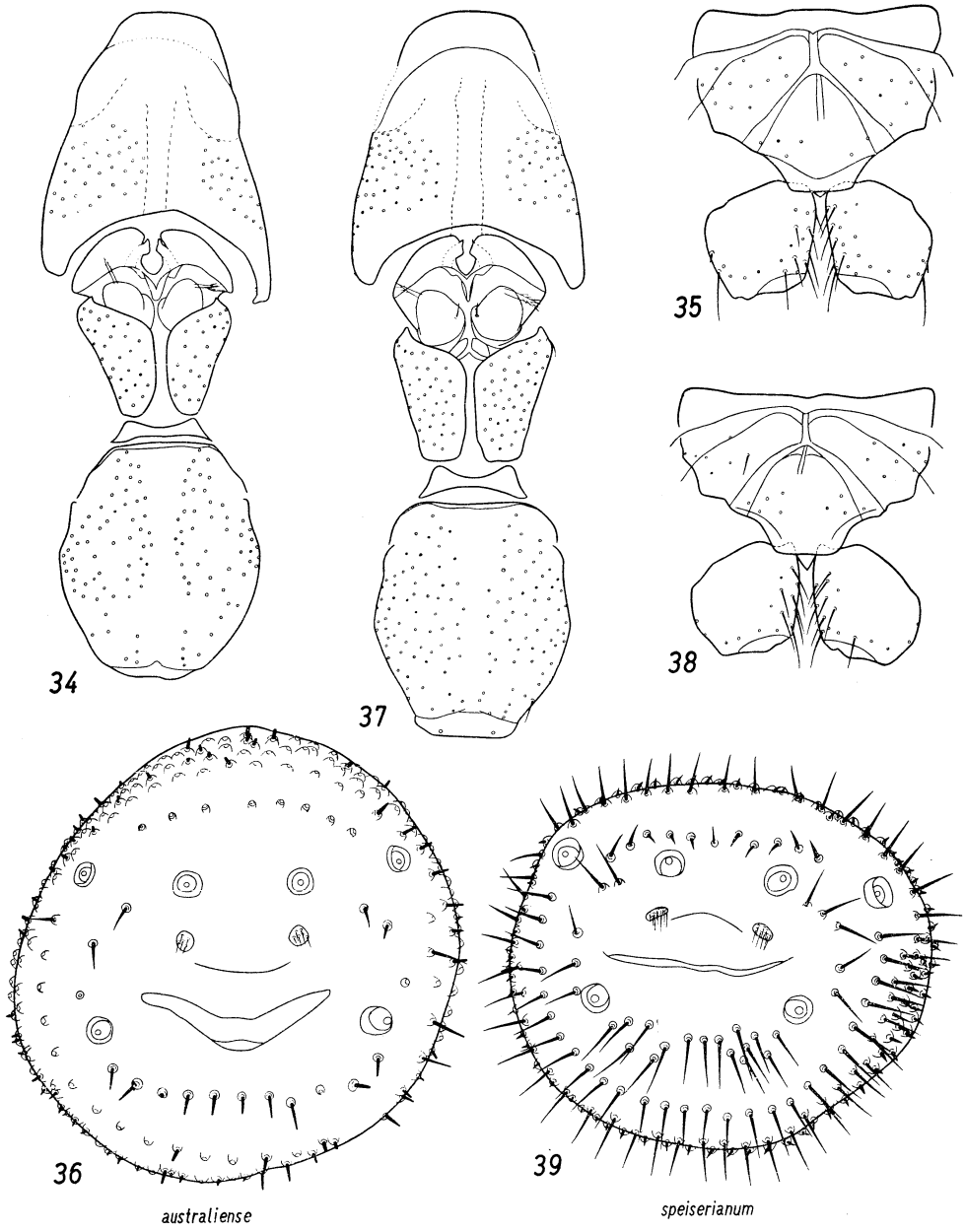


Fig. 34-39. *Ascodipteron*, encysted ♀ ♀. Heads plus thoraces, dorsal view (34, 37), thoraces, ventral view (35, 38), abdominal apices, caudal view (36, 39). Fig. 34-36, *As. austra- liense* Muir, slide #1177; fig. 37-39, *As. speiserianum* Muir, Amboina: Liangikan Cave, slide #1178. Each figure drawn to same scale as its counterpart.

Ascodipteron australiense Muir Fig. 34-36.

Ascodipteron australiansi (sic) Muir, 1912: 366, fig. 17 (a, b), ♀, orig. des., type presumably lost.
A. australiense (nom. emend.): Bezzi, 1916, *Riv. Sci. Nat.* "Natura", Milano 7: 179. — Stiles & Nolan, 1931, *Nat. Inst. Hlth. Bull.* **155**: 659.
Ascodipteron sp., Hughes, 1960: 183, 2 fig., general account.

PREVIOUS RECORDS. 1 encysted ♀ (type), 1 larva, ex *Miniopterus schreibersii*, Mossman. Unnumbered ♀ ♀ (Hughes 1960), ex *Miniopterus* sp., no locality given, presumably from Queensland.

NEW MATERIAL. 10 encysted ♀ ♀. Ex *M. australis*: 5 ♀ ♀, Cangai, Mungana, Rockhampton. — Ex *M. schreibersii blepotis:* 5 ♀ ♀, Phoenician Mine, Rockhampton.

HABITAT. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae) and to Cape York Penin., southward to ca 23° 20' S. The cysts are found at ear-bases of the host. Relative preference to *M. australis* vs *M. schreibersii* not known yet.

AFFINITIES. This species is closely related to *speiserianum* Muir (ex *Miniopterus schreibersii*, Amboina) (fig. 37-39), from which Muir noted that it differs in "head and thorax smaller and darker, notum more convex and hairy, spines round the exposed part of abdomen stouter and shorter; spiracles of full-grown larva in slightly different position, being much nearer together." On comparing with topotypes of *speiserianum*, I cannot appreciate the first 2 characters (I have no full-grown larvae to compare with). The more important differences, as shown in the accompanying figures, are in the posterior margin of dorsal surface of labial theca and the setae on interspace of abdominal spiracles 7. The former is narrowly, rather deeply notched at middle in *speiserianum* but not so in *australiense* while the setae are much fewer and relatively shorter, stouter in *australiense*. Furthermore, the laterovertices are relatively narrower and the metasternum longer in *australiense* than in *speiserianum*. Both species will be redescribed in a forthcoming revision of the genus. The original spelling *australiansi* is evidently a typographical error.

Family **NYCTERIBIIDAE** Samouelle 1819

KEY TO AUSTRALIAN GENERA OF NYCTERIBIIDAE

1. Thoracic sternal plate (fig. 44) abnormal, with lateral margin deeply incurved at vicinities of thoracic ctenidium and with oblique sutures replaced by a continuous transverse suture which is perpendicular to median suture; basitarsi only about as long as tarsomere 5 and at most 1/3 as long as corresponding tibiae; abdominal ctenidium entirely absent, its teeth all replaced by loosely arranged, uniformly short strong setae; thoracic ctenidium well developed..... **Archinycteribia**

   Thoracic sternal plate not as above, lateral margin not or hardly incurved at vicinities of thoracic ctenidium, oblique sutures each forming an acute angle to median suture, never jointly forming a continuous transverse suture; basitarsi more or less longer than tarsomeres 2-5 together and hardly shorter than corresponding tibiae; thoracic and abdominal ctenidia either both present, or (in Australia, only 1 species) both absent..... 2

2. Head capsule in dorsal view subtriangular and flattened; eye prominent, 2-faceted, with black

ring at base; posterior margin of ♂ synsternite 5 + 6 with single series of closely arranged peg-like spines; ♀ abdominal dorsum entirely membranous between tergite 2 and anal segment and thereupon entirely or largely covered with uniform short setae each originating from a large prominent basal papilla.....**Cyclopodia**

Head capsule not as above; eye either absent or, impromminent, 1-faceted and without black ring at base; posterior margin of ♂ synsternite 5 + 6 either without spines, or with loosely arranged uniseriate or closely arranged multiseriate pointed spines; ♀ abdominal dorsum with at least 1 median plate between tergite 2 and anal segment, membranous area not as described above.....3

3. Head capsule subcylindrical, in lateral view nearly as long as high, dorsum with patch of 25 or more long strong dense setae; eye present, 1-faceted; thoracic ctenidium either absent, or greatly reduced (only ca 1/2 as wide as coxa 2); abdominal ctenidium either absent, or poorly developed and with slender loosely arranged teeth, interspaces of teeth not or hardly less than length of teeth; haltere groove entirely closed by a cover; laterite 1 absent. .....**Penicillidia**

Head capsule bilaterally compressed, in lateral view more or less longer than high, dorsum usually with only 4-6 setae, occasionally (in Australia, only 1 species) with 12 ± short sparse fine setae; eye absent; thoracic ctenidium always well developed, about as wide as coxa 2; abdominal ctenidium also always well developed and with robust closely arranged teeth; haltere groove open; laterite 1 present.....4

4. Tibiae exceedingly short and strongly compressed, in profile somewhat semicircular, 2-3.5 × as long as wide, widest at or very near midlength; femur 1 short, only ca 2/3 as long as 2, in profile ca 2 × as long as wide; posterior margin of ♂ synsternite 5+6 either without spines, or with only few very loosely arranged uniseriate spines; lateral connexivum of ♀ abdomen either entirely bare, or at most with rather small setal patch at each side of median tergal plate; ♀ postgenital plate either very small, bare and hardly definable, or (fig. 268, 273) bearing numerous strong spines on and near posterior margin.....**Nycteribia**

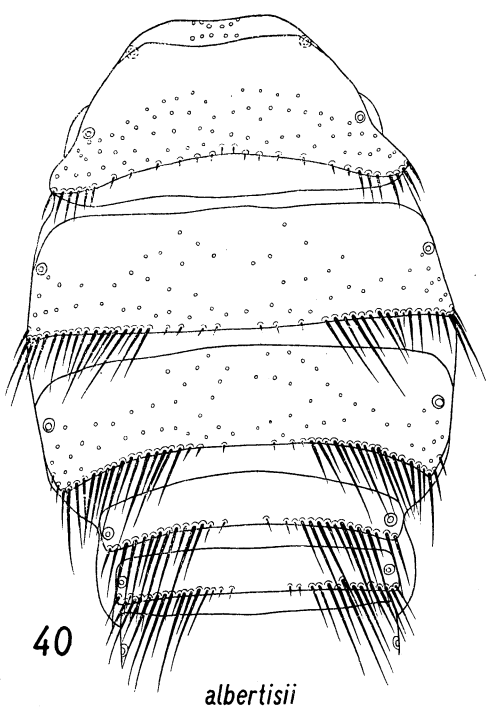
Tibiae moderately short and compressed, in profile at least 4 × as long as wide and widest distinctly beyond midlength; femur 1 only slightly shorter than 2, in profile at least 2.5 × as long as wide; posterior margin of ♂ synsternite 5+6 always with numerous multiseriate spines; lateral connexivum of ♀ abdomen very extensively setose or spinose; ♀ postgenital plate either (in *Phthiridium*) large, subquadrate, bare on surface, and with 1-2 pairs of fine short marginal setae or (in most *Basilia* species, fig. 165 etc.), moderately large, roundish, microscopically setose on surface with sparse strong setae on or near posterior margin or (in 1 Australian *Basilia* species, fig. 230), unusually large, surface not microsetose but with sparse strong setae.....5

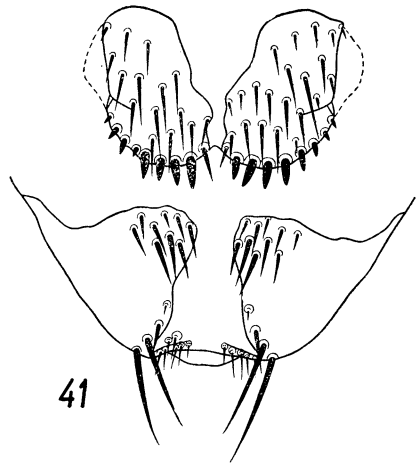
5. Thoracic sternal plate (fig. 52-64) more or less shorter than wide, always with complete posterior fringe, median angle jointly formed by oblique sutures 90 or more degrees; ♀ tergite 2 posteriorly strongly produced into pair of submedian lobes each bearing strong spines and bristles; posterior margin of ♀ tergite 1 with strong spines or strong bristles; ♀ adanal plate present; anterior surface of ♂ femora 2 and 3 often with sensory pores .....**Basilia**

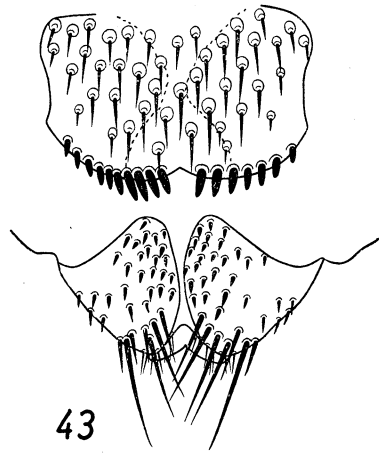
Thoracic sternal plate (fig. 51) longer than wide, posterior fringe reduced to 3-6 setae on each side, median angle formed by oblique sutures less than 90°; ♀ tergites 1 and 2 not as above, both lacking strong bristles on posterior margins; no adanal plate in ♀; ♂ femora 2 and 3 never with sensory pores .....**Phthiridium**

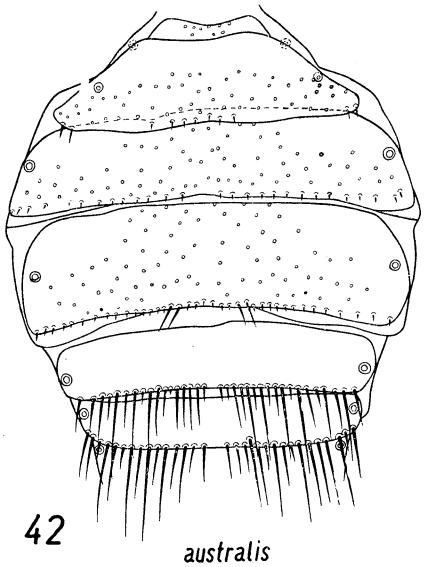
Genus **Cyclopodia** Kolenati 1863

This genus is Palaeotropical in distribution and is parasitic exclusively on Pteropodidae. In Australia, it is represented by 3 species, 1 of which belongs to the Group









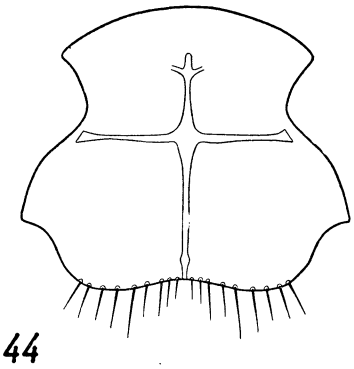


Fig. 40-44. *Cyclopodia* and *Archinycteribia.* ♂ Basal tergites (40, 42), ♀ abdominal apices, ventral view (41, 43), ♂ thoracic sternal plate (44). Fig. 40-41, *C. albertisii* Rndn., slides ♯ K 51829 (♂) and K51832 (♀); fig. 41-43, *C. australis* Theod., slides ♯ K51833 (♂) and K55159 (♀); all drawn to same scale and based on Aust. Mus. Sydney material (Musgrave Colln). Fig. 44, ***Ar. actena*** Speis., New Guinea.: Humboldt Bay, slide ♯199.

Inflatipes and 2 to the Group Sykesii. Both of these groups are widespread in the Oriental Region. The species *australis* and the subspecies *euronoti* are endemic. In addition, Bau (1930: 290) wrote that *Cyclopodia macrura* Speiser "ist bisher nur aus Australien, und zwar aus Neu Pommern, bekannt". Obviously the word "Australien" was an error for New Guinea and incidentally, *C. macrura* is now known as *Leptocyclopodia (Oncoposthia) macrura.*

Key to Australian Cyclopodia Species

1. Large species, length 4-5 mm; head capsule dorsally with 8-30 setae between eyes; haltere groove completely closed by cover; ♂ tergites 2-4 posteriorly at most with incomplete fringes of long setae; ♀ dorsal connexivum posterolaterally with a number of long bristles, sternite 7 posteriorly fringed with heavy blunt spines. Group Sykesii.....2

   Small species, length 2-2.5 mm; head capsule dorsally with only 2 short setae on anterior margin, elsewhere bare; haltere groove widely open; ♂ tergites 2-4 posteriorly each with a complete fringe of long setae; ♀ dorsal connexivum uniformly covered with short setae, no long bristles, sternite 7 posteriorly fringed with fine pointed setae. Group Inflatipes. .....**sycophanta euronoti**

2. Head capsule dorsally with 25-30 setae between eyes not including those on anterior margin; notopleural setae always present, usually 3 in number; ♂ (fig. 40) tergites 2-6 each with a medially interrupted posterior fringe of long setae; ♀ dorsal connexivum discally with a group of 0-7 (usually about 4) heavy spines, posterolaterally with pair of patches of 1-7 bristles, sternite 7 (fig. 41) lacking patch of dense setae between its anterior lobes...**albertisii**

   Head capsule dorsally with 8-10 setae between eyes without counting those on anterior margin; notopleural setae usually entirely wanting, occasionally 1 on either or both sides; ♂ (fig. 42) tergites 2-3 entirely without and tergite 4 laterally without long setae on posterior margin, tergites 5-6 each with a complete posterior fringe of long setae; ♀ dorsal connexivum discally always without heavy spines, posterolaterally with pair of patches of 9-11 bristles, sternite 7 (fig. 43) with patch of dense setae between its anterior lobes.....**australis**

Cyclopodia albertisii Rondani Fig. 40-41.

Cyclopodia albertisii Rndn., 1878, *Ann. Mus. Stor. Nat. Genova* **12**: 150, ♂♀, orig. des., type ♂ in Genova Mus.

C. (Cyclopodia) albertisi (= pteropus): Scott, 1932: 25, rec. — Theod., 1959: 257, fig. 12, 13b, 14, 77b, ♂♀, redes., rec., key; 1967: 448, fig. 785, 801-103, ♂♀, key, des., rec. — Maa, 1962: 429, rec.

C. albertisii: Bearup & Lawrence, 1947: 197-200, negative findings of *Plasmodium* in midgut & salivary gland.

Nycteribia pteropus Rainbow, 1904: 78, pl. 9, ♀♂, orig. des., lectotype♀ in Aust. Mus., Sydn. — Froggatt, 1907: 321, remarks.

Cyclopodia pteropus: Ferris, 1924: 5, fig. 5, ♂♀, redes., rec. — Tillyard, 1926: 378, fig. W72 (♂), list.

C. (Cyclopodia) pteropus: Musgr., 1925: 300, rec.

C. similis [nec Speis.] (= *pteropus);* Ratcliffe, 1931: 39, relative abundance on 4 *Pteropus* spp., occurrence of phoretic mites.

C. novaguineae (!) Schuurmans Stekhoven, 1959. *Deuts. Ent. Zs.* (N. F.), **6**: 261, fig. 1-22, ♂♀, orig. des., type (?) lost.

Previous Records. 6 ♂♂, 5 ♀♀, ex *Pteropus conspicillatus,* Olive R.; unnumbered specimens, ex *Pteropus* sp., Mossman (Scott 1932). — 26 specimens ex *Pt. gouldi, Pt. conspicillatus, Pt. poliocephalus,* NE Qld., N. S. Wales (Theod. 1959). — 4 ♂♂, 3 ♀♀, ex *Pt. gouldi,* Olive R.; 1 ♂, 1 ♀, ex *Pt. conspicillatus,* N Barnard Is. 1 ♂, ex *Pt. poliocephalus,* Sydney; 1 ♂, 1 ♀, ex *Pteropus* sp., Mossman; 3 ♂♂, 3 ♀♀, ex small longtailed

bat, Cairns; 3 ♂♂, 3 ♀♀, no host data, Mary R. (Theod. 1967). — 2 ♂♂, 1 ♀, ex fruit bat, Cairns (Maa 1962). — 1 ♂, 3 ♀♀ (type series of *N. pteropus*), ex *Pt. gouldi*, Mapoon Mission Stn.; unnumbered specimens (doubtfully referred by Rainb. 1904) ex *Pteropus* sp., King George's Sound. — 4 ♂♂, 2 ♀♀, ex *Pt. conspicillatus*, Babinda Ck. (Ferr. 1924). — 3 ♂♂, 1 ♀ ex *Pt. conspicillatus*, Sydney; unnumbered specimens ex *Pt. conspicillatus*, N Barnard Is. (Musgr. 1925). Obviously repeated records from Olive R., Mossman and N Barnard Is. have been based on same series of specimens respectively. The type of *albertisii* is from Goram I., nr Ceram, no host; that of *novaguineae*, ex *Pteropus macrotis epularius*, New Guinea: Kampong Poe-e nr. Hollandia.

New Material. 195 ♂♂, 160 ♀♀, For brevity, the following symbols in parentheses are used for host records, viz., c = *Pteropus conspicillatus*, f = undetermined fruit bats or "flying foxes," g = *Pt. gouldi*, p = *Pt. poliocephalus*, s = *Pt. scapulatus*.

Queensland: Babinda Ck. (c), Barcaldine (f), Brisbane (f, p), Cairns (c, f), Coen ("*Dobsonia* sp."), Cooktown (c), Daragee (c), Fisherman's I. (f), Freshwater (c), Gordonvale (f), Hospital Ck. (g), Ingham (f), Innisfail (c, g), Koiri R. S. (f), Kowanyama (g), Kuranda (f), Mapoon Mission Stn. (g), Mt Molloy (c, s), Mossman (f), Mundoo (c), N Barnard Is. (c), Rocky Range (c, g), Sand Hills (g), S Johnstone (f), Stanthorpe (f), Tambourine Mt (p), Townsville (g), "N Queensland" (s).

Northern Territory: Katherine R. (f), Liverpool & Tonkinson Rivers junction (g), Smith Point (g).

New South Wales: Kempsey (p), Sydney (p).

Western Australia: Palm Springs (f), Wotjulum (s).

Habitat. Obviously confined to *Pteropus* (Pteropodidae); probably *Pt. conspicillatus* (14 records) is the most preferred host, the next are *Pt. gouldi* (11) and *Pt. poliocephalus* (6), and the least is *Pt. scapulatus* (3). Occasionally it is found together on the same individual bats with *C. australis*. The odd records ex "*Dobsonia* sp." and "small long-tailed bat" are apparently unreliable. The distributional range is most probably the same as that of its hosts. The southernmost record is from Sydney (ca 34° S) in N. S. Wales (the record from King George's Sound (ca 35° S) in W. Australia needs verification). Outside of Australia, the species is known to occur in New Guinea, Kei Is., Goram I. and Palau Is.

Synonymy. The synonymy of *albertisii* with *pteropus* was first established by Scott (1932). I have seen the type series of both nominal species. In the Aust. Mus., Sydn., there are 2 ♀♀ glued on the same card and bearing 4 labels (a) "K 15789", (b) "Mapoon Miss. Sta. Mth. Batavia Riv. Gulf of Carpentaria" (c) "Host, Gould's Flying Fox, *Pteropus gouldi* Peters" (d) "*Nycteribia pteropus* Rainb. Type ♂ (1), Type ♀ (3)". All 4 labels are probably in Musgrave's handwriting. The upper ♀ on the card was selected and labelled by me as lectotype. It has 3 notopleural setae on the left side and 2 on the right, its abdominal dorsum has 4 discal spines and 3 and 4 para-anal bristles on the left and right sides respectively. The lower ♀ is less engorged and has 3 notopleural setae each on the left and right sides, 4 discal abdominal spines and 3-4 para-anal bristles. The 3rd ♀ as well as the unique ♂ were mounted on slides by Musgrave. The synonymy of *novaguineae* S. Stkh. with *albertisii* Rndn. was established

by Maa (1966, *Pacif. Ins.* **8:** 649).

AFFINITIES. This species is so closely related to *ponapensis* Theod. (ex *Pteropus molossinus*, Ponape I.) that they are entirely inseparable in the ♂ sex. The species also bears, in external characters of the ♂, very strong similarity to *sykesii* Wwd. (India, Ceylon, Burma), *horsfieldi* de Meijere (Burma to Philippines-Celebes), *similis* Speis. (New Guinea, Bismarck Arch.), *oxycephala* Bigot (New Hebrides, Loyalty Is., New Caledonia) and *bougainvillensis* Theod. (Solomon Is., D'Entrecasteaux Is.). The chief differences in these species are in the ♀ abdominal chaetotaxy and details of the ♂ genitalia. According to Theodor (1959), the number of discal spines on the abdominal dorsum in 26 ♀ ♀ from Australia studied by him was 4.1 ± 0.26 (S.E.) and was statistically different from that of 43 ♀ ♀ from the Palau Is. (2.6 ± 0.21). The range of variation of this number is so wide (0-7) that I doubt if, as suggested by Theodor, it could be used as a criterion for subspecific separation.

Cyclopodia australis Theodor Fig. 42-43

Cyclopodia (*Cyclopodia*) *australis* Theod., 1959: 258, fig. 15, ♂ ♀, orig. des., key, holotype ♂ in Hebrew Univ., Jerusalem; 1967: 450, fig. 791, 804, key, des. — Maa, 1962: 429, rec.

PREVIOUS RECORDS. 1 ♂ (holotype), ex *Pteropus gouldi*, Townsville; 3 ♂ ♂, 1 ♀ (paratypes), Mary R. and Darwin, no host data. 7 ♂ ♂, 3 ♀ ♀ (Maa 1962), ex fruit bat, Cairns.

NEW MATERIAL. 324 ♂ ♂, 243 ♀ ♀. Symbols for hosts as those in use for *C. albertisii*.

Queensland: Adels Grove (s), Barcaldine (f), Brisbane (f), Byfield (s), Cairns (c, f), Chillagoe (s), Coen (f, s), Cooktown (c, s), Eidsvold (f), Gracemere (g), Ingham (f), Mt Isa (s), Kowanyama (s), Laura (f), Lawn Hill (s), Mt Molloy (c, s), Mornington I. (g), Rocky Scrub (f), Sand Hills (g), Tambourine Mt (p, s), Townsville (g).

Northern Territory: Mary R. (f), Wilton R. (s).

New South Wales: Bonshaw (s), Sydney (p, s), Tooloom (s), Walcha (f).

Western Australia: Wotjulum (s).

HABITAT. Obviously confined to *Pteropus* (Pteropodidae). Probably the most preferred host is *Pt. scapulatus* (17 records), the next are *Pt. gouldi* (5), *Pt. conspicillatus* (3) and *Pt. poliocephalus* (2). Although occasionally found together with *C. albertisii* on the same individual bats, the host preference of the 2 species appears to be different. Endemic to Australia, the distributional range of *C. australis* is most probably the same as that of its hosts. The southernmost record is from Sydney (ca 34° S)

AFFINITIES. In contrast to the preceding one, this species has no close relatives and may well be considered as isolated and highly specialized. The notopleural setae, ♂ abdominal chaetotaxy as well as the patch of dense setae between the anterior lobes of ♀ sternite 7 are very unusual for the genus.

Cyclopodia sycophanta sycophanta Maa, new species and subspecies Fig. 48-50.

Cyclopodia (*Cyclopodia*) (?) *inflatipes*: Theod., 1959: 281, fig. 46c, 48, ♂ ♀; 1967: 473, fig. 850, 852, 853, ♂ ♀.

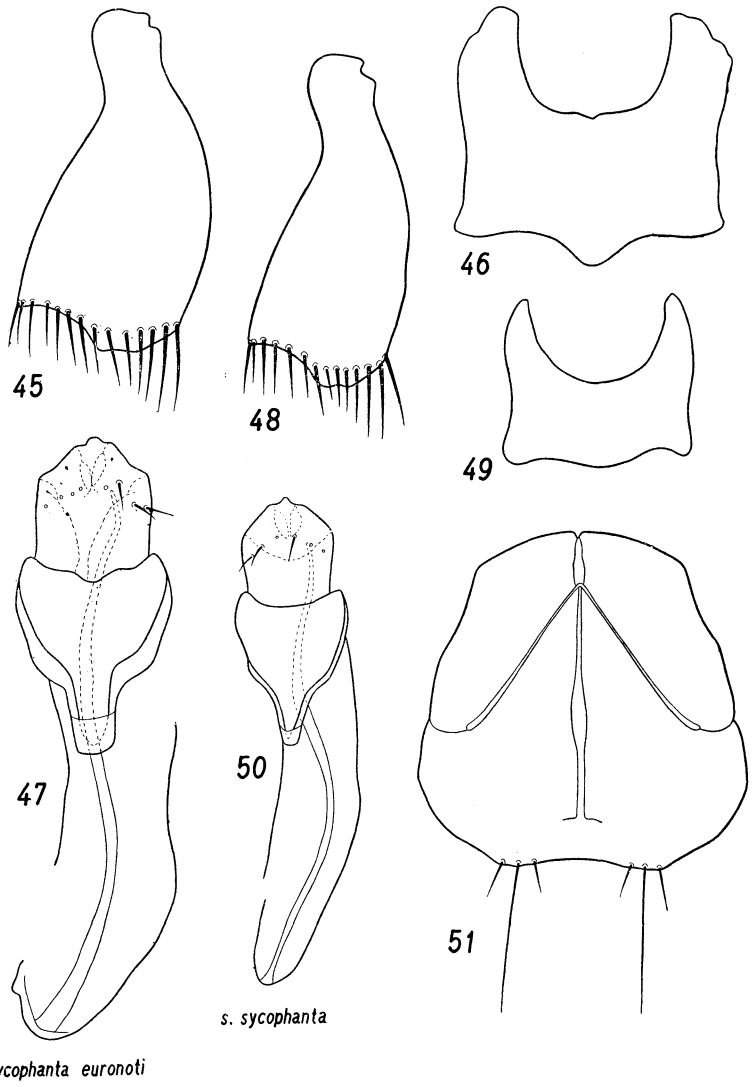


Fig. 45-51. *Cyclopodia and Phthiridium.* ♀ Coxae 1, omitting setae on surface (45, 48), ♂ genital deckplate (46, 49), genitalia (47, 50), ♀ thoracic sternal plate (51); fig. 45-50 drawn to same scale. Fig. 45-47, *C. sycophanta euronoti* n. ssp., slides #1103 (♂) and 1104 (♀); fig. 46-50, *C. sycophanta sycophanta* n. sp. & n. ssp., slides #1101 (♂) and 1102 (♀); fig. 51, *Ph. curvatum* Theod., slide #1169.

C. (*C.*) *inflatipes* sensu Theod.: Maa, 1962: 430.

MATERIAL. 155 ♂♂, 211 ♀♀ in 224 lots. Holotype ♀ (BISHOP 8463).

Ex *Syconycteris*, 133 ♂♂, 174 ♀♀ in 190 lots: Archbold Lake, 2 ♂♂, 2 ♀♀, L. & S. Quate; Bokondini, 2 ♂♂, 1 ♀, Quate; Bulldog Rd. nr Wau, 2 ♂♂, 4 ♀♀, H. Clissold, P. J. Shanahan; Bulolo R., 15 ♂♂, 28 ♀♀, P. H. Coleman, A. B. Mirza, P. J. Shanahan, A. C. Ziegler; Coviak, 1 ♂, 2 ♀♀, Clissold; Dawai R., 6 ♂♂, 3 ♀♀, N. Wilson; Edie Ck., 2 ♂♂, 7 ♀♀, P. Shanahan, R. Mitchell, N. Wilson; Enarotali, 3 ♂♂, 12 ♀♀, Clissold; Finschhafen, 1 ♂, 2 ♀♀, Clissold; Imbia, 3 ♂♂, 3 ♀♀, K. Keith; Jumbora, 1 ♂, Clissold; Kabwum, Saruwaged Rge., 3 ♂♂, 7 ♀♀, N. Wilson; Mt Kaindi, 13 ♂♂, 14 ♀♀, Coleman, Ziegler; Kalalo, 2 ♂♂, 4 ♀♀, O. R. & J. Wilkes; Kassam, 1 ♂, 2 ♀♀, H. M. Van Deusen; Kebar Valley, 2 ♂♂, 1 ♀, Quate; Kubor Valley, 1 ♂, 2 ♀♀, W. B. Hitchcock; Minj, 1 ♀, T. C. Maa; Mt Missim, 12 ♂♂, 17 ♀♀, Clissold, Mirza, Shanahan; Mulik R. nr Archbold Lake, 2 ♂♂, Quate; Nabire, 9 ♂♂, 7 ♀♀, Wilson; Nakata Ridge nr Wau, 2 ♂♂, 1 ♀, Shanahan; Nondugl, 2 ♂♂, 1 ♀, Maa; Oriomo, 2 ♀♀, Clissold; Popondetta, 1 ♀, Shanahan; Purosa, 2 ♂♂, 4 ♀♀, Van Deusen; Sandy Ck., 4 ♂♂, Clissold; Sibil Valley, 10 ♂♂, 8 ♀♀, Quate; Singauwa R., 3 ♂♂, 4 ♀♀, Mitchell; Slate Ck., 1 ♂, 3 ♀♀, Clissold; Uiba, Kubor Valley, 5 ♂♂, 9 ♀♀, Hitchcock; Waghi Valley, 2 ♀♀, R. F. Peterson; Wau & Wau Ck., 21 ♂♂, 27 ♀♀ (incl. holotype ♀), Clissold, Coleman, Shanahan, Ziegler; "E. Highland", 6 ♀♀, Archbold Exped.

Ex *Macroglossus lagochilus*, 4 ♀♀ in 4 lots, Brown R., Laloki, Tubusereia, Vanapa, all by W. H. Ewers. — Ex *Nyctimene*, 3 ♂♂, 3 ♀♀, in 6 lots, Coviak, Jumbora, Wau Ck., all by P. J. Shanahan. — Ex "*Halcyon sancta*" [kingfisher], 2 ♂♂, Singauwa R., R. Mitchell.

Ex "bats", 17 ♂♂, 30 ♀♀ in 23 lots: Edie Ck., 5 ♂♂, 16 ♀♀, R. Mitchell, J. Sedlacek; Nabire, 3 ♂♂, 1 ♀, N. Wilson; Wantoat, 1 ♂, 1 ♀, G. Holland; Wau, 8 ♂♂, 12 ♀♀, T. Harrief, E. Monteith, J. Sedlacek.

The 6 ♂♂, 9 ♀♀ recorded by me (1962: 430) from Markham R. Valley, Mt Michael, Mt Otto, Mt Wilhelm and Oomsis Ck., are not available at present and are therefore not included in the type series.

HABITAT. Evidently confined to *Syconcyteris* (Pteropodidae: Macroglossinae). The odd records ex *Macroglossus, Nyctimene* and a kingfisher as listed above are hardly reliable. *Macroglossus lagochilus* (Pteropodidae: Macroglossinae) is the breeding host of *C. inflatipes* Speis. and is so similar to *Syconycteris* in both appearance and structure that it might have been mistaken for the latter. *Nyctimene* (Pteropodidae: Nyctimeninae) represents a different group of fruit-bats and is quite unlikely to be a breeding host of flies of the Group Inflatipes but its roosting sites are similar to that of *Syconycteris*, and the listed records might be due to straggling or contamination particularly because there were a good number of *C. s. sycophanta* ex *Syconycteris* from the 3 localities involved, Coviak, Jumbora and Wau Ck. The record ex a kingfisher is certainly erroneous, either a mislabelling or contamination. The 3 ♂♂, 1 ♀ from Mt Dayman recorded by Theodor (1959) were also ex *Syconycteris*. According to the ledger of the Archbold Expeditions, 8 bats belonging to *Pteropus, Dobsonia, Macroglossus* and *Syconycteris* were collected in VII. 1953 by Mr H. M. Van Deusen at Mt Dayman, and

ectoparasites collected thereupon were only from 3 *Syconycteris* bats (AMNH 157376, 156377, 156379 = A. E. 12665, 15666, 12298). *C. s. sycophanta* is widespread all over New Guinea and is at present known from Vogelkop Penin. (Kebar Valley), Japen I. (Dawai R.) in the west, and Huon Penin. (Finschhafen, Wantoat etc.), Port Moresby area (Brown R., Vanaka etc.), Mt Dayman in the east. Probably it is more abundant than *C. inflatipes* in the highlands since most of the records were from the mountains and since in the Port Moresby area, Mr W. H. Ewers collected in 1967-1968 only 4 *sycophanta* vs 104 *inflatipes*, while in the highlands, the Bishop Museum field teams collected in the last decade 330 ± *sycophanta* vs 5 *inflatipes*.

Affinities. This species may be recognized easily by the extensively setose coxopleurite and proportionately short broad thoracic sternal plate. Other important but slightly less distinctive characters are head capsule with 1 pair (occasionally absent) of anterodorsal setae, 1-3 (usually 2) notopleural setae, coxa 1 moderately long (for the species-group), abdomen in both sexes fairly richly setose, basal arc and phallobase of ♂ genitalia short and broad, posterior margin of ♂ synsternite 5 + 6 moderately produced at middle, side piece of ♀ sternite 7 narrowed posteriorly. In the size of the body, the number of dorsal cephalic and notopleural setae, relative lengths of segments of leg 1 and other general features, the species is so similar to *tenuis* Sch. Stkh. (ex *Macroglossus minimus*, Java, Malaya, Moluccas) that Theodor (1959, 1967) suggested *tenuis* might eventually prove to be a subspecies of what he provisionally referred to "(?) *inflatipes*."

This species has long been confused with *C. inflatipes* Speis. (ex *M. lagochilus*, New Guinea). The latter is a close relative of *tenuis* and differs from *sycophanta* in being smaller and having anterodorsal setae of the head always absent, 0-1 notopleural setae, the coxopleurite largely bare, the thoracic sternal plate much longer in proportion, setae on palpus and ♀ connexivum fewer and weaker, the surface of the tergite 2 bare, the ♂ phallobase and basal arc narrower in proportion, and the side-piece of ♀ sternite 7 not narrowed posteriorly. Originally *inflatipes* was described from 1 ♀, ex *Kiodotus* [*Macroglossus*] *minimus*, Kaiser-Wilhelms-Land [NE New Guinea], no precise locality. The type is presumably lost. Since *M. minimus* has been confused in literature with *M. lagochilus* which is the only *Macroglossus* known to New Guinea, *lagochilus* should be accepted as the type host of *C. inflatipes*. It is true that the original description of *inflatipes* (length 2 mm, abdominal ctenidium with 42 teeth....) would fit both *inflatipes* (as here interpreted) and smaller (i. e., not fully engorged) ♀♀ of *sycophanta*. But from the host record, it appears justified to interpret *inflatipes* as the smaller, less setose species ex *Macroglossus* in New Guinea and to recognize the larger, more setose one ex *Syconycteris* as a new species. The name *sycophanta* (Latin, a trickster, a cunning flatterer, a sycophant) is suggested partly in allusion to the confusing state in nomenclature and partly by taking the same first stem *syco* of the host name *Syconycteris*.

Description. Length 2.0-2.5 mm. Yellowish brown; femora, ♀ sternite 7 and ♀ anal segment darker, ♂ anal segment not distinctly darker than corresponding tergites. *Head* with 1 pair of setae (occasionally absent) on anterior margin of dorsum; palpus with 3-6 setae (usually 4 or 5) on upper margin. *Thorax* with 1-3 (usually 2) notopleural setae; coxopleurite (="coxite a of mesocoxa" of Nussbaum 1960) with 15-20 setae in 3-4 columns; thoracic sternal plate 42 × 48. Coxa 1 (fig. 48)

slightly shorter in proportion than in ***inflatipes.*** *Abdomen* of ♂: Surface of tergite 1 with 10 ± black erect setae, which are about as long as diameter of their respective basal papillae; surface of tergite 2 (and often that of 3 and 4) with some small setae shortly before posterior fringe; median section of posterior fringe of tergite 2 with several short setae arranged more or less alternately with long setae which are not markedly shorter than those at lateral section. Relative median lengths of sternites 3, 4 and 5 + 6 as 10: 10: 14; setae of posterior fringes of sternites 3 and 4 longer, more closely arranged than in ***tenuis*** and ***inflatipes,*** posterior margin of synsternite 5 + 6 with 6-8 short peg-like spines and more strongly produced at middle than in ***tenuis.*** Clasper usually bearing 2 bristles near base. Basal arc (fig. 50) short, broad, with long anterior process; phallobase also short, broad; deckplate (fig. 49) short. *Abdomen* of ♀: Surface of tergite 1 with 10 ± black erect setae which are largely longer than diameter of their respective basal papillae; surface of tergite 2 with some scattered small setae; posterior fringe of tergite 2 composed of 20 ± long setae which are often with a number of short interstitial setae and of which the median ones slightly shorter than lateral ones. Connexivum with more numerous setae than in ***tenuis*** and ***inflatipes;*** for instance, there are 5-6 setal rows between abdominal spiracles 3 and 4; hindmost-row setae markedly longer than those of anterior rows. Side-pieces of sternite 7 clearly separated from each other, posteriorly narrowed and each fringed with 3-4 setae. Anal segment with 15 ± pairs of small setae on surface and 5-6 pairs of long setae on posterior margin, with small ones largely on ventral surface and long ones largely on dorsal surface; ventral surface slightly shorter than dorsal and lateral surfaces.

Cyclopodia sycophanta euronoti Maa, new subspecies Fig. 45-47.

MATERIAL. 3 ♂♂, 4 ♀♀. Holotype ♀ in Aust. Mus., Sydney.

Ex *Syconycteris australis:* Murwillumbah, Qld., 2 ♂♂, 2 ♀♀. Kingscliff, N.S.W., 1 ♂, 2 ♀♀ (incl. holotype ♀).

HABITAT. Probably confined to *Syconycteris australis* which occurs, according to Tate (1942, *Bull. Amer. Mus. Nat. Hist.* **80:** 346), in eastern Australia and in SE New Guinea on the southern side of the Central Range. The subspecific name (*euronotus, -ti,* Latin, SE wind) refers to its geographical range. The southernmost record is from Kingscliff (ca 28° 10' S).

AFFINITIES. *C. s. euronoti* is a very weak race of *sycophanta,* although the host *S. australis* was said (Tate, loc. cit.) to be readily distinguishable from *S. crassa* (host of nominotypical *sycophanta*) in having much narrower molars and premolars. The differences in the 2 subspecies are given below.

Description. Differing from typical ***sycophanta*** in: Coxa 1 shorter, broader in proportion; ♂, phallobase and basal arc broader in proportion, anteromedian lobe of latter longer, genital deckplate broader and with broader anterior lobes; ♀, setae on dorsal connexivum with smaller basal papillae, those near anterior margin longer than diameter of their respective basal papillae, sternite 7 broader.

Genus **Archinycteribia** Speiser 1901

This genus is unique in the family in having the thoracic sternal plate (fig. 44) strongly narrowed near the anterior end and angularly widened near the posterior end, with "oblique" sutures of that plate joining the median suture in right angles, basitarsi exceedingly short (1/4 to 1/3 as long as corresponding tibia, subequal in length to tarsomeres 2-4 together). It is endemic to the Oriental Region, with 2 known species ex Pteropodidae (*Dobsonia, Penthetor*).

Archinycteribia actena Speiser Fig. 44.

Archinycteribia actena Speis., 1901: 31, pl. 3 (6, 8, 12), ♂, orig. des., type formerly in Berlin Mus., now lost.

PREVIOUS RECORD. No such for Australia. The type was ex *Dobsonia "peroni,"* New Britain: Ralum nr Rabaul.

MATERIAL. 4 ♂♂, 1 ♀ (MCZ), ex *Dobsonia* sp. (#138), Coen, Qld.

HABITAT. Cave-dwelling, parasitic normally on *Dobsonia*. In Australia, known only from Cape York Penin. at 14° S; extralimital distribution: Celebes to Solomon Is.

AFFINITIES. This species differs from the only congener, *octophthalma* Theod. (ex *Penthetor lucasi*, Malaya, Borneo), in the following characters: Head in profile nearly 2× as long as high (not hardly longer than high), eye 1-faceted (not 4-faceted); notum long and narrow, tibiae ca 4×(not 3×) as long as corresponding basitarsi; ♂ sternite 4 much shorter than (not slightly longer than) synsternite 5+6, clasper ca 6× as long as wide and pointed at apex; ♀ tergite 6 divided at middle, not entire, side-pieces of sternite 6 widely separated from one another.

Genus **Basilia** Miranda Ribeiro 1903

This genus is widespread all over the world and contains nearly 100 described species which are so diverse in structure that there exists no satisfactory scheme for subgeneric classification. The Australian species were assigned by some authors to the subgenus *Tripselia* Scott 1917 but are segregated in this paper into 4 groups (outstanding characters of each group are *italicized*) as enumerated below. The name *Tripselia* is not accepted here since, in the current usage, it is clearly not a natural taxon but an assemblage of remotely related forms.

(a) Group Blainvillii. Head capsule dorsally with patch of 12±setae. Thoracic sternal plate (fig. 52) posteriorly fringed with rather uniform short setae; its median suture widened at middle; *legs* (fig. 88, 101) *unusually long and slender*, ♂ femora 2 and 3 lacking patch of sensory pores, ♀ femur 3 much narrower than femur 2 and with upper margin very weakly concave, tibiae ca 7×as long as wide, with 1st row of ventral bristles arising from a point very slightly basad to tibial midlength, basitarsi ca 4 × as long as 4 corresponding apical tarsomeres together. Abdomen: Ctenidium flanked at lateral ends by strong setae, lateralmost ctenidial tooth slightly shorter than median and submedian teeth; ♂ tergites 5-6 (but not 4) each posteriorly with 2-3 pairs of outstandingly long bristles; ♀ tergite 6 present, always entire; ♂ genital deckplate (fig. 150) nearly as long as wide; ♀ postgenital plate small, surface with numerous microsetae. On Emballonuridae. 1 species: *techna* n. sp:

(b) Group Falcozi. Head capsule dorsally with only 6 ± setae. Setae fringing posterior margin of thoracic sternal plate much varied in length and robustness, 1 or 2 pairs of them reaching or surpassing level of posterior margin of synsternite 1+2; median suture of that plate widened at middle; legs moderately long, ♂ femora 2 and 3 lacking patch of sensory pores, ♀ *femur 3* (fig. 89-95) *quite dissimilar in shape to femur* 2, apical 1/2 of upper margin distinctly concavely curved, tibiae ca 4.5× as long as wide,

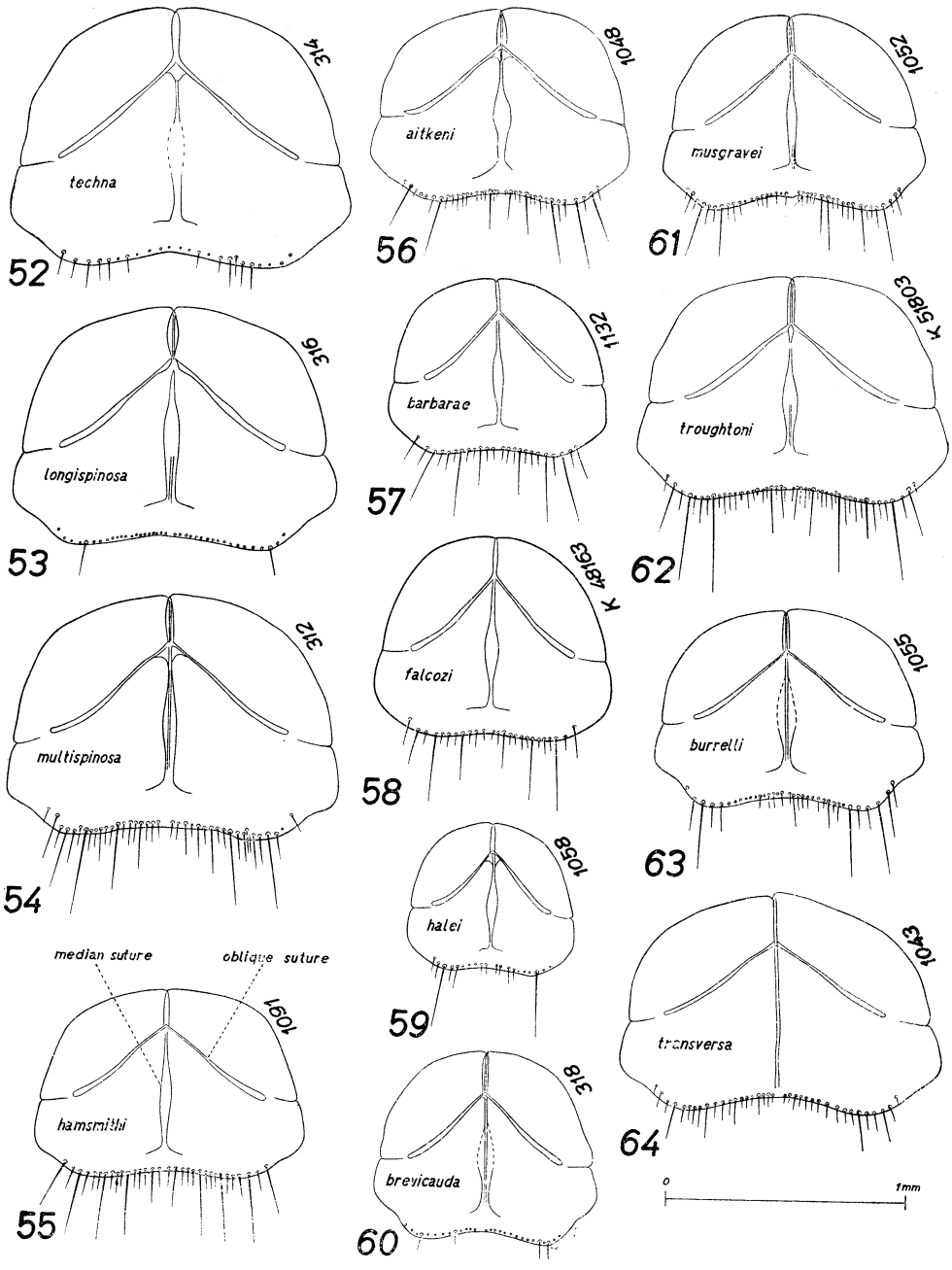


Fig. 52-64. *Basilia*, ♀ thoracic sternal plates. Drawn to same scale; setae on surface of the plates omitted. For ♂ thoracic sternal plate of *B. nodulata*, see fig. 207.

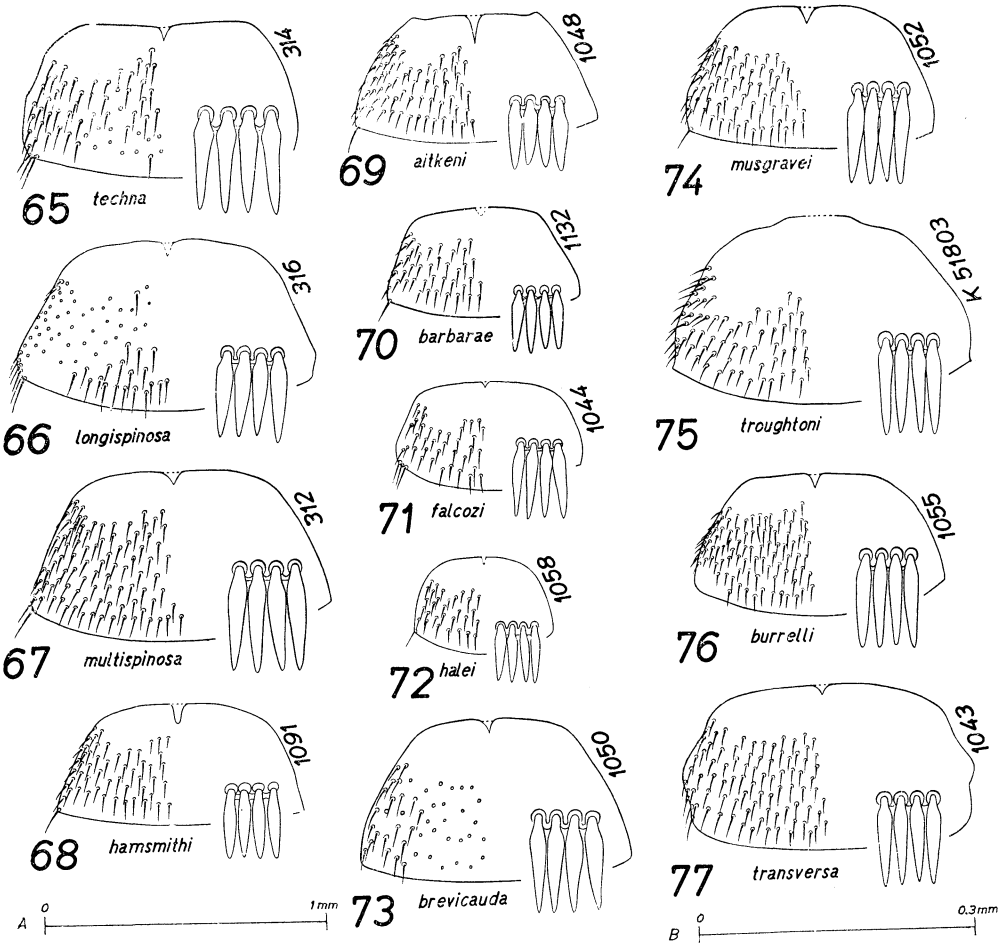


Fig. 65-77. *Basilia,* ♀ synsternites 1+2 and submedian teeth of abdominal ctenidia. Drawn to same scale (scales A and B for the former and latter, respectively). Note the presence of setae at posterolateral corners of the synsternites in certain species.

with 1st row of ventral bristles arising from tibial midlength or basad to that point, basitarsi ca 1.5× as long as 4 corresponding apical tarsomeres together. Abdomen: Ctenidium (fig. 87) flanked at lateral ends by strong setae, lateralmost ctenidial tooth slightly shorter than median and submedian teeth; ♂ tergites 5-6 (but not 4) each posteriorly with 2-3 pairs of outstandingly long bristles; ♀ tergite 6 present, always entire; ♂ genital deckplate (fig. 151-155) fairly long; ♀ postgenital plate small, with numerous microsetae on surface. On Vespertilionidae. 7 species: *longispinosa* Musgr., *multispinosa* Musgr., *hamsmithi* n. sp., *aitkeni* n. sp., *barbarae* n. sp., *falcozi* Musgr., *halei* Musgr.

(c) Group Brevicauda. Head capsule dorsally with only 6 ± setae. Posterior fringe of thoracic sternal plate as in Group Falcozi; median suture of that plate widened at middle; legs moderately long, ♂ *femora 2 and 3* (fig.78, 79) *each with patch of sensory*

pores on anterior surface near base, ♀ femur 3 similar in shape to femur 2, tibiae ca 4.5× as long as wide, with 1st row of ventral bristles arising from tibial midlength or basad to that point, basitarsi ca 1.5× as long as 4 corresponding apical tarsomeres together. Abdomen: Ctenidium (fig. 86) not flanked at lateral ends by strong setae, *lateralmost ctenidial tooth only 1/2 or even 1/3 as long as median and submedian teeth;* ♂ tergites 4-6 (in 1 species, only 5-6) each posteriorly with 2-3 pairs of outstandingly long bristles; ♀ tergite 6 present, usually represented by pair of widely separated plates; ♂ *genital deckplate* (fig. 157-160) *short;* ♀ postgenital plate small, with numerous microsetae on surface. On Vespertilionidae. 5 species: *nodulata* n. sp., *brevicauda* Musgr., *musgravei* Theod., *troughtoni* Musgr., *burrelli* Musgr.

(d) Group Transversa. Head capsule dorsally with only 6± setae. Thoracic sternal plate (fig. 64) very short, posteriorly fringed with rather uniform short setae; median suture of that plate not widened at middle; legs (fig. 100, 231) rather short, femora widest near midlength, femur 3 similar in shape to femur 2, tibiae (fig. 231) ca 4× as long as wide, with lst row of ventral bristles arising from a point clearly apicad of tibial midlength, basitarsi ca 1.5 as long as 4 corresponding apical tarsomeres together. Abdomen: Ctenidium not flanked at lateral ends by strong setae, lateralmost ctenidial tooth much shorter than median and submedian teeth; ♀ *tergite 6 undefinable;* ♀ *postgenital plate* (fig. 230) *unusually large*, surface lacking microsetae. (♂ unknown). On Vespertilionidae. 1 species: *transversa* n. sp.

The following characters are common to all Australian species and are therefore not repeated in the descriptions: Head capsule weakly compressed bilaterally; eyes absent; 9-15 notopleural setae, notopleurite moderately wide, notum weakly widened posteriorly; posterior margin of ♂ synsternite 5+6 very weakly notched at middle, with 2 rows of blunt spines, spines of 2nd row slightly longer than in lst row; ♂ claspers in ventral view straight, slender, evenly tapering apicad, pointed and darkened at apex, in lateral view hardly decurved at apex; ♀ sternite 7 entire or incompletely divided at middle.

Key to Australian Basilia Species

1. Legs (fig. 88, 101) unusually long and slender, femur 3 more than 1.5 × as long as thoracic sternal plate, tibia 3 ca 7 × as long as wide and with apical 1/4 gently narrowed apicad; dorsum of head capsule anteriorly with patch of 12 ± setae in 3-5 rows; posterior fringe of thoracic sternal plate (fig. 52) composed of rather evenly short and robust setae, all similar in length and robustness to those on surface of synsternite 1+2; ♀: apical 2/3 of anterior surface of femur 3 similarly setose as in femur 2; ♂: surface of tergite 6 (fig. 161) slightly more scantly setose than in tergites 3-5 ..... **techna**

Legs not so long and slender as described above, apical 1/4 of tibia 3 usually strongly narrowed apicad; dorsum of head capsule anteriorly with ca 6 (4+2) setae in 2 rows; posterior fringe of thoracic sternal plate composed of either rather uniformly short fine setae (in ***transversa***, fig. 64), or quite unevenly long robust plus short fine setae (in remaining species); ♀: apical 2/3 of anterior surface of femur 3 usually less profusely setose than in femur 2; ♂: surface of tergite 6 either entirely bare or distinctly more scantly setose than in tergites 3-5 2

2(1). Thoracic sternal plate (fig. 64) very short, setae of posterior fringe rather uniformly short and fine, longest of which not reaching midlength of synsternite 1+2, median suture even in width, not widened at middle; legs (fig. 100, 231) short and wide, 1st row of ventral bristles of tibia 3 arising from a point clearly apicad to tibial midlength; ♀: tergite 1 (fig. 229) ca 2× as wide as long, tergite 6 (in unique type) apparently undefinable, apical lobes of tergite 2 ca 1/2 as wide as hind part of anal segment, preapical setae of sternite 7 (fig. 232) regularly arranged and closely parallel to apical fringe, postgenital plate (fig. 230) unusually large, not microsetose on surface; ♂ unknown ..... **transversa**

Thoracic sternal plate (fig. 53-63) distinctly longer in proportion than that shown in fig. 64, setae of its posterior fringe much varied in length and robustness, with 2-4 pairs of long setae which reach or (usually so) much surpass midlength of synsternite 1+2, median suture distinctly widened at middle; legs much longer, narrower in proportion than that shown in fig. 100 and 231, 1st row of ventral bristles of tibia 3 arising from tibial midlength or from a point clearly basad to midlength; ♀: tergite 1 not or hardly wider than long, tergite 6 clearly definable particularly by presence of its strong setae, apical lobes of tergite 2 never so wide as described above, preapical setae of sternite 7 loosely, rather irregularly arranged, postgenital plate normal in size, with numerous microsetae besides some strong setae 3

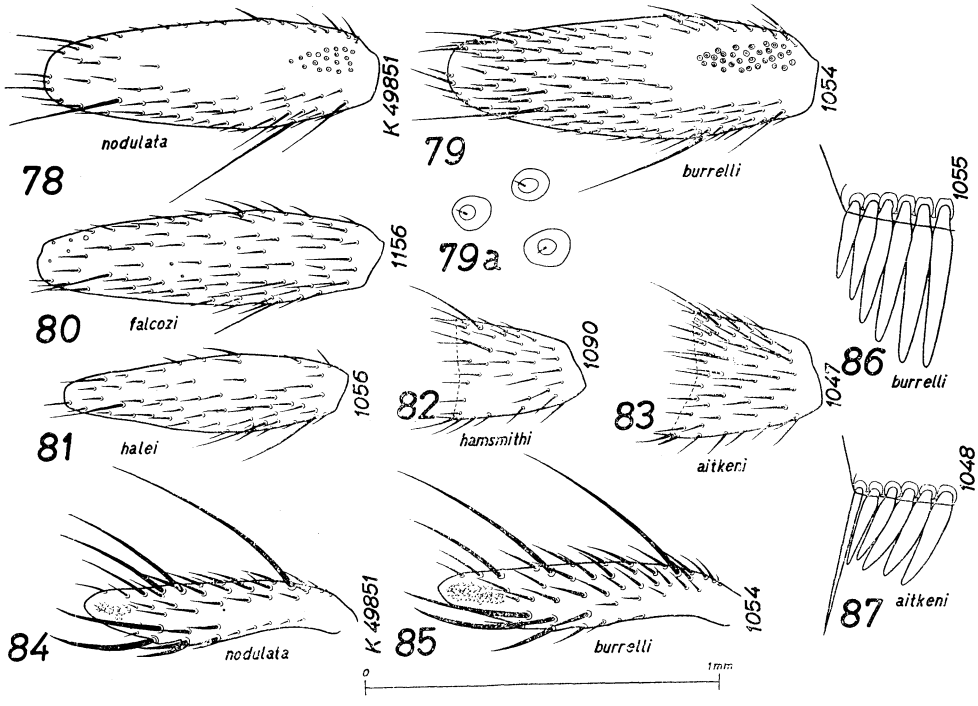


Fig. 78-87. *Basilia.* ♂ Femora 3, anterior surface (78-81), sensory pores on ♂ femur 3, more enlarged (79a), ♂ femora 2, anterior surface, parts basad to pale rings (82-83), ♂ tibiae 3, anterior surface (84-85), ♀ abdominal ctenidia, lateral sections, showing presence or absence of flanking setae and relative length of ctenidial teeth (86-87). All except fig. 79a and 86-87 drawn to same scale.

3(2). Abdominal ctenidium (fig. 86) not flanked by strong setae at lateral ends (in ***musgravei***, occasionally with 1 such seta on right or left side), lateralmost ctenidial tooth ca 1/2 or even 1/3 as long as median and submedian ones in average; ♀: femur 3 similar in shape to femur 2, relatively short and robust, with apical 1/2 of upper margin in profile either very weakly concavely or convexly curved, disc of lateral connexivum (fig. 210, etc.) always with 1 row of long setae each at levels of posterior margins of sternites 3 and 4, posterior fringe of sternite 7 (fig. 212 etc.) always composed of short setae at middle and much longer ones on sides; ♂: femora 2 and 3 (fig. 78, 79) each with patch of sensory pores near base of anterior surface, tergite 4 (fig. 208 etc.) (except in ***burrelli***), as in tergites 5 and 6, posteriorly with 2-3 pairs of outstandingly long bristles, anal segment dorsally with median length smaller than basal width and with anterior 1/2 of surface entirely bare, genital deckplate (fig. 157-160) much shorter than wide.....4

Abdominal ctenidium (fig. 87) always flanked at each lateral end by 1-3 strong setae, lateralmost ctenidial tooth hardly shorter than median and submedian ones in average; ♀: femur 3 dissimilar in shape to femur 2, relatively long and slender, with apical 1/2 of upper margin in profile distinctly concavely curved, disc of lateral connexivum usually uniformly covered with short pustulate spines, only occasionally with 1 row of long setae at level of sternite 3 (very seldom at levels of both sternites 3 and 4), posterior fringe of sternite 7 composed of either entirely long setae, or short setae at middle and long ones on sides, (setae of tergite 6 always arranged in single transverse or transversely arcuate series); ♂: femora 2 and 3 lacking sensory pores, tergite 4 (fig. 166 etc.), as tergites 2-3 but not 5-6, never with such outstandingly long bristles, anal segment dorsally with median length subequal to or greater than basal width and with surface more extensively setose than described above, genital deckplate (fig. 151-156) as long as or longer than wide.....12

4(3). ♀.....5

♂.....8

5(4). Tergite 6 (fig. 210, 211) entire (or, very seldom, divided into 5 small pieces), with single continuous series of setae; lateral connexivum with an oblique series of 2-6 long setae near outer side of each apical lobe of tergite 2 and lined in parallel to lateral marginal setae of that tergite; apical 1/2 of anterior surface of femur 3 (fig. 96) with quite scattered setae.....**brevicauda**

Tergite 6 (fig. 216, 221, 226) widely interrupted at middle and clearly divided into pair of roundish setose lobes; lateral connexivum lacking such long setae; apical 1/3 or 1/2 of anterior surface of femur 3 (fig. 97-99) with fairly evenly distributed setae.....6

6(5). Apical lobes of tergite 6 (fig. 221, 226) each about as long as wide, strongly protruding laterad beyond level of apical lobe of tergite 2, setae on each lobe arranged in a longitudinally arcuate series; lateral connexivum with longitudinal patch of 5 ± rows of long setae between levels of sternites 3 and 5 but lacking long setae near abdominal spiracles 6 and 7; setae on lateral parts of surface of sternite 3 distinctly longer those on median part; 3rd row of ventral bristles of tibia 3 (fig. 111, 112) much surpassing level of tibial apex; preapical setae of sternite 7 (fig. 222, 227) uniform in length and lined in an either complete or medially interrupted series.....7

Apical lobes of tergite 6 (fig. 216) each ca 1/2 as long as wide, lying immediately behind or below those of tergite 2, setae on each lobe arranged in a transversely arcuate series; lateral connexivum with 1 row of long setae each at levels of posterior margins of sternites 3 and 4 (setae between these 2 rows very short, hence not forming above-described longitudinal patch) and with 5 ± moderately long robust setae near abdominal spiracles 6 and 7; setae on surface of sternite 3 uniformly short, lateral ones not markedly longer than median ones; 3rd row of ventral bristles of tibia 3 (fig.

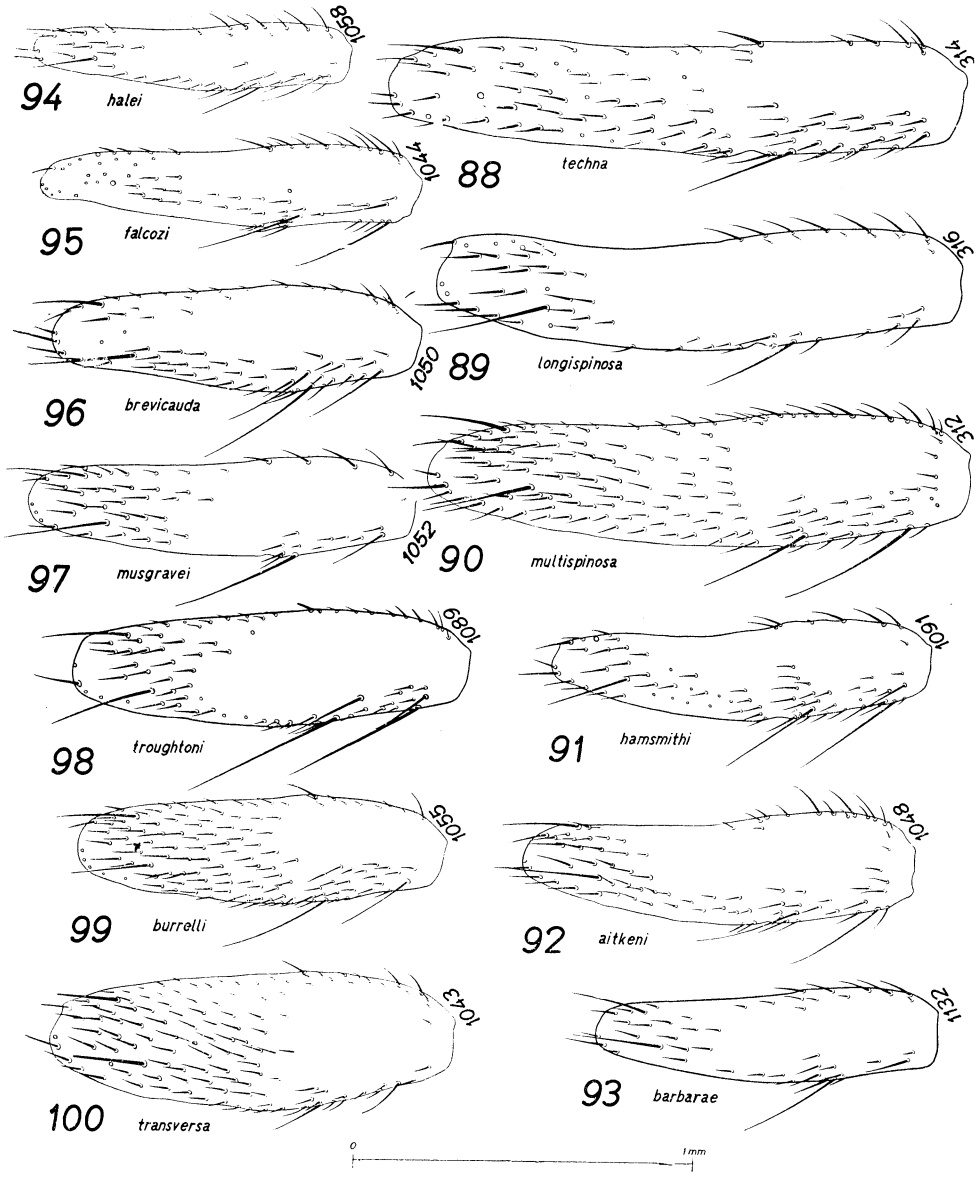


Fig. 88-100. *Basilia,* ♀ femora 3, anterior surface, all at same magnification.

110) hardly surpassing level of tibial apex; preapical setae of sternite 7 (fig. 217) uneven in length and rather irregular in arrangement, median ones distinctly shorter and closer to posterior margin, not quite in alignment with lateral ones.....**musgravei**

7(6). Apical bristles of tergite 1 (fig. 221) normal, slender, sharply pointed at apex, distinctly finer, longer than those of tergite 2; lateral lobes of tergite 6 subcylindrical, with 7 ± setae in double series; posterior end of lateral connexivum with, besides very short pustulate spines, 1, occasionally 2, rows of long setae; postgenital plate (fig. 223) small, ca 2× as long as its major setae; posterior fringe of sternite 6 and preapical setal row of sternite 7 (fig. 222) both interrupted at middle.....**troughtoni**

Apical bristles of tergite 1 (fig. 226) unusually heavy, spine-like, blunt at apex, as robust and only ca 1/3 as long as those of tergite 2; lateral lobes of tergite 6 conical, each with 3 ± setae in single series; posterior end of lateral connexivum entirely covered with very short pustulate spines, no long setae; postgenital plate (fig. 228) large, as long as or shorter than its major setae; posterior fringe of sternite 6 and preapical setal row of sternite 7 (fig. 227) both continuous, not interrupted at middle....**burrelli**

8(4). Tergites 4-6 (fig. 203, 208, 214, 219) posteriorly each with 2-3 pairs of outstandingly long bristles, surface of tergite 2 with 1-2, rarely 3, rows of erect spine-like setae, that of tergite 3 bare (in *troughtoni*, occasionally with single short row of small preapical setae at middle); short setae of posterior fringes of tergites 2-3 replaced by robust spines; lower lobe of paramere (fig. 145-148) apically rounded or angulated, not produced, aedeagus (fig. 133-136) broad.....9

Tergites 5 and 6, but not 4 (fig. 224), each with 2-3 pairs of outstandingly long bristles, surface of tergite 2 with 4-5 rows of erect fine setae, that of tergite 3 with conspicuous patch of discal setae; short setae of posterior fringes of tergites 2 and 3 normal, slender, not spine-like; paramere (fig. 149) apically deeply bilobed, lower lobe distinctly produced; aedeagus (fig. 137) slender.....**burrelli**

9(8). Surface of tergite 2 (fig. 203, 208, 214) with 1-2 spine-rows, setae of posterior fringes of all tergites less numerous and less closely arranged, for instance, fringe of tergite 3 composed of 40 ± setae; body rather slender, 2.0-2.4 mm long; venter of anal segment (fig. 123, 125, 204) rather scantly setose 10

Surface of tergite 2 (fig. 219) with 3 spine-rows plus some setae out of alignment, setae of posterior fringes of all tergites more numerous (i.e., more closely arranged), for instance, fringe of tergite 3 composed of 60 ± setae; body robust, 2.6-2.7 mm long; venter of anal segment (fig. 124) profusely setose.....**troughtoni**

10(9). Apical 2/3 of anterior surface of femur 2 practically as scantly, unevenly setose as in femur 3, distinctly less profusely setose than in femur 1; dorsal surface of anal segment (fig. 203, 208) with 20 ± spines, spines on posterior margins of tergites 5 and 6 distinctly shorter than those on posterior margin of anal segment, posterior fringe of tergite 6 usually with narrow gap at middle; thoracic sternal plate narrower in proportion (41×52) 11

Apical 2/3 of anterior surface of femur 2 as richly, evenly setose as in femur 1 and markedly more profusely setose than in femur 3; dorsal surface of anal segment (fig. 214) with only 10 ± spines, short spines on posterior margins of tergites 5 and 6 subequal in length to those on posterior margin of anal segment, posterior fringe of tergite 6 with wide gap at middle; thoracic sternal plate wider in proportion (42×55) .....**musgravei**

11(10). Teeth of abdominal ctenidium (fig. 205) abnormal, clearly nodulate near base; aedeagus (fig. 133) long, paramere (fig. 145) narrowly rounded at apex.....**nodulata**

Teeth of abdominal ctenidium normal; aedeagus (fig. 134) short, paramere (fig. 146) broadly rounded at apex.....**brevicauda**

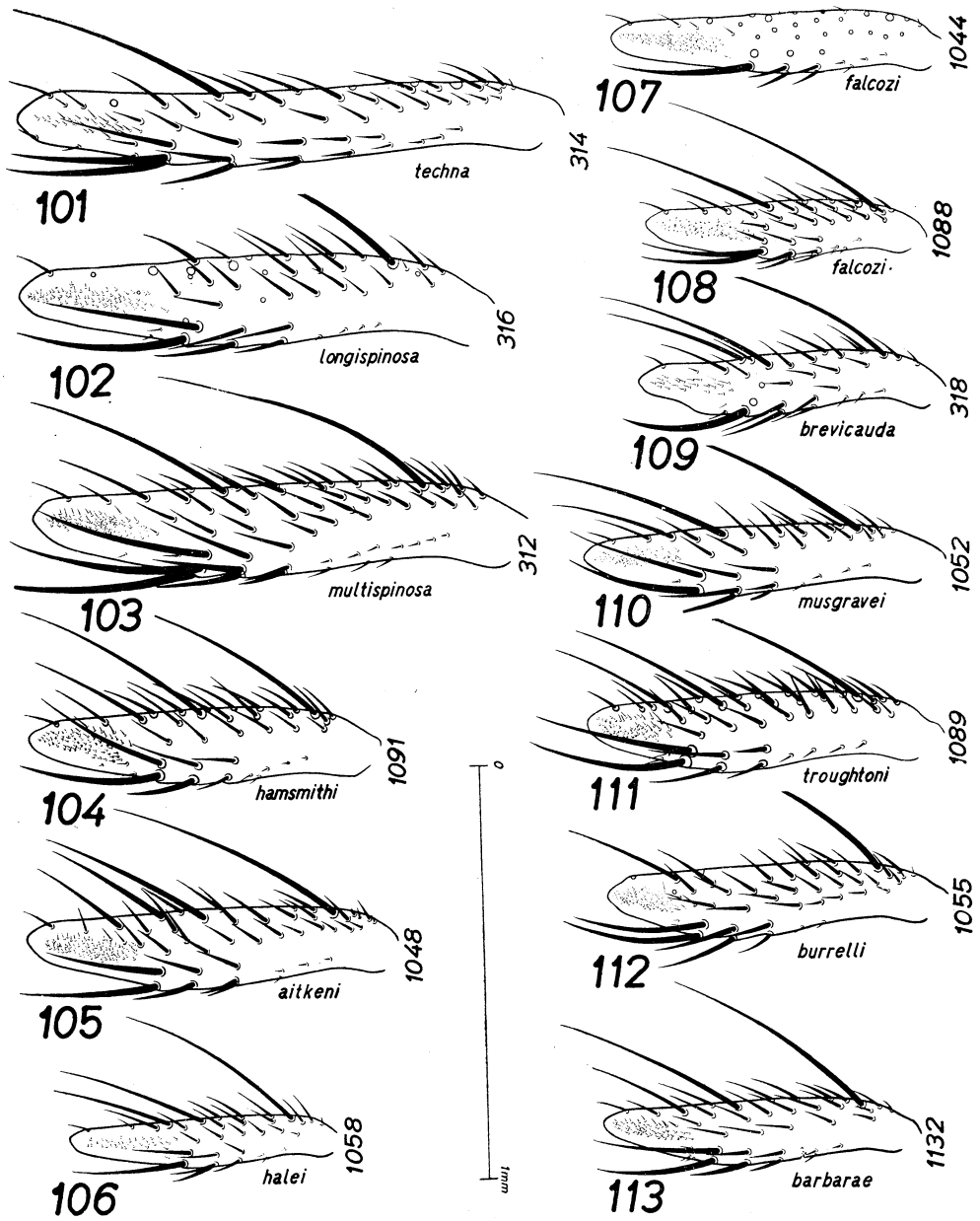


Fig. 101-113. *Basilia*, ♀ tibiae 3, anterior surface, all at same magnification. For ♀ tibia 3 of *B. transversa*, see fig. 231.

12(3). Body exceedingly long and robust, length 3.4-3.7 mm; ♀: tergite 2 (fig. 173) densely, evenly setose all over surface, its apical lobes each with 2-3 rows of spines plus 1 row of of bristles, anterior surface of femur 3 (fig. 90) richly setose at apical 2/3, that of femur 2 almost as profusely, extensively setose as in femur 1; ♂: surface of tergites 2 and 3 (fig. 171) exceedingly richly setose, that of tergite 6 bare besides 1 row of preapical setae, anterior 1/2 of dorsum of anal segment extensively bare, anterior surface of femora 1 and 2 virtually similar to one another in robustness and distribution of setae, basal 2/3 of anterior surface of femur 3 medially extensively bare whereas apical 1/3 evenly setose, thoracic sternal plate clearly transverse.....**multispinosa**

Body at most moderately robust, length (except in *longispinosa* for which, see next couplet) not more than 2.6 mm; ♀: tergite 2 sparsely and/ or unevenly setose on surface, its apical lobes each with 1 row of spines plus 1 row of bristles, anterior surface of femur 3 largely bare, that of femur 2 distinctly more scantly and less extensively setose than in femur 1; ♂: not in above combination.....13

13(12). Body 3.0-3.6 mm long; ♀: posterior margin of tergite 1 (fig. 168) with 7-9 pairs of very long (0.6 ± mm) bristles, median line of tergite 2 usually with 2-3 pairs of setae, surface of sternite 7 (fig. 169) with 25-32 setae, femur 3 (fig. 89) 1.7 ± mm long, basal 2/3 of its anterior surface very extensively bare; ♂: surface of tergites 2 and 3 (fig. 166) profusely setose, dorsum of anal segment extensively spinose, setae on anterior surface of femur 2 distinctly finer, less evenly distributed than in femur 1, basal 2/3 of anterior surface of femur 3 medially extensively bare and apical 1/3 evenly setose.....**longispinosa**

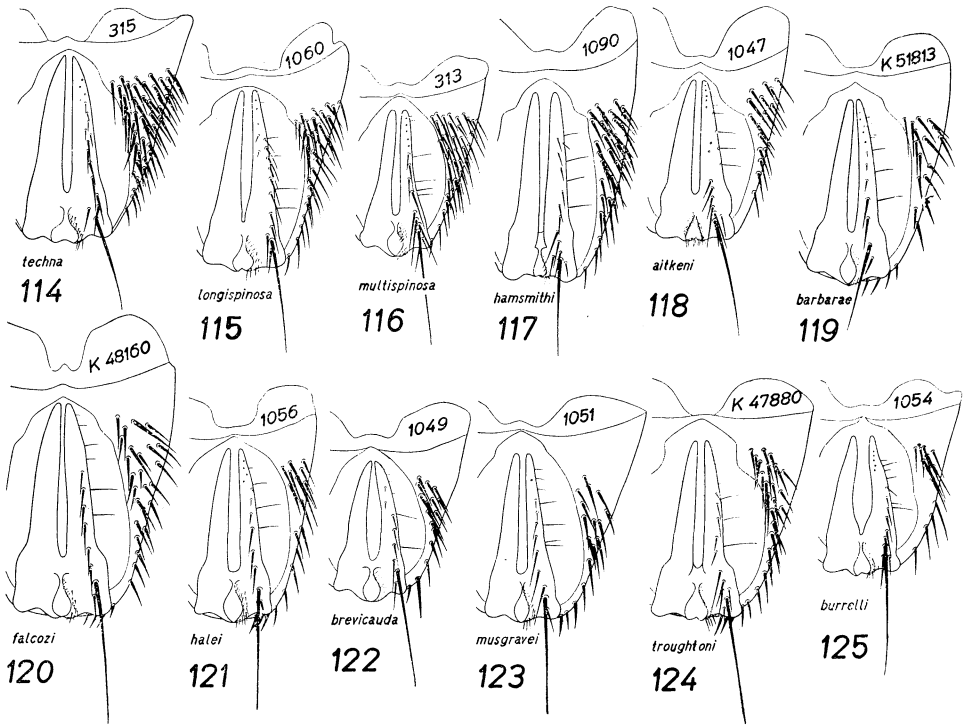


Fig. 114-125. *Basilia*, ♂ anal segments and claspers, ventral view, magnifications varied.

Body not more than 2.6 mm long; ♀: posterior margin of tergite 1 with 3-6 pairs of moderately long (0.4 mm or less) bristles, median line of tergite 2, except in very small specimens, usually with 5-7 pairs of spines, surface of sternite 7 with 8-14 setae, femur 3 at most 1.3 mm long, basal 2/3 of its anterior surface not so extensively bare as in fig. 89; ♂: not in above combination 14

14(13). Thoracic sternal plate (fig. 55, 56) as long as (♂) or shorter than (♀) width of synsternite 1+2, clearly transverse, ca 2/3 as long as wide, anterior margin parallel or subparallel to posterior margin, never strongly curved; ♂: surface of tergite 3, except its extreme lateral areas, as densely and extensively setose as in tergite 2 15

Thoracic sternal plate (fig. 57-59) markedly longer than width of synsternite 1+2, and except in ***barbarae*** (which is confined to Tasmania and SE Australia mainland, and to ***Vespadelus pumilus***), hardly shorter than wide and with anterior margin almost always strongly curved, not parallel to posterior margin; ♂: surface of tergite 3 distinctly less profusely setose than that of tergite 2 16

15(14). Tibia 1 distinctly shorter than, while tibia 2 as long as, thoracic sternal plate; ♂: anterior surface of femur 2 (fig. 82) clearly less evenly, less profusely setose than that of femur 1, setae on its basal 1/3 quite uneven in distribution and length, sternites 3 and 4 posteriorly fringed with loosely arranged setae, lateral parts of surface of tergite 6 usually with 1-2 setal rows, paramere (fig. 141) unilobed at apex; ♀: posterior fringe of sternite 7 (fig. 179) with loosely arranged setae, anal segment with 12 ± setae on each side before laterolateral corner ..... **hamsmithi**

Tibia 1 as long as, tibia 2 distinctly longer than thoracic sternal plate; ♂: anterior surface of femur 2 (fig. 83) practically as evenly and richly setose as that of femur 1, sternites 3 and 4 posteriorly fringed with closely arranged setae, lateral parts of surface of tergite 6 never with setal rows, paramere (fig. 142) bilobed at apex; ♀: posterior fringe of sternite 7 (fig. 184) with more or less closely arranged setae, anal segment with 6 ± setae on each side before posterolateral corner ..... **aitkeni**

16(14). Thoracic sternal plate (fig. 57) clearly transverse, ca 7/9 as long as wide; median length of ♂ genital deckplate (fig. 156) smaller than anterior width; width of ♀ synsternite 1+2 greater (38: 35) than distance between posterior ends of oblique sutures of thoracic sternal plate; body length 2.0-2.3 mm, labella as long as or shorter than width of labial theca, aedeagus (fig. 131) distinctly curved in S-shape ..... **barbarae**

Thoracic sternal plate (fig. 58, 59) seemingly as long as wide; median length of ♂ genital deckplate (fig. 155, 197) as great as or greater than anterior width; width of ♀ synsternite 1+2 equal to or smaller than distance between posterior ends of oblique sutures of thoracic sternal plate; body length, labella length and aedeagus shape not in above combination 17

17(16). Body at least 1.9 mm long; ♂: anterior surface of femur 2 (fig. 80) rather evenly, profusely setose, aedeagus (fig. 197) straight; ♀: synsternite 1+2 (fig. 71) normal in shape, ca 1.7 × as wide as long, surface of tergite 2 (fig. 194, 195) with 40 or more spines, which are never distinctly darker than those on lateral connexivum. ..... **falcozi**

Body 1.4-1.6 mm long; ♂: anterior surface of femur 2 (fig. 81) markedly unevenly setose, aedeagus (fig. 132) distinctly curved in S-shape; ♀: synsternite 1+2 (fig. 72) unusual in shape, ca 1.3 × as wide as long, surface of tergite 2 (fig. 200) with only 20 ± spines, which are usually much darker than those on lateral connexivum ..... **halei**

Basilia techna Maa, new species Fig. 52, 65, 88, 101, 114, 126, 138, 150, 161-165.

MATERIAL. 15 ♂♂, 15 ♀♀. Holotype ♀ in S. Aust. Mus.

Ex *Taphozous georgianus:* 3 ♂♂, 4 ♀♀ (SAM, incl. holotype ♀), Lawn Hill; 3

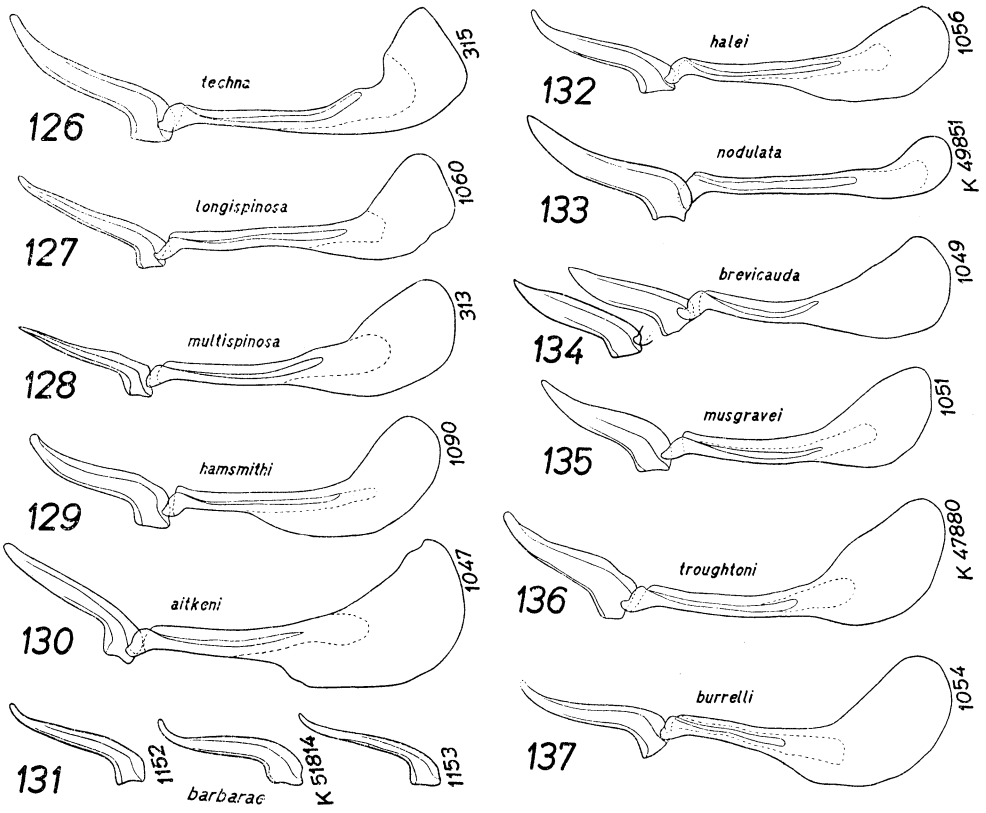


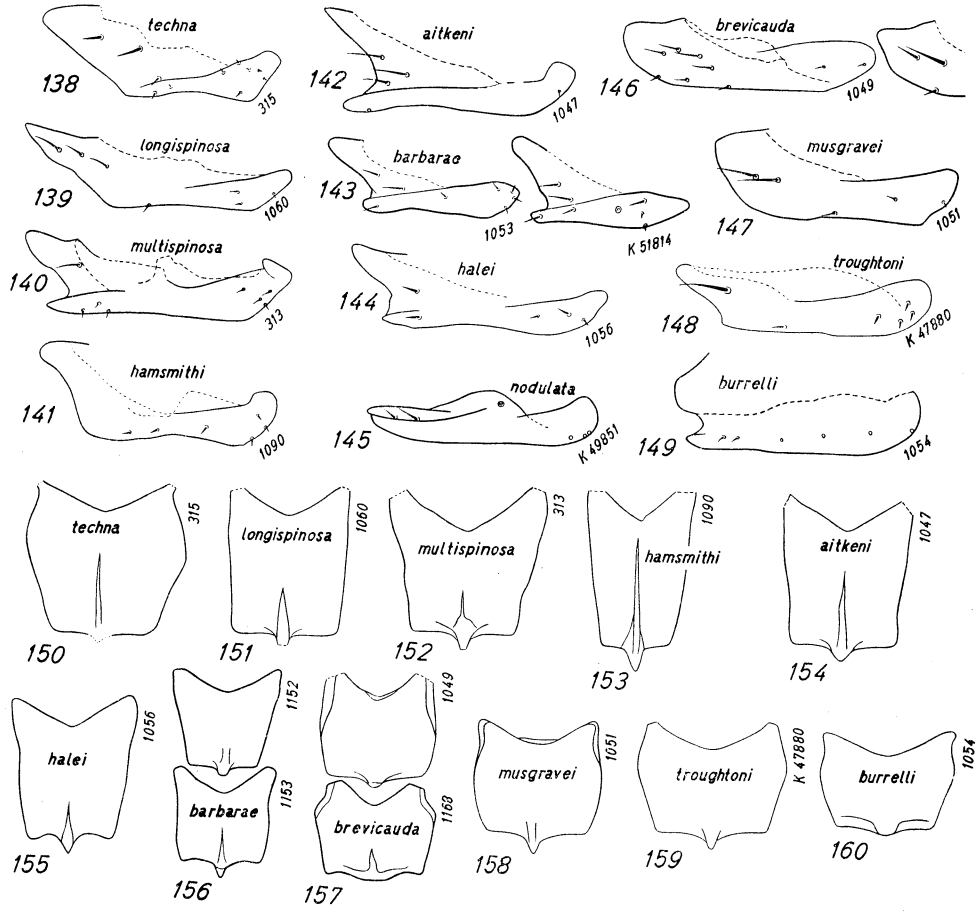
Fig. 126-137. *Basilia,* aedeagi and aedeagal apodemes, lateral view, magnifications varied. Fig. 131 and 134 showing intraspecific variation; for such variation in *B. falcozi*, see fig. 197.

♂♂, 5 ♀♀, Mt Isa; 1 ♂, 1 ♀ (SAM), Green Ant Ck.; 2 ♀♀ in 2 lots(AM), Louie Ck. — Ex *T. troughtoni:* 1 ♂, 1 ♀ (UQD), Capella; 2 ♂♂ (AM), Mt Cityan; 1 ♂ (ANIC), Olsens Caves. — Ex *Taphozous* sp.: 2 ♂♂ (ANIC), Many Peaks Ra.; 2 ♂♂, 2 ♀♀ (AMNH), Red Bank Mine.

HABITAT. A cave-dwelling species. Evidently confined to *Taphozous* (Emballonuridae) and to the tropical zone of Australia; at present known from Queensland (Capella, Mt Cityan, Mt Isa, Lawn Hill, Louie Ck., Many Peaks Ra., Olsens Caves) and Northern Territory (Green Ant Ck., Red Bank Mine). The northern- and southernmost records are from Red Bank Mine nr Wollogorang (ca 16° 10' S) and Rockhampton (ca 23° 20' S) respectively.

AFFINITIES. An isolated species in Australia, *B. techna* is easily distinguishable by the robust body, very long slender legs (particularly tibiae) and short posterior marginal setae on the thoracic sternal plate. In the body size, relative length and setoseness of femora and other superficial features, *techna* is somewhat similar to *multispinosa* but

its tibiae are much longer, thoracic sternal plate anteriorly narrower and abdominal setae much sparser. The species is closely related to *blainvillii* Lch. (ex *Taphozous mauritianus*, *T. longimanus* etc., Ethiopian and western Oriental Regions), and differs chiefly in having the body much more robust and abdominal setae (particularly in the ♂) stronger and more numerous. To a lesser extent, it is related to *aequisetosa* Theod. (ex *T. peli*, W. Africa) and differs, in addition to the above-mentioned characters, by the rather uniform short setae fringing the thoracic sternal plate and longer apical bristles on the tergite 2. Since *blainvillii*, *aequisetosa* and *techna* are all parasitic on *Taphozous*, the last species may well be considered an Australian vicariiant, although there exists a quite wide gap between distributional ranges of this and the other 2 species. The name *techna* (Greek, a cunning trick, an artful device) refers to this feature of affinities and geographical gap.



Fig, 138-160. *Basilia*, parameres, lateral view (138-149) and ♂ genital deckplates (150-160), magnifications varied. Fig. 143, 146, 156 and 157 showing intraspecific variation; for such variation in *B. falcozi*, see fig. 197.

Description. *Body* brown, darker in ♂, robust, length 2.5-3.2 mm. *Head* dorso-anteriorly with patch of 12 ± setae, 4 of which lie on anterior margin. Labial theca hardly longer than wide, as long as labella; palpus 1/2 as long as profile height of head capsule. *Thorax* moderately short. Sternal plate (fig. 52) 56×71 (♂) or 56×75 (♀), narrowed anteriorly, oblique sutures forming 95° angle at middle, median suture widened at middle, surface much more finely setose than in synsternite 1+2, posterior margin gently concave, lined with rather uniform short setae. *Legs* (fig. 88, 101) very long and slender, relative lengths of ♂ femora 1-3 and tibiae 1-3 as 65: 81: 87 and 58: 63: 65; relative widths of same, 20: 21: 19 and 10: 10: 10. Anterior surface of femur 1 evenly setose all over, femur 2 similar but with small bare area near base, femur 3 extensively bare at basal 1/3. Femora 2 and 3 in ♂ lacking sensory pores, femur 2 in ♀ distinctly broader than femur 3 (20: 17), upper margin of which very weakly concave. Tibia 3 with narrow patch of pale setulae on anterior surface near apex, ca 7× as long as wide, 1st row of ventral bristles arising from a point slightly basad to tibial midlength, 3rd row apically reaching level of tibial apex. Basitarsus 3 half as long as width of thoracic sternal plate (in ♂ 37: 75) and ca 2.5 × as long as 4 apical tarsomeres together.

Abdomen of ♂ (fig. 161, 162) densely setose. Tergite 1 less than 1/2 as long as wide, surface with patch of 15 ± irregularly arranged small setae on each side, posterior fringe broadly interrupted at middle and composed of 10 ± pairs of strong erect setae. Tergites 2-3 evenly densely setose on entire surface, 4-5 similar but narrowly bare along anterior margin, tergite 6 sparsely unevenly covered with longer stronger setae; posterior fringes of tergites 2-4 composed of setae of slightly varied length, no short strong spines, fringes of tergites 5-6 composed of longer stronger setae and each including 2-3 pairs of long bristles. Anal segment moderately long, dorsal surface with anterior 1/3 and median stripe bare, remaining areas richly spinose, anterior margin straight. Synsternite 1+2 short, 22×51, anterior margin deeply notched at middle, ctenidium with 55 ± long slender closely arranged teeth and flanked on each side by 2 ± strong setae, lateralmost ctenidial tooth slightly shorter than median and submedian teeth. Relative median lengths of sternites 3, 4, 5+6 as 10: 8: 17; surface of these sternites with 2-3, 1 and 1 rows of fine setae respectively, posterolateral corners of each sternite with stronger and more numerous setae; setae of posterior fringes much varied in length and robustness. Posterior margin of synsternite 5+6 shallowly incised at middle, with 30 ± blunt spines of similar length and arranged in 2-3 rows. Ventral surface of anal segment (fig. 114) richly setose. Clasper normal for Australian *Basilia* species. Genitalia (fig. 126, 138, 150) also normal; phallobase in vertical view very broad; deckplate nearly as long as wide, widest near anterior end, lateral margin gently curved; aedeagus moderately long and slender, gently curved in S-shape; aedeagal apodeme moderately long, strongly curved along upper margin; paramere narrowly rounded and obliquely truncate at apex.

Abdomen of ♀ (fig. 163, 164) rather sparsely setose, with distinct darkened stripes and strong apical bristles on tergites 1 and 2. Tergite 1 as long as wide, slightly widened posteriorly; lateral margin straight, narrowly darkened; surface with 2 patches each of 25 ± erect setae; posterior margin also straight and narrowly darkened (median section lacking bristles and not darkened), with 6-8 pairs of bristles which are about as long and robust as those on apical lobes of tergite 2. Tergite 2 slightly longer than wide, anteromedian area bare, rest of surface moderately setose, lateral margin gently curved, with 3-4 fairly long setae; apical lobe long, narrow, with 6-8 spines and 3-5 bristles. Tergite 6 less sclerotized than tergite 2, transverse, posterior margin often concave, with 2-5 setae. Anal segment transverse, strongly narrowed posteriorly, lateral margin straight, posterior margin weakly concave, lateral surface poorly setose. Lateral connexivum uniformly covered with very short pustulate spines but 1st row of them often containing 2-3 longer setae. Synsternite 1+2 (fig. 65) fairly long, 30×49, otherwise as in ♂. Sternite 3 represented by 5 ± (at middle) to 9 ± (on sides) rows of short setae on surface plus 1 row of long setae which form its posterior fringe, short setae (except in 1st row) at middle finer but hardly shorter than those on sides; sternite 4 represented by 1 (at middle) or 2 (on sides) rows of setae; sternite 5 similarly setose, laterally forming pair of sclerotized plates; sternite 6 medially interrupted, with 2 setal rows plus a few setae out of alginment.

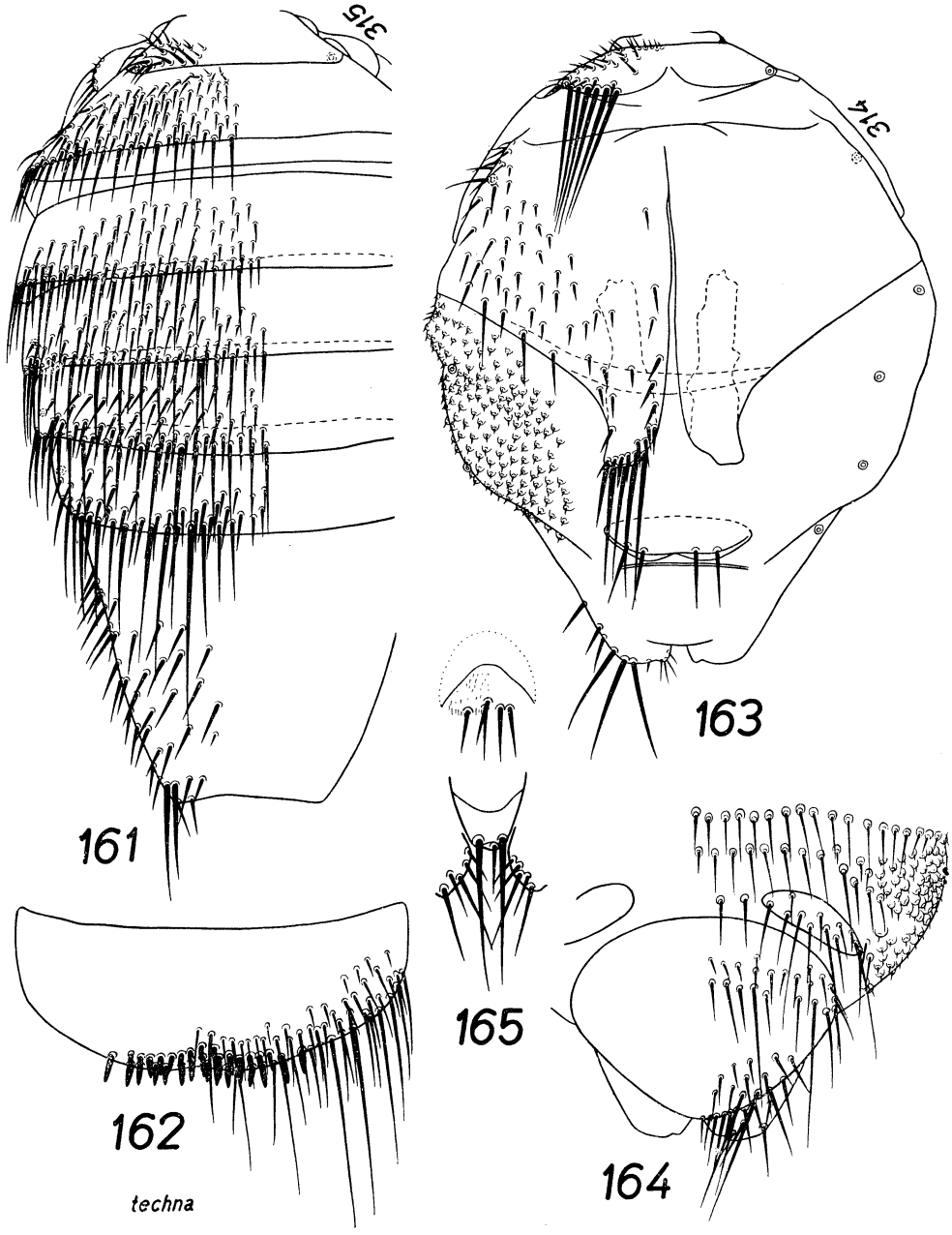


Fig. 161-165. *Basilia techna* n. sp. ♂ Abdomen, dorsal view (161), ♂ synsternite 5+6 (162), ♀ abdominal apex, ventral (164), ♀ postgenital, infra-anal, and adanal plates (165).

Sternite 7 moderately large, weakly sclerotized along median line, surface with irregularly arranged setae, posterior margin evenly rounded, loosely fringed with 15 ± setae of varied length. Postgenital plate (fig. 165) small, roundish, with 4-6 setae in 2 rows; infra-anal and adanal plates subequal in size, each with 4-6 setae of varied length in 2 rows.

Basilia longispinosa (Musgrave) Fig. 53, 66, 89, 102, 115, 127, 139, 151, 166-170.

Nycteribia (Nycteribia) longispinosa Musgr., 1927: 274, pl. 23 (7-10), ♀ ♂, key, orig. des., holotype ♀ in Aust. Mus., Sydney.
Basilia (Basilia) longispinosa: Maa, 1965: 380, list.
B. (Tripselia) longispinosa: Theod., 1967: 323, fig. 548-550, ♂ ♀, key, redes., rec.

Previous Records. 2 ♂♂, 4 ♀♀ (type series), ex *Nycticeius rueppellii*, Botany Bay; 1 ♀ (paratype), ex *Nycticeius* (?) sp., Ropes Ck. 1 ♂ (Theod. 1967), ex *N. rueppellii*, Richmond R. According to Theodor (1967: 326), the ♂ paratype was referable to *B. troughtoni* (see discussion under the latter species).

New Material. 2 ♂♂, 7 ♀♀.

Ex *Nycticeius rueppellii:* 2 ♀♀, Nimbin; 1 ♀ (ANIC), Peacock Ck.; 1 ♂, 1 ♀ (GVN), Sydney; 1 ♂, 2 ♀♀ (ANIC), Yabbra State Forest.

Ex "bat": 1 ♀ (AMNH), Koombaloomba Ck.

Habitat. Apparently confined to *Nycticeius rueppellii* (Vespertilionidae: Vespertilioninae). At present known from Queensland (Koombaloomba Ck.) and New South Wales (Botany Bay, Nimbin, Peacock Ck., Richmond R., Ropes Ck., Sydney, Yabbra State Forest). The Queensland record needs verification since it was based upon material from museum specimens of bats. The northernmost limits of distribution are uncertain, the southernmost record is from Peacock Ck. nr Bonalbo (ca 28° 4' S).

Affinities. This species is most closely related to *multispinosa* Musgr. but body less robust, setae on femora, ♂ tergite 3 and ♀ tergite 2 less numerous and less evenly distributed, whereas those on dorsal surface of ♂ anal segment more numerous and more extensive, paramere apically unilobed. From remaining species of the Group Falcozi, *longispinosa* can easily be distinguished by its large size, richly setose ♂ tergites and long apical bristles on ♀ tergite 2. In Theodor's (loc. cit.) figure, the ♀ lateral connexivum was shown as uniformly covered with very short pustulate spines. This is not true for the ♀♀ I have examined. The following relative measurements are supplementary to Musgrave's and Theodor's descriptions. Thoracic sternal plate 50×65 (♂) or 52×72 (♀); relative lengths of ♂ femora 1-3 and tibiae 1-3 as 55: 70: 75 and 51: 58: 58; relative widths of same, 20: 21: 19 and 11: 12: 12; basitarsus 3 less than 1/2 as long as width of thoracic sternal plate (25: 65) and ca 2× as long as 4 apical tarsomeres together; synsternite 1+2 as 21×43 (♂) or 31×56 (♀); relative median lengths of ♂ sternites 3, 4, 5+6 as 8: 8: 16.

Basilia multispinosa (Musgrave) Fig. 54, 67, 90, 103, 116, 128, 140, 152, 171-175.

Nycteribia (Nycteribia) multispinosa Musgr., 1927: 268, pl. 22 (5-10), ♀ ♂, key, orig. des., holotype ♀ in Aust. Mus., Sydney.
Basilia (Basilia) multispinosa: Maa, 1965: 380, list.

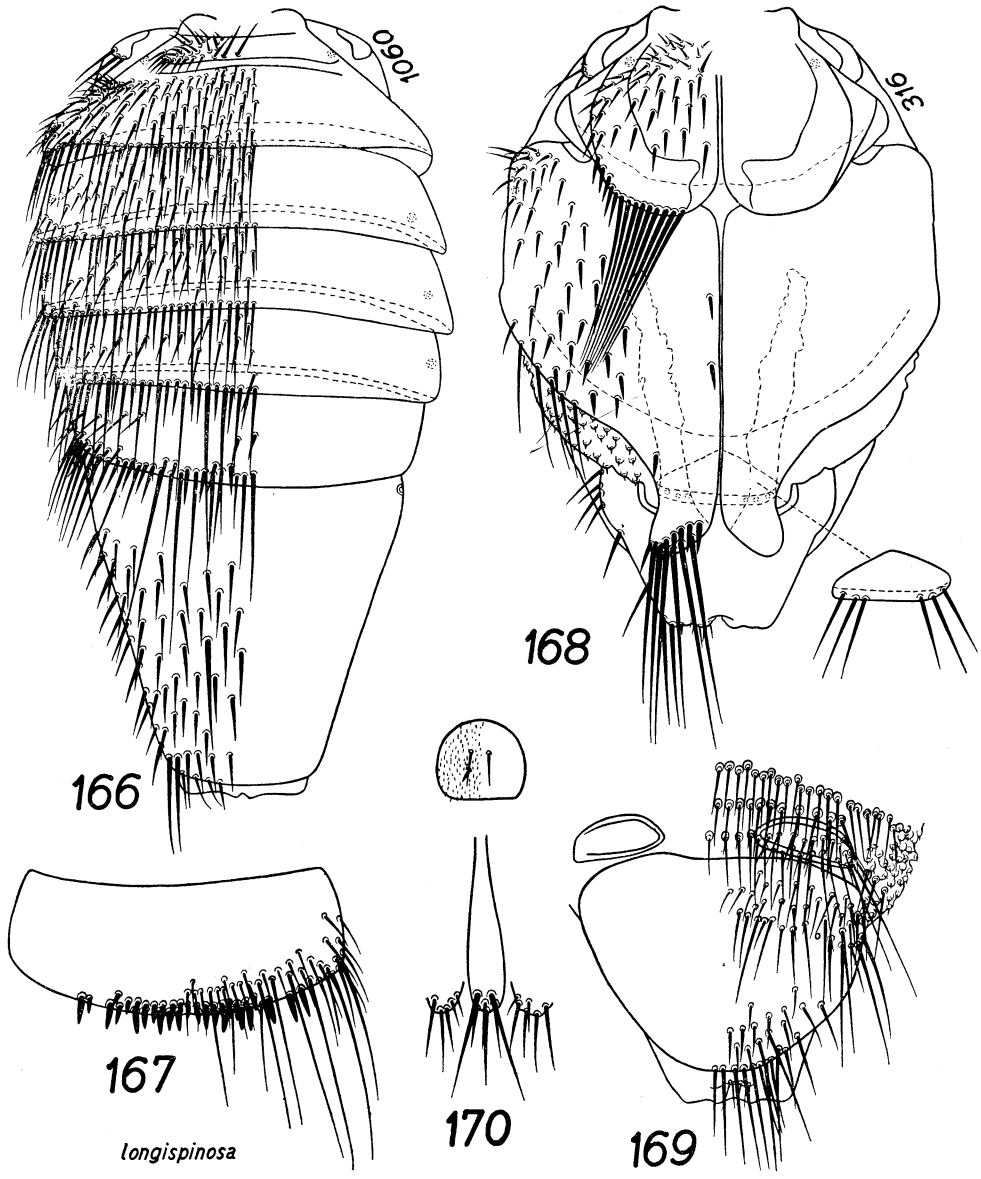


Fig. 166-170. *Basilia longispinosa* Musgr. ♂ Abdomen. dorsal view (166), ♂ synsternite 5+6 (167), ♀ abdomen, dorsal (168), ♀ abdominal apex, ventral (169), ♀ postgenital, infra-anal and adanal plates (170).

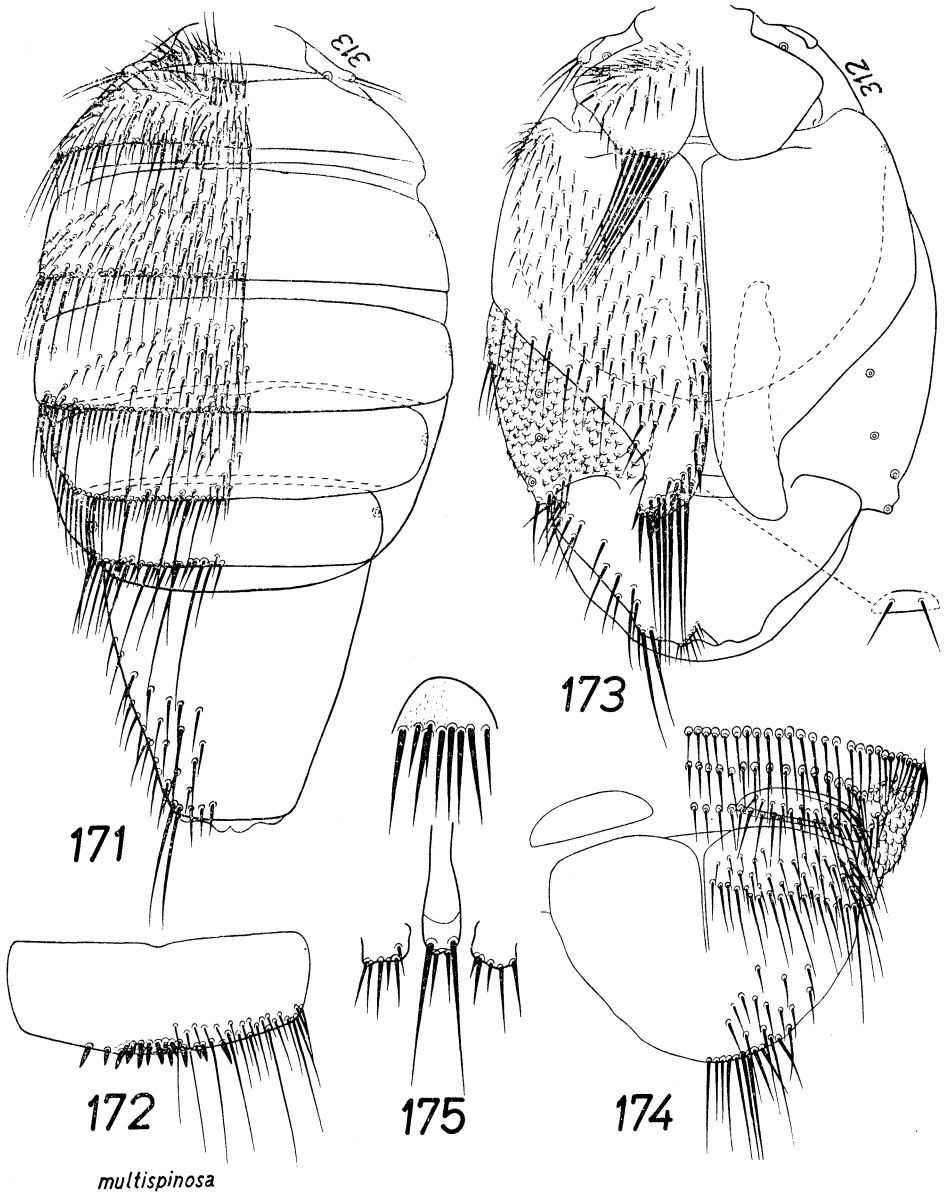


Fig. 171-175. *Basilia multispinosa* Musgr. ♂ Abdomen, dorsal view (171), ♂ synsternite 5+6 (172), ♀ abdomen, dorsal (173), ♀ abdominal apex, ventral (174) ♀ postgenital, infra-anal and adanal plates (175).

B. (*Tripselia*) *multispinosa:* Theod, 1967: 327, fig. 552-554, ♂ ♀, key, redes. of paratypes.

PREVIOUS RECORDS. 4 ♂♂, 7 ♀♀ (type series), ex *Nycticeius rueppellii*, Berrima and Barrington R.

NEW MATERIAL. 18 ♂♂, 12 ♀♀.

Ex *Pipistrellus tasmaniensis:* 2 ♂♂, 1 ♀, Bendithera; 7 ♂♂, 2 ♀♀ in 2 lots, Nettle Arch Cave; 5 ♂♂, 7 ♀♀ in 2 lots, Mt Tinderry.

Ex *Miniopterus schreibersii:* 1 ♂ (SAM), Colong Caves. — Ex "bat": 2 ♀♀ (MCZ), McPherson Ranges; 3 ♂♂ (ANIC), Hobart.

HABITAT. Probably parasitic normally on *Pipistrellus tasmaniensis* (Vespertilionidae: Vespertilioninae). There are so far 5, 2 and 1 records ex *Pipistrellus*, *Nycticeius* and *Miniopterus*, respectively. The 3 ♂♂ from Hobart were labelled as ex a small brown bat in the Town Hall, perhaps referring to *P. tasmaniensis*. The species is at present known to occur in Queensland (McPherson Range), New South Wales (Barrington R., Bendithera, Berrima, Colong Caves, Nettle Arch Cave, Mt Tinderry) and Tasmania (Hobart). The northern- and southernmost records are from McPherson Range (ca 28° 30' S) and Hobart (ca 42° 50' S) respectively.

AFFINITIES. This is the largest, most robust and apparently a generalized species of the Group Falcozi. It can immediately be recognized by the size, robustness of the body and dense setae on femora, ♂ tergites and ♀ tergite 2. Its closest relative is *longispinosa* Musgr. (q. v.). The ♀ anal segment often bears as many as 20 setae on each lateral surface and the ♂ one is extensively bare on the anterior 1/2 of the dorsal surface; the upper margin of ♀ femur 3 in profile is less concavely curved than in other species of the Group; the ♀ lateral connexivum (fig. 173), not as figured by Theodor (loc. cit.), has 3 transverse patches of long setae; the ♀ postgenital plate (fig. 175), not as in Theodor's figure, transverse. The following relative measurements are supplementary to Musgrave's and Theodor's descriptions. Thoracic sternal plate 53×72 (♂) or 52×73 (♂); relative lengths of ♂ femora 1-3 and tibiae 1-3 as 62: 76: 80 and 53: 63: 64; relative widths of same, 21: 23: 21 and 11: 12: 12; basitarsus 3 less than 1/2 as long as width of thoracic sternal plate (33: 72); synsternite 1+2 in ♂ 23×47, in ♀ 33×57; relative median lengths of ♂ sternite 3, 4, 5+6 as 10: 9: 17.

Basilia hamsmithi Maa, new species Fig. 55, 68, 82, 91, 104, 117, 129, 141, 153, 176-180.

Nycteribia (*Nycteribia*) *falcozi:* Musgr., 1927: 265, rec. (pt. of Cunnamulla series only).

MATERIAL. 13 ♂♂, 23 ♀♀. Holotype ♀ in Aust. Nat. Ins. Colln.

Ex *Myotis adversus:* 7 ♂♂, 12 ♀♀ (incl. holotype ♀), Warragamba Dam; 1 ♀ (ANIC), Kuranda; 2 ♂♂, 3 ♀♀, Nimbin; 3 ♂♂, 4 ♀♀, Samford.

Ex *Nycticeius balstoni:* 1 ♂, Griffith.

Ex *Nyctophilus* (?) sp.: 1 ♀, Gulargambone. — Ex "bat": 1 ♀ (UQD), Canungra; 1 ♀ (AM), Cunnamulla, det. Musgrave as *falcozi*.

HABITAT. Apparently confined to *Myotis adversus* (Vespertilionidae: Vespertilioninae); at present known only from Queensland (Canungra, Cunnamulla, Kuranda, Nim-

bin, Samford) and New South Wales (Griffith, Gulargambone, Warragamba Dam). The northern- and southernmost records are from Samford (ca 27° 20′ S) and Griffith (ca 34° 10′ S) respectively.

AFFINITIES. This and the next species together form a link between *multispinosa-longispinosa* on one hand, and the remaining species of the Group on the other. In the robustness of the body and setoseness of the abdomen, they are similar to the former while in the relative length of legs, they are closer to the latter. The species is named after Mr Elery Hamilton-Smith of Montmorency, Victoria. For its differences from *aitkeni*, see discussion under that species and also couplet 15 of the key.

Description. *Body* brown, robust, length 2.0-2.3 mm. *Head* dorsally with 4 setae on anterior margin and 2 slightly behind them. Labial theca slightly longer than wide, and slightly longer (♂) or slightly shorter (♀) than labella. *Thorax* short. Sternal plate (fig. 55) 41×54 (♂) or 41×58 (♀); oblique sutures forming 110° angle at middle, median suture widened at middle; anterior margin parallel or almost parallel to posterior margin, which is gently concave, hardly produced at middle and lined with numerous setae of varied length and robustness. *Legs* (fig. 82, 91, 104) moderately short, relative lengths of femora 1-3 and tibiae 1-3 as 44: 53: 56 and 35: 41: 42 in ♂, 44: 57: 62 and 35: 42: 43 in ♀; relative widths of same, 15: 15: 15 and 8.5: 9: 9.5 in ♂, 16: 17: 15.5 and 9: 9.5: 10 in ♀. Anterior surface of femur 1 rather evenly setose, that of femur 2 slightly more unevenly and sparsely so, extensively bare at basal 1/3; that of femur 3 in ♂ largely bare at basal 1/3 and unevenly setose at apical 2/3, in ♀ more poorly setose than in ♂ and with apical 1/2 of upper margin distinctly concave; no patches of sensory pores on femora 2 and 3 of ♂. Tibia 3 ca 4.5 × as long as wide, lst row of ventral bristles arising from a point clearly basad to tibial midlength, 3rd row apically reaching level of tibial apex. Basitarsus 3 ca 2/5 as long as width of thoracic sternal plate (in ♂, 22: 54) and 2× as long as 4 apical tarsomeres together.

Abdomen of ♂ (fig. 176, 177) fairly densely setose. Tergite 1 ca 1/2 as long as wide, surface with 10 ± small setae on each 1/2, lateral margin thickened, posterior fringe broadly interrupted at middle and composed of 12 ± setae. Tergite 2 with ca 4, tergites 3-4 each with 3, tergite 5 with 2-3 setal rows on surface, extreme lateral areas of tergites 3-6 bare, tergite 6 almost always with 1 medially interrupted setal row on midlength of surface. Posterior fringes of tergites 2-6 with densely arranged setae and spines, all without median gap, fringes of tergites 5-6 each with 2-3 pairs of long bristles. Anal segment moderately long, anterior 1/3 of dorsal surface bare, anterior margin straight. Synsternite 1+2 moderately short, 15×39, slightly narrower than length of thoracic sternal plate (39: 41), anterior margin deeply notched at middle, ctenidium with 60 ± long slender closely arranged teeth and flanked at each end with 1-2 strong setae, lateralmost ctenidial tooth slightly shorter than median and submedian teeth. Relative median lengths of sternites 3, 4 and 5+6 as 6: 6: 17; surface of sternite 3 with 3 setal rows; sternite 4 with 1, synsternite 5+6 with 1-2 preapical rows of erect setae; posterior fringes of these sternites composed of moderately loosely arranged setae of varied length, sternite 3 with 40 ± such setae. Ventral surface of anal segment (fig. 117) rather richly setose. Clasper normal for Australian *Basilia* species. Genitalia (fig. 129, 141, 153) normal for Group Falcozi; deckplate long, narrowed caudad, laterally straight; aedeagus moderately long and broad, gently curved in S-shape; paramere apically unilobed.

Abdomen of ♀ (fig. 178, 179) fairly profusely setose. Tergite 1 about as long as wide, hardly narrowed anteriorly, with 12 ± fine setae rather evenly distributed over each 1/2 of surface; lateral margin posteriorly curved, broadly darkened and with 5 ± spines; posterior margin broadly interrupted at middle and fringed with 5 ± pairs of rather loosely arranged bristles which are slightly finer than but as long as those of tergite 2. Tergite 2 nearly as long as wide, suddenly narrowed apicad; surface with stronger, more numerous spines than in *falcozi*, median area more sparsely spinose than lateral areas; lateral margin strongly curved, marginal setae concentrated to intermediate section;

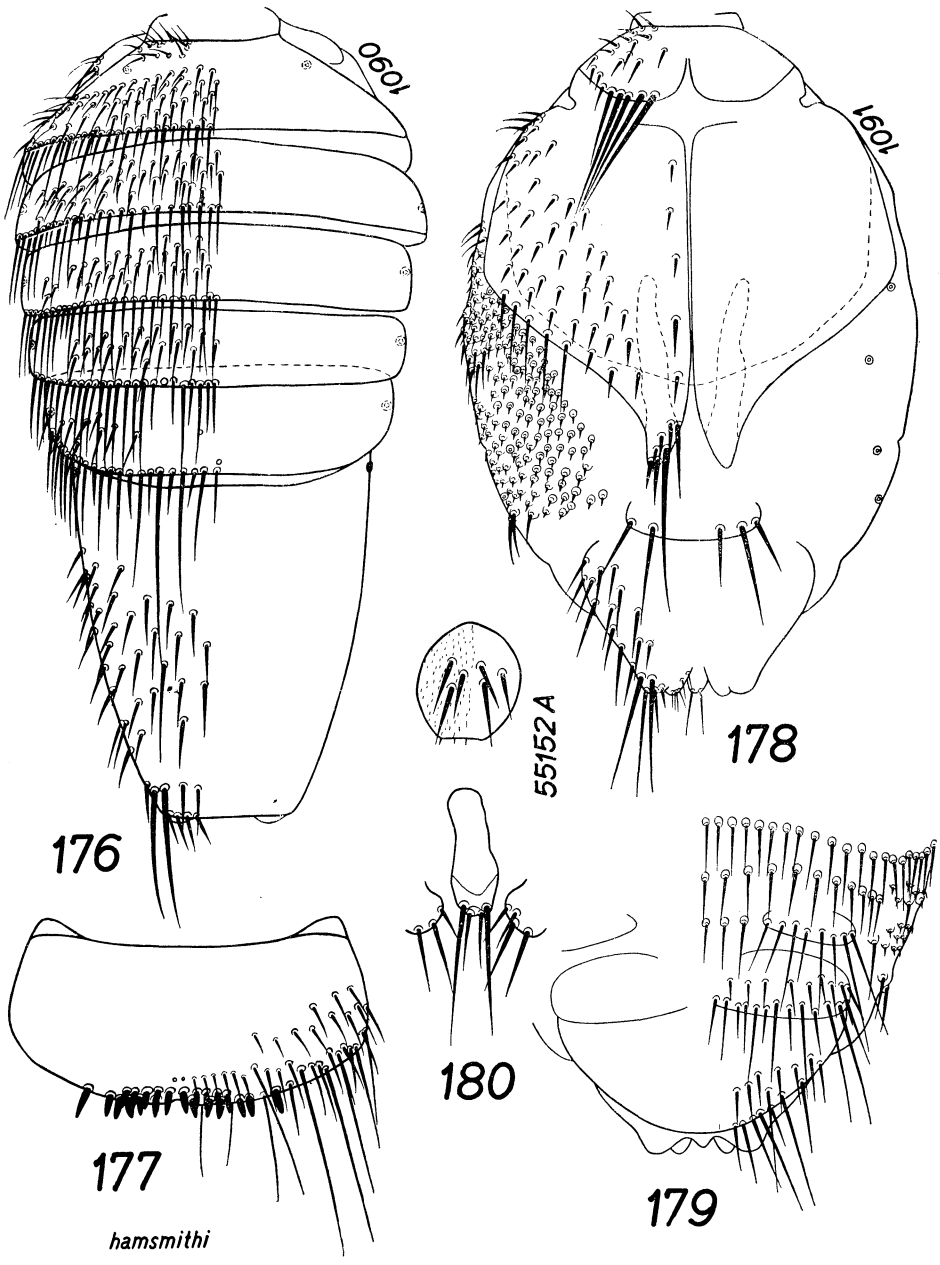


Fig. 176-180. *Basilia hamsmithi* n. sp. ♂ Abdomen, dorsal view (176), ♂ synsternite 5+6 (177), ♀ abdomen, dorsal (178), ♀ abdominal apex, ventral (179), ♂ postgenital, infra-anal and adanal plates (180).

lateral dark stripes indistinct except near bases of apical lobes; apical lobes short, narrow, usually with 1 bristle and 2-5 spines. Tergite 6 very short, broad, with single, medially interrupted row of 6 ± setae. Lateral connexivum with, besides numerous short strong pustulate spines, 1 row of long setae each on anterior margin of spinose area and at level of hind margin of sternite 3, and 1 short row of similar setae each at level of sternite 4 and between abdominal spiracles 6 and 7. Anal segment shorter than wide, strongly narrowed apicad, lateral surface richly setose. Synsternite 1+2 (fig. 68) larger than in ♂, 23×47, wider than length of thoracic sternal plate, with 65 ± ctenidial teeth, otherwise similar to that in ♂. Sternite 3 with 6-7 setal rows on surface, setae on anteromedian area distinctly shorter finer than on anterolateral area; posterior fringe, as that of sternites 4 and 5, composed of uniformly long and fairly closely arranged setae; sternite 4 sometimes with few preapical setae at middle; sternite 5 short, medially broadly interrupted. Sternite 6 fairly large, medially narrowly interrupted, with 2 setal rows. Sternite 7 moderately large, slightly paler along median line, surface with 15 ± irregularly arranged setae, posterior margin broadly rounded, fringed with loosely arranged setae. Postgenital plate (fig. 180) small, with 6 ± moderately long setae. Infra-anal and adanal plates similar to one another in size and shape, each bearing 3-4 apical setae.

Basilia aitkeni Maa, new species Fig. 56, 69, 83, 87, 92, 105, 118, 130, 142, 154, 181-185.

MATERIAL 2 ♂♂, 6 ♀♀. Holotype ♀ in S. Aust. Mus.

Ex *Nycticeius rueppellii:* Holotype ♀ (SAM), Blackfellow's Gully; 1 ♀ (SAM) Seven Hills. — Ex *N. balstoni:* 1 ♀, Mitchell. — Ex *N. greyi:* 1 ♀ (AM), Warren. — Ex *N. influatus:* 2 ♂♂, 1 ♀ (MCZ), Dorrigo. — Ex *N. orion:* 1 ♀ (SAM), Blackfellow's Gully.

HABITAT. Apparently confined to genus *Nycticeius* (Vespertilionidae: Vespertilioninae); at present known from Queensland (Mitchell) and New South Wales (Blackfellow's Gully, Dorrigo, Seven Hills, Warren). The northern- and southernmost records are from Mitchell (ca 26° 25′ S) and Seven Hills (ca 35° 50′ S) respectively.

AFFINITIES. *B. aitkeni* is most closely related to *hamsmithi,* from which it differs chiefly in the relative length of femora and tibiae vs thoracic sternal plate and in the shape of the ♂ genital deckplate, aedeagus and parameres. The ♂ can also be conveniently recognized by the setation on the anterior surface of the femur 2 and on the posterior margin of the sternite 3; the ♀ is less characteristic and is hardly separable from *hamsmithi.* The species is named after Mr Peter Aitken of the S. Australian Museum, Adelaide.

Description. Differing from preceding species in following points: ***Head:*** Labial theca shorter than labella in both sexes. ***Thorax:*** Sternal plate (fig. 56) 44×55 (♂) or 42×57 (♀). ***Legs:*** Relative lengths of femora 1-3 and tibiae 1-3 as 47: 57: 60 and 43: 48: 48 in ♂, 47: 59: 62 and 42: 47: 48 in ♀; relative widths of same, 18: 19.5: 19.5 in ♂ (18: 19: 17 in ♀) and 10: 10: 10 (in both sexes). Anterior surface of femur 2 with basal 1/3 similarly setose as apical 2/3 (fig. 92), and in ♂, with setae on entire surface practically same as in femur 1. Tibia 3 (fig. 105) ca 4.8× as long as wide. ***Abdomen*** of ♂ (fig. 181, 182) with generally fewer setae on surface of tergites 4-6, tergite 5 with 1-2 setal rows, tergite 6 either entirely bare or with 2-4 setae near middle. Synsternite 1+2 ca 18×39, ctenidium (fig. 87) with 55 ± teeth, relative median lengths of sternites 3, 4 and 5+6 as 6: 6: 16. Posterior fringes of sternites 3 and 4 composed of rather closely arranged setae, sternite 3 with 50 ± such setae. Genitalia (fig. 130, 142, 154) with deckplate much shorter in proportion, hardly narrowed caudad; aedeagus shorter, broader in proportion, distinctly curved in S-shape; paramere bilobed at apex. ***Abdomen*** of ♀ (fig. 183, 184) more richly setose on surface of tergites 1, 2 and 6, and on apical lobes

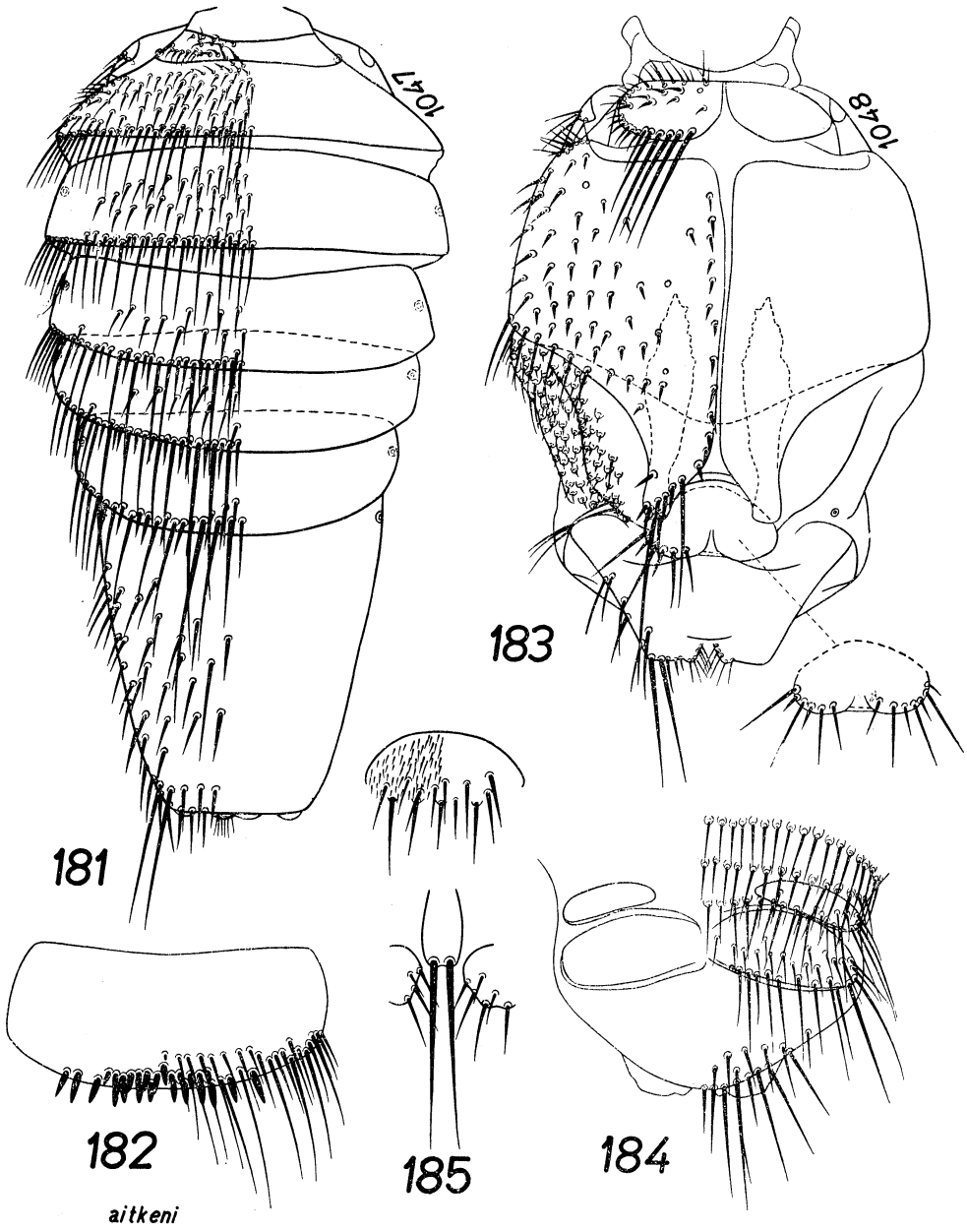


Fig. 181-185. *Basilia aitkeni* n. sp. ♂ Abdomen, dorsal view (181), ♂ synsternite 5+6 (182), ♀ abdomen, dorsal (183), ♀ abdominal apex, ventral (184), ♂ postgenital, infra-anal and adanal plates (185).

of tergite 2. Synsternite 1+2 (fig. 69) slightly longer in proportion, 25×49; sternite 7 posteriorly fringed with more closely arranged setae. Postgenital plate (fig. 185) densely microsetose, with 12 ± setae; infra-anal plate narrower than adanal plate.

Basilia barbarae Maa, new species Fig. 57, 70, 93, 113, 119, 131, 143, 156, 186-190.

Nycteribia (Nycteribia) falcozi (pt.): Musgr., 1927: 265, Bicheno rec. only.

MATERIAL. 33 ♂♂, 45 ♀♀. Holotype ♀ in Aust. Nat. Ins. Colln.

Ex *Vespadelus pumilus:* 19 ♂♂, 36 ♀♀ in 7 lots (incl. holotype ♀) (ANIC), Green's Beach; 4 ♂♂, 3 ♀♀ (AM), Bicheno; 1 ♀ (ANIC), Launceston; 2 ♂♂, 2 ♀♀, Lake George; 2 ♂♂ (ANIC), Gungahlin; 1 ♂, Rocklands Dam; 1 ♀ (SAM), "Uriarra" nr Canberra.

Ex *Chalinolobus gouldi:* 1 ♂, Mt Tinderry.

Ex "Bat": 1 ♂ (ANIC), Maydena; 3 ♂♂, 3 ♀♀ (NVM), Gunbower.

HABITAT. Apparently confined to *Vespadelus pumilus* (Vespertilionidae: Vespertilioninae) and to SE Australia. At present known from New South Wales (Lake George, Mt Tinderry), Australian Capital Territory (Gungahlin, Uriarra), Victoria (Gunbower, Rocklands Dam) and Tasmania (Bicheno, Green's Beach, Launceston, Maydena). Theodor's (1956: 367) record of *B. falcozi* ex *Vespadelus pumilus*, Victoria: Mildura perhaps belongs here. The northern- and southernmost records are from Lake George (ca 35° S) and Maydena (ca 42° 40′ S) respectively.

AFFINITIES. This is obviously a species intermediate between *hamsmithi-aitkeni* and *falcozi-halei.* It is similar to the former in the shape of the thoracic sternal plate but to the latter in most other important characters. Chief differences from its closest relative *falcozi* are: Labella shorter, thoracic sternal plate shorter, ♀ synsternite 1+2 slightly wider, aedeagus distinctly curved in S-shape, genital deckplate shorter and broader. Perhaps due to the limited host and distributional ranges, the species does not vary as much in size and genitalic and chaetotactic details as does *falcozi.* The Bicheno specimens were originally determined by Musgrave as *falcozi* and later labelled in pencil by him as "n.sp. A." The species is named in honor of the late Miss Barbara Dew of Sydney, N.S.W.

Description. *Body* brownish, slender, length 2.0-2.3 mm. *Head* dorsally with 4 setae on anterior margin and 2 slightly behind them. Labial theca usually longer than wide and ca 1.5 × as long as labella, sometimes as long as wide and subequal in length to labella. *Thorax* short. Sternal plate (fig. 57) 35×45; oblique sutures forming 90° angle at middle, median suture widened at middle, anterior margin subparallel to posterior margin which is gently concave (not produced at middle), lined with numerous setae of varied length and robustness. *Legs* (fig. 93, 113) moderately short, relative lengths of femora 1-3 and tibiae 1-3 in ♀ as 41: 51: 56 and 35: 40: 40; relative widths of same, 15: 17: 15 and 7.5: 8.5: 8.5. Anterior surface of femur 1 rather evenly setose, femur 2 more unevenly and sparsely setose (particularly in ♀) than femur 1; femur 3 in ♂ largely bare at basal 2/3, unevenly setose at apical 1/3; femur 3 in ♀ very extensively bare, with few setae near upper and lower margins and near apex, apical 1/2 of upper margin distinctly concave; no patches of sensory pores on ♂ femora 2 and 3. Tibia 3 ca 4.7 × as long as wide, 1st row of ventral bristles arising from a point clearly basad to tibial midlength, 3rd row apically hardly reaching level of tibial apex. Basitarsus 3 ca 1/2 as long as width of thoracic sternal plate and 2 × as long as 4 apical tarsomeres together.

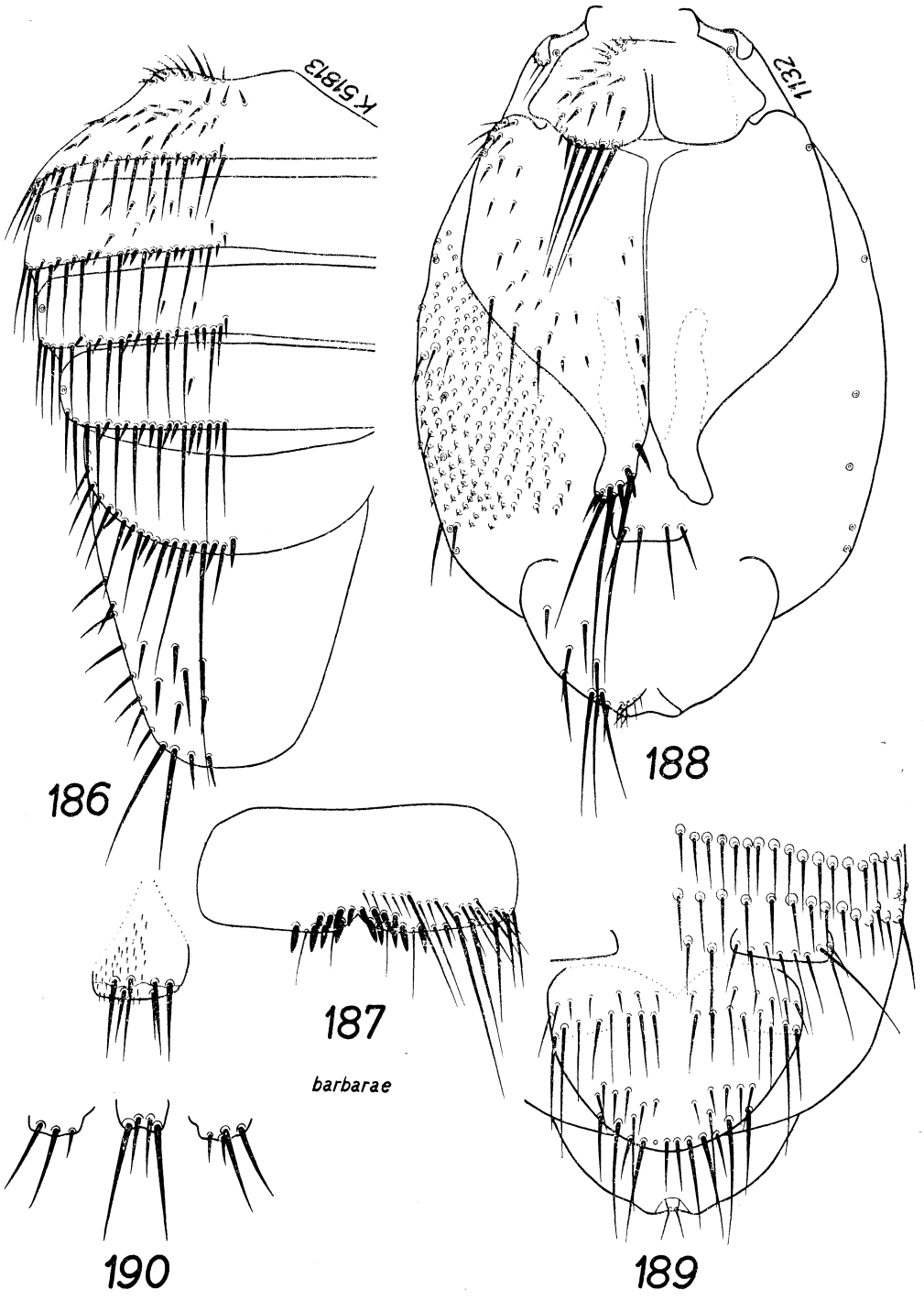


Fig. 186-190. *Basilia barbarae* n. sp. ♂ Abdomen, dorsal view (186), ♂ synsternite 5+6 (187), ♀ abdomen, dorsal (188), ♀ abdominal apex, ventral (189), ♀ postgenital, infra-anal and adanal plates (190).

Abdomen of ♂ (fig. 186, 187) rather poorly setose. Tergite 1 ca 1/2 as long as wide, surface with 8 ± pairs of small setae, lateral margin thickened, posterior fringe narrowly interrupted at middle, with 12 ± setae. Tergite 2 usually with 3-4, tergite 3 with 2-3, tergite 4 with 1-2 setal rows on surface; tergite 5 either bare or with 1 incomplete setal row, tergite 6 always bare. Posterior fringes of tergites 2-4 composed of closely arranged setae and spines, those of tergites 5 and 6 similar but each with 2-3 pairs of long bristles. Anal segment moderately long, anterior 1/2 of dorsal surface bare, posterior 1/2 sparsely spinose, anterior margin straight. Synsternite 1+2 half as long as wide (15×31), narrower than length of thoracic sternal plate, anterior margin notched at middle; ctenidium with 50 ± slender, closely arranged teeth and flanked on each side by 1-3 strong setae, lateralmost ctenidial tooth slightly shorter than median and submedian teeth. Relative lengths of sternites 3, 4 and 5+6 as 6: 6: 11; sternite 3 with 3 rows of small setae on surface; sternite 4 with 1, synsternite 5+6 with 1—2 rows of preapical setae; posterior fringes of these sternites composed of rather loosely arranged setae of varied length and robustness. Ventral surface of anal segment poorly setose. Clasper normal. Genitalia (fig. 131, 143, 156) also normal; deckplate moderately long and broad, distinctly narrowed caudad; aedeagus long, narrow, distinctly curved in S-shape; paramere bilobed at apex.

Abdomen of ♀ (fig. 188, 189) more strongly and richly setose than in average specimens of ***falcozi.*** Tergite 1 about as long as wide, hardly narrowed anteriorly, with 10 ± erect setae distributed over each 1/2 of surface; lateral margin posteriorly curved, broadly darkened and with 5 ± spines; posterior fringe broadly interrupted at middle, with 5 ± pairs of bristles which are shorter, finer than those on apical lobes of tergite 2. Tergite 2 slightly longer than wide, gently narrowed apicad, with indistinct dark stripes; apical lobes divergent apicad, moderately narrow, usually each bearing 4 spines plus 3 bristles. Tergite 6 small, transverse, with single row of 2-8 setae. Lateral connexivum with, besides numerous short strong pustulate spines, 1 row of long setae each on anterior margin of spinose area and at level of hind margin of sternite 3, usually no such setae between abdominal spiracles 6 and 7. Anal segment shorter than wide, strongly narrowed apicad, lateral surface poorly setose. Synsternite 1+2 (fig. 70) longer than in ♂ (21×36), with 60 ± ctenidial teeth. Sternite 3 with 6 ± setal rows on surface, setae on median area distinctly shorter finer than those on lateral areas, posterior fringe composed of uniform long setae. Posterior fringes of sternites 4 and 5 similar. Sternite 5 broadly, sternite 6 narrowly interrupted at middle, latter with 1 setal row on surface. Sternite 7 fairly large, slightly paler along median line, surface with 15 ± irregularly arranged setae, posterior margin broadly rounded, fringed with loosely arranged setae. Postgenital plate (fig. 190) small, with 6 ± moderately long setae. Infra-anal and adanal plates similar to one another in size and shape, each bearing 3-4 apical setae.

Basilia falcozi (Musgrave) Fig. 58, 71, 80, 95, 107, 108, 120, 191-197.

Nycteribia (*Nycteribia*) *falcozi* (? = *oceanica* Speis.) Musgr., 1925: 292, pls. 14, 15 (5-7), ♂ ♀, orig. des., holotype ♂ in Aust. Mus., Sydney; 1927: 265, key, rec. (pt.)

Basilia (*Basilia*) *falcozi:* Maa, 1965: 380, list.

Tripselia falcozi (? = *oceanica* Speis.): Theod., 1956: 367, fig. 21-24, ♂ ♀, redes. of paratypes, rec.

Basilia (*Tripselia*) *falcozi* (= *brevicauda* ♀, = *oceanica* Speis.): Theod. 1967: 315, fig. 534-537, ♂ ♀, key, des., rec.

(?) *Basilia* sp.: Allison & Middleton, 1971: 29, rec.

Previous Records. 7 ♂♂, 5 ♀♀ (type series), ex *Chalinolobus gouldi,* Mt Lyndhurst. 1 ♂, 1 ♀ (Theod. 1956, 1967), ex *Ch. morio,* Parramatta; 1 ♂, 1 ♀ (Theod. 1956, 1967), ex *Ch. gouldi,* Alexandria; 1 ♂ (Theod. 1967), ex *Vespadelus pumilus,* Dinner Ck.; [?] 1 ♀ (Theod. 1956), ex *V. pumilus,* Mildura. 1 ♀ (Musgr. 1927), ex "bat," Wagga [Wagga Wagga]; 9 ♂♂, 8 ♀♀ (plus "others" in alcohol) (Musgr. 1927), ex "bat," Cunnamulla.

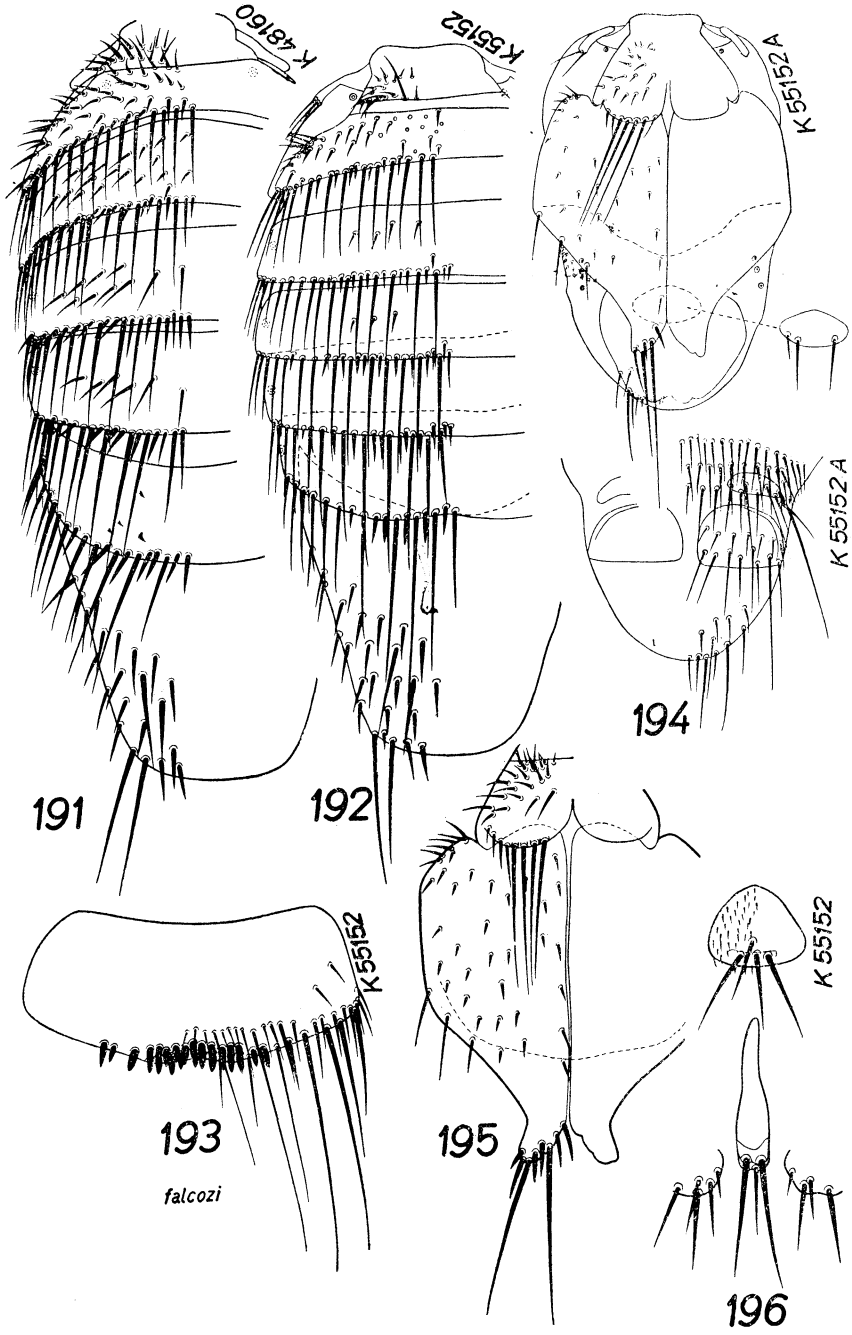


Fig. 191-196. *Basilia falcozi* Musgr. ♂ Abdomen, dorsal view (191, 192), ♂ synsternite 5+6 (193), ♀ abdomen (dorsal) and abdominal apex (ventral) (194), ♀ tergites 1-2 (195), ♀ postgenital, infra-anal and adanal plates (196). Fig. 191-193 and 194-195 drawn to same scales respectively; slide ♯K48160 is a paratype. whereas K55152A is a minor form from Cunnamulla.

NEW MATERIAL. 24 ♂♂, 22 ♀♀.

Ex *Chalinolobus dwyeri.* 1 ♂ (ANIC), Hill End Gold Mine. — Ex *Ch. gouldi:* 2 ♂♂, 3 ♀♀ (AM), Barcarolle; 1 ♀ (ANIC), Border Waterhole; 1 ♀, Braidwood; 1 ♀ (SAM), Cudlee Ck.; 4 ♂♂ (SAM), Pt. Pirie; 2 ♂♂ (WAM), Randall Dam; 2 ♂♂, 2 ♀♀ (ANIC), Wialki. — *Ch. picatus:* 1 ♀ (AMNH), Karumba; 3 ♂♂, 3 ♀♀ (ANIC), Nourlangie Camp.

Ex *Nycticeius balstoni:* 2 ♂♂, 2 ♀♀ (AM, NVM), Alice Springs. — Ex *N. greyi:* 1 ♀ (SAM), Caroline Musgrave Ranges; 2 ♂♂, 1 ♀ (AM), Lawn Hill Ck.

Ex *Nyctophilus* (?) sp.: 1 ♂ (SAM), Mornington I. — Ex *Vespadelus pumilus* (?): 1 ♂, Bornholm. — Ex *Taphozous flaviventris:* 1 ♀ (AM), Burren Junction; 1 ♂ (ANIC), Noohona. — Ex "bat": 1 ♀ (SAM), Innamincka; 1 ♂ (QDM), Pentland; 2 ♂♂, 4 ♀♀ (SAM), Razor Back Ridge.

HABITAT. Probably preferring *Chalinolobus* (Vespertilionidae: Vespertilioninae). The occurrence on *Taphozous* (Emballonuridae) is most probably accidental. The species is widespread on the Australia mainland and is at present known from Queensland (Barcarolle, Cunnamulla, Dinner Ck., Karumba, Lawn Hill Ck., Mornington I., Pentland), Northern Territory (Alexandria, Alice Springs, Border Waterhole, Nourlangie Camp), New South Wales (Braidwood, Burren Junction, Hill End Gold Mine, Noohona, Parramatta, Razor Back Ridge, Wagga Wagga), South Australia (Caroline Musgrave Ranges, Cudlee Ck., Innamincka, Mt Lyndhurst, Pt. Pirie) and Western Australia (Bornholm, Randall Dam, Wialki). The northern- and southernmost records are from Nourlangie Camp (ca 12° 50' S) and Wagga Wagga (ca 35° 10' S) respectively. As mentioned above, Theodor's (1956) record ex *Vespadelus pumilus*, Victoria: Mildura is perhaps referable to *B. barbarae* n. sp.

SYNONYMY. Musgrave (1925) and Theodor (1967) suggested, respectively, that *oceanica* Speis. (not of Bigot) and ♀ *brevicauda* Musgr. (not ♂) were synonymous with *falcozi*. These are not accepted here. See discussions under *troughtoni* and *brevicauda*.

AFFINITIES. *B. falcozi* is closely related to *barbarae* and *halei*. To *barbarae*, it is similar in the body size, abdominal setation and shape of synsternite 1+2, while to *halei*, similar in the shape of the thoracic sternal plate. As hereby accepted, the species is to be recognized by a combination of the above mentioned characters. In certain respects, the variation is so strong that when more material becomes available, it may be necessary to split into races or even species. Roughly, the material at hand may be allotted into 2 forms. The major or typical form is from Barcarolle, Innamincka, Mt Lyndhurst, Noohona, Pentland, Randall Dam, Wagga Wagga, Wialki ex *Chalinolobus* and undetermined bats, the femur 3 measures 1.2-1.3 mm (37-40 micrometric units) long, the setae on the surface of ♂ tergites 2-4 and the spines on the surface of the ♀ tergite 2 are fine and sparse to moderately dense, the lower margin of the aedeagus in profile is very weakly curved near base. The minor form is from the remaining localities ex *Chalinolobus*, *Nycticeius* and other bats, the femur 3 is 0.9-1.1 mm (28-35 micrometric units) long, the setae on ♂ tergites and spines on the ♀ tergite 2 as well as the shape of the aedeagus vary with localities and hosts. In the

4 ♂♂, 4 ♀♀ ex *Nycticeius* spp., the above mentioned setae and spines are numerous, erect and robust, the lower margin of aedeagus (fig. 197 H) is angularly curved near the base. They should perhaps stand as a separate species. In the 2 ♂♂, 4♀♀ ex "bat," Razor Back Ridge, the setae-spines are similar to those of the major form but the aedeagus (fig. 197 F) is intermediate between the major and minor forms. In the single ♂ ex "*Vespadelus pumilus*," Bornholm, the setae are as in the major form while the aedeagus (fig. 197 G), as in the minor form but with the apex slightly recurved; furthermore, the bristles on posterior margins of tergites 5 and 6 are markedly shorter. The single ♀ ex *Chalinolobus gouldi*, Cudlee Lake is atypical in having the thoracic sternal plate unusually shorter in proportion. Variation in other details is shown in fig. 107, 108, 191, 192, 194, 195 and 197 A-H.

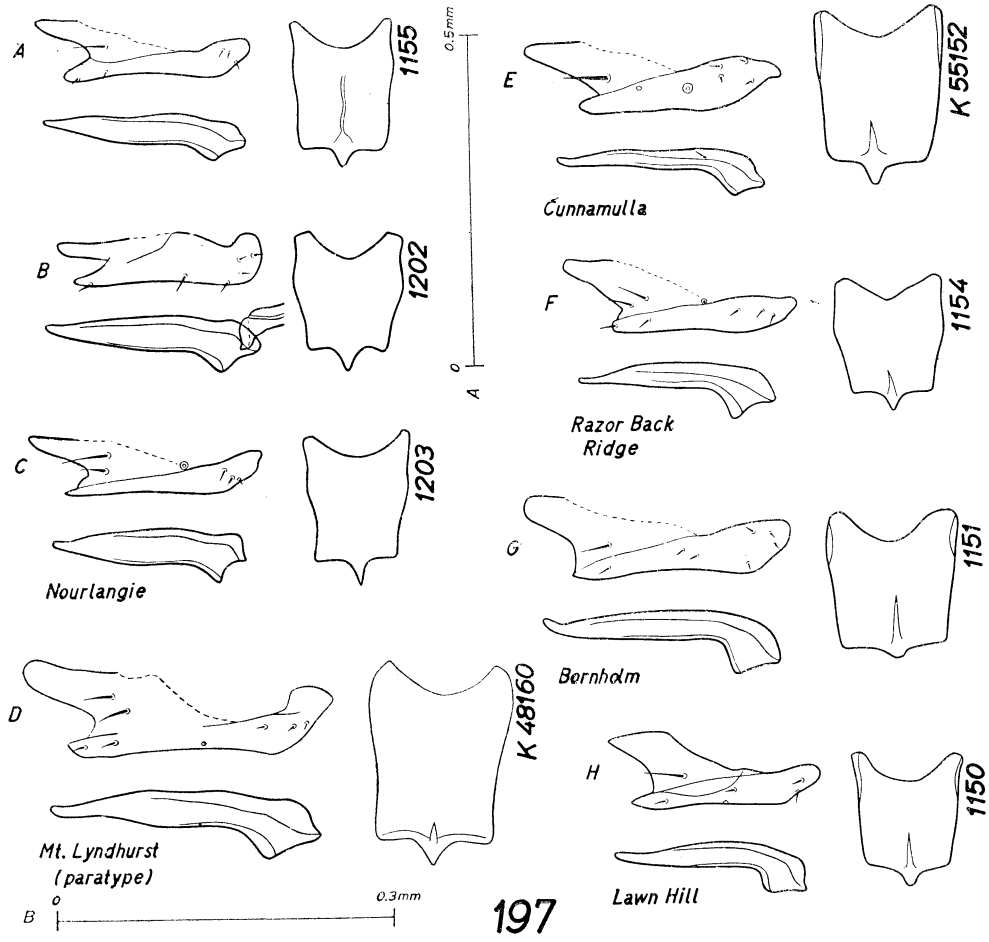


Fig. 197. *Basilia falcozi* Musgr., parameres, aedeagi and ♂ genital deckplates, intraspecific variation. Scale A for parameres and aedeagi; scale B for deckplates.

In Theodor's (loc. cit.) illustrations, the ♂ claspers of this species were drawn as if shorter, broader than in average specimens I examined (fig. 120) and distinctly curved inward at the apex. Most probably they were based upon a specimen over-treated with KOH or otherwise distorted. The following relative measurements were taken from 2 paratypes (K 48160, 48163). Thoracic sternal plate 43×48 (♂) or 44 ×52 (♀); relative length of ♀ femora 1-3 and tibiae 1-3 as 42: 54: 60 and 36: 40: 42; relative widths of same 14: 14: 13 and 7: 7: 8; basitarsus 3 about 1/2 as long as width of thoracic sternal plate and 2 × as long as 4 apical tarsomeres together; synsternite 1+2 in ♂ 14×31, in ♀ 24×37; relative median lengths of ♂ sternites 3, 4 and 5+6 as 6: 6: 14.

Mr F. R. Allison recently sent me photographs of the ♂ of a *Basilia* species which he and G. J. Middleton (1971: 29) reported from *Miniopterus*, Chillagoe, and which I am unable to determine to species. Possibly it belongs here.

Basilia halei (Musgrave) Fig. 59, 72, 81, 94, 106, 121, 132, 144, 155, 198-202.

Nycteribia (*Nycteribia*) *halei* Musgr., 1927: 271, pl. 23 (1-3, 6), ♀♂, key, orig. des., holotype ♀ in Aust. Mus., Sydney.

Basilia (*Basilia*) *halei:* Maa, 1965: 380, list.

B. (*Tripselia*) *halei:* Theod., 1967: 317, fig. 538-540, ♂♀, key, des., rec.

Previous Records. 1 ♂, 2 ♀♀ (type series), ex *Chalinolobus morio*, Arkaba. 2 ♂♂, 2 ♀♀ (Theod. 1967), ex *Nyctophilus walkeri*, "N. Australia."

New Material. 14 ♂♂, 20 ♀♀.

Ex *Chalinolobus morio:* 5 ♂♂, 2 ♀♀ (SAM), Arkaba, topotypes.

Ex *Vespadelus pumilus:* 2 ♀♀ (ANIC), Iron Range; 1 ♀ (AMNH), Katherine; 3 ♂♂, 10 ♀♀ (ANIC), Katherine; 3 ♂♂, 2 ♀♀, Pierce's Creek; 1 ♀ (ANIC), Wilgie Mia; 1 ♂, 1 ♀, Winnecke Ck.

Ex *Nyctophilus timoriensis gouldi:* 1 ♀ (SAM), Doomadgee Mission Stn.

Ex "bat": 2 ♂♂, 1 ♀ (SAM), Ayers Rock.

Habitat. Probably not strictly host specific. There are 5 and 2 records, respectively, ex *Vespadelus pumilus* and *Chalinolobus morio* (both belonging to Vespertilionidae: Vespertilioninae) which are possibly the preferred hosts. The 2 records ex *Nyctophilus* (Vespertilionidae: Nyctophilinae) perhaps represent stragglers. Found sporadically over the Australia mainland; at present known from Queensland (Doomadgee Mission Stn., Iron Range), Northern Territory (Ayers Rock, Katherine, Winnecke Ck.), Australian Capital Territory (Pierce's Ck.), South Australia (Arkaba) and Western Australia (Wilgie Mia). The southernmost record is from Arkaba (ca 31° 40' S).

Affinities. This is the smallest and least setose of the Australian *Basilia* species. It stands most close to *falcozi* which has similar host and distribution ranges but in no case, have these 2 species been found together. Chief differences from *falcozi* are: Uniformly smaller size, longer (in proportion) thoracic sternal plate (fig. 59 vs 58) and ♀ synsternite 1+2 (fig. 72 vs 71), fewer setae on surface of ♀ tergites 1 and 2 (fig.

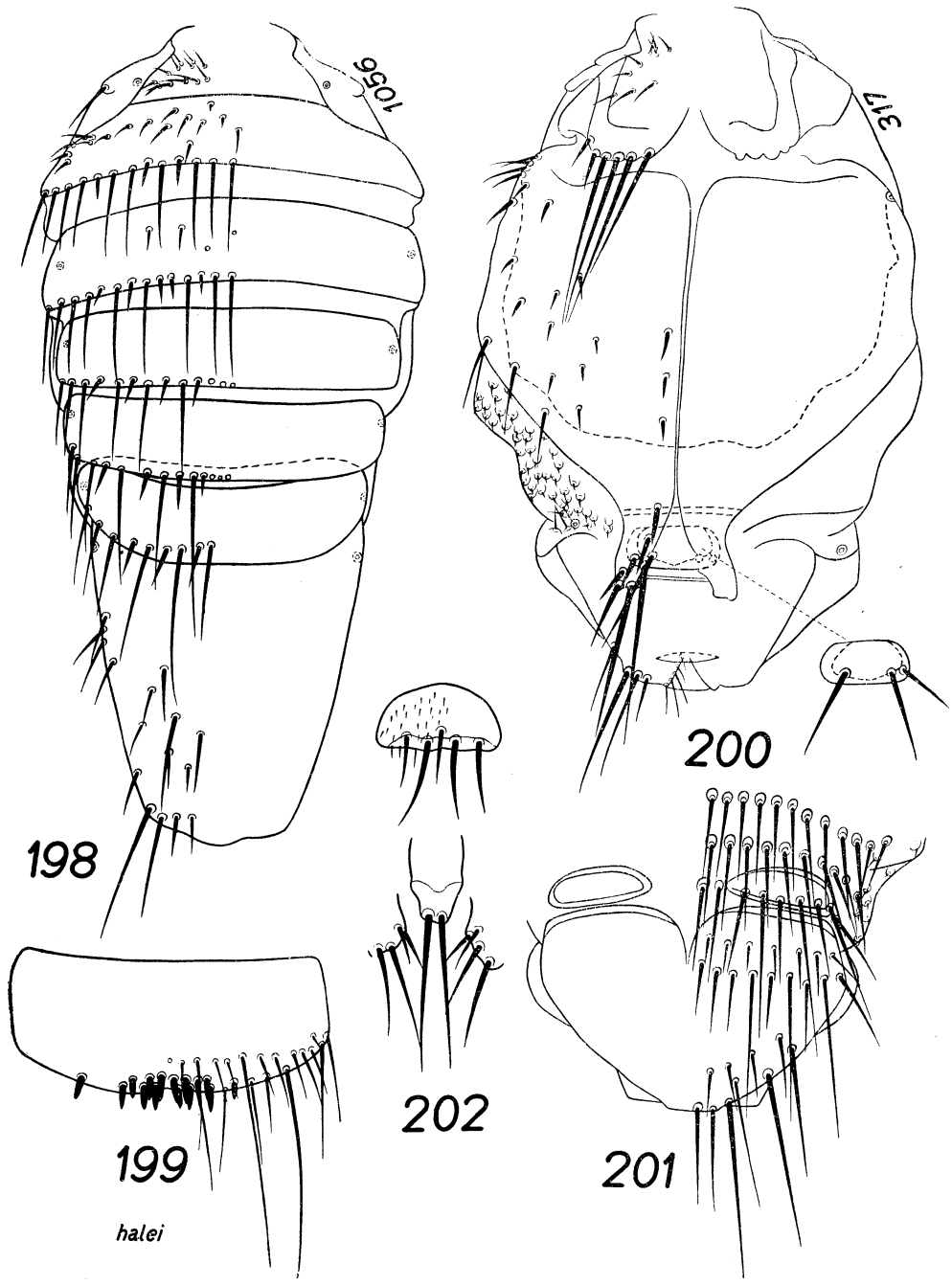


Fig. 198-202. *Basilia halei* Musgr. ♂ Abdomen, dorsal view (198), ♂ synsternite 5+6 (199), ♀ abdomen, dorsal (200), ♀ abdominal apex, ventral (201), ♀ postgenital, infra-anal and adanal plates (202).

200 vs. 194-195), much weaker spines on ♀ lateral connexivum, much weaker setae on anteromedian area of ♀ sternite 3 (in *falcozi*, these setae are similar in length and robustness to those on anterolateral areas), averagedly fewer setae and spines on ♂ tergites (fig. 198 vs 191-192), averagedly fewer spines on posterior margin of ♂ synsternite 5+6 (fig. 199 vs 193), and curved aedeagus (fig. 132 vs 197). In figures by Theodor (loc. cit.), the ♀ lateral connexivum was shown as uniformly covered with short spines and the aedeagus, as straight. In ♀♀ examined by me, there are 1-4 moderately long setae between abdominal spiracles 6 and 7, and in the topotypes and other ♂♂, the aedeagus is curved at the apex. The following relative measurements were taken from a ♂ topotype and a ♀ from Katherine. Thoracic sternal plate 34×36 (♂) or 33×37 (♀); relative lengths of femora 1-3 and tibiae 1-3 in ♂ 34: 42: 46 and 29: 33: 34; relative widths of same, 11: 11: 10 and 6: 6: 6.5; basitarsus 3 nearly 1/2 as long as width of thoracic sternal plate (19: 36) and 2× as long as 4 apical tarsomeres together; synsternite 1+2 in ♂ 14×25, in ♀ 19×26; relative median lengths of ♂ sternites 3, 4, 5+6 as 5: 4.5: 9.

Basilia nodulata Maa, new species Fig. 78, 84, 133, 145, 203-207.

MATERIAL. 1 teneral ♂, originally labelled in pencil by Musgrave as "*Nycteribia brevicauda* Musgr. (immature)," catalogue number K49851, collected by L. Abrahams on 12. I. 1921 at Hazelbrook, Blue Mts., N. S. W., no host record. Holotype dissected and remounted on 3 slides, in Aust. Mus., Sydney. This specimen was not mentioned in the original description of *brevicauda* which bears exactly the same data, except the catalogue numbers were K49848 to 49850 and the host was definitely given as *Nyctophilus gouldi*.

HABITAT. Host uncertain. At present known from the unique type from New South Wales.

AFFINITIES. Insofar as the ♂ sex is concerned, this is clearly a member of the Group Brevicauda but apparently has no close relatives. The very narrow and apically weakly bilobed parameres are unknown in other Australian *Basilia* species. The nodulate, loosely arranged teeth of the abdominal ctenidium are only comparable to those in *tenuispina* Theod. (ex *Epomops franqueti*, Congo). The latter species is also known from a single ♂. Its eyes are well developed, 1st row of ventral tibial bristles arising from a point clearly apicad to tibial midlength, synsternite 1+2 longer (ca 2× as long as wide), posterior margin of the synsternite 5+6 distinctly convex, lower margin of the aedeagus not deeply concave near the base. Therefore *nodulata* bears no real affinity to *tenuispina*. The seemingly very wide abdomen shown in the drawings for the former species was a result of much flattening after KOH treatment of the unique teneral specimen.

Description. *Body* brown, slender (but due to the teneral state of the unique type, the abdomen is seemingly very broad), length 2.1 mm. *Head* dorsally with 4 setae on anterior margin and 2 slightly behind them. Labial theca longer than wide, and ca 2× as long as labella. *Thorax* short. Sternal plate (fig. 207) 41×52; oblique sutures forming 100° angle at middle, median suture widened at middle; posterior margin less curved than anterior margin, slightly produced at middle, lined with a number of setae of varied length and robustness. *Legs* (fig. 78, 84) moderately short, relative

lengths of femora 1-3 and tibiae 1-3 as 43: 52: 52 and 37: 41: 41; relative widths of same, 16: 18: 18 and 8.5: 9: 9. Anterior surface of femur 1 sparsely setose, setae near upper margin sparser than elsewhere; femora 2 and 3 similar to one another in shape, setation, and in presence of patch of sensory pores near base, surface largely bare, with only few setae near lower margin. Tibia 3 ca 4.5× as long as wide, 1st row of ventral bristles arising from tibial midlength, 3rd row apically surpassing level of tibial apex. Basitarsus 3 ca 2/5 as long as width of thoracic sternal plate and 2 × as long as 4 apical tarsomeres together.

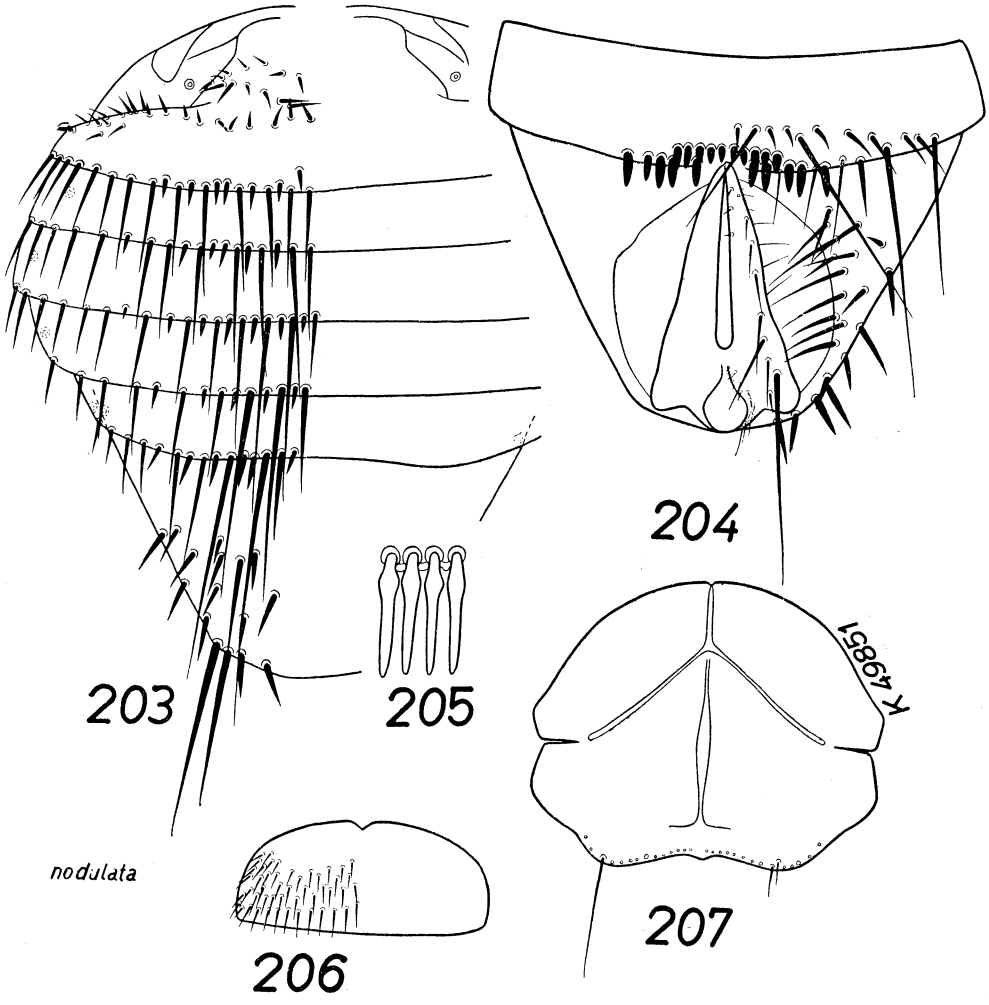


Fig. 203-207. *Basilia nodulata* n. sp., holotype ♂ (teneral). Abdomen, dorsal view (203), abdominal apex, ventral (204), submedian teeth of abdominal ctenidium (205), synsternite 1+2 (206), thoracic sternal plate, omitting setae on surface (207). Note the widening of abdomen, as shown in fig. 203 and 204, due to the teneral state of the unique specimen.

Abdomen of ♂ (fig. 203, 204) poorly setose. Tergite 1 ca 1/2 as long as wide, surface with 15 ± setae, lateral margin thickened, posterior fringe broadly interrupted at middle, composed of 12 ± setae. Tergite 2 with single setal row near anterior margin, otherwise bare on surface, surface of tergites 3-6 entirely bare. Posterior fringes of tergites 2-3 composed of rather loosely arranged setae and spines, those of tergites 4-6 similar but setae longer and each bearing 2-3 pairs of long bristles. Anal segment short, anterior 1/2 of dorsal surface bare, posterior 1/2 sparsely spinose. Synsternite 1+2 (fig. 206) short, 16×37, anterior margin weakly notched at middle, ctenidium with 42 slender, loosely arranged, basally nodulate teeth (fig. 205) and not flanked on sides by strong setae, lateralmost ctenidial tooth ca 1/2 as long as median and submedian teeth. Sternite 3 with few fine setae on surface, posterior fringes of sternites 3 and 4 comprised of loosely arranged setae of varied length and robustness. Synsternite 5+6 short, with 1 row of preapical setae, posterior margin very weakly curved, with 20 blunt spines arranged in 2 rows. Ventral surface of anal segment poorly setose. Clasper normal. Genitalia (fig. 133, 145) not quite normal; aedeagus long, broad, gently curved; paramere narrow, very weakly bilobed at apex. ♀ unknown.

Basilia brevicauda (Musgrave) Fig. 60, 73, 96, 109, 122, 134, 146, 157, 208-213.

(?) *Nycteribia elongata* Rudow, 1871: 122, ♀ (excl. ♂), orig. des., type lost; 1872: 408, ♀ (excl. ♂), English version of 1871 des.

Nycteribia (*Nycteribia*) *brevicauda* Musgr., 1925: 295, pl. 45 (1-4), ♂ ♀, orig. des., holotype ♂ in Aust. Mus., Sydney.

Basilia (*Basilia*) *brevicauda:* Maa, 1965: 380, list.

B. (*Tripselia*) *falcozi* (=*brevicauda* ♀): Theod., 1967: 315, syn. list.

B. (*T.*) *troughtoni* (=*brevicauda* ♂): Theod., 1967: 336, syn. list.

Previous Record. 2 ♂♂, 1 ♀ (type series), ex *Nyctophilus timoriensis gouldi*, Hazelbrook.

New Material. 15 ♂♂, 22 ♀♀.

Ex *Nyctophilus geoffroyi pacificus:* 4 ♂♂, 4 ♀♀ in 3 lots (AM), Milmerran; 1 ♀ (SAM), Armidale; 2 ♂♂, 4 ♀♀ in 3 lots (ANIC), Canberra; 1 ♀ (AM), Grahamstown; 1 ♀ (ANIC), Gungahlin. — Ex *N. timoriensis gouldi:* 1 ♀ (AM), Anna Bay; 1 ♀, Innisfail; 1 ♂, 1 ♀, Narooma; 1 ♀ (GNV), Somerset; 1 ♂, 1 ♀, Springwood; 1 ♀ (AM), Tweed R. — Ex *Nyctophilus* sp.: 1 ♂, 2 ♀♀ (ANIC), Black Mt; 1 ♂ (SAM), Glenalbyn; 1 ♀ (AMNH), Shipton's Flat. — Ex *Chalinolobus gouldi* [apparently error for *N. timoriensis gouldi*]: 1 ♀ (AM), Dunedoo.

Ex "bat": 1 ♂ (AM), Bornholm; 1 ♂ (MCZ), Cooktown; 1 ♀ (BVP), Myall Lakes; 1 ♂ (AM), Tweed R.

Habitat. Apparently confined to *Nyctophilus* (Vespertilionidae: Nyctophilinae) and widespread in Australia; at present known from Queensland (Cooktown, Innisfail, Milmerran, Shipton's Flat, Somerset), New South Wales (Anna Bay, Armidale, Dunedoo, Grahamstown, Hazelbrook, Myall Lakes, Narooma, Springwood, Tweed R.), Australian Capital Territory (Black Mt., Canberra, Gungahlin), Victoria (Glenalbyn), and Western Australia (Bornholm). The southernmost records are from Canberra, Grahamstown and Glenalbyn (all ca 35° 20′ S)

Synonymy. From the host record, and Rudow's brief description, the ♀ of *elongata* (ex *Nyctophilus geoffroyi*, no locality) may perhaps be surmised as a senior synonym of

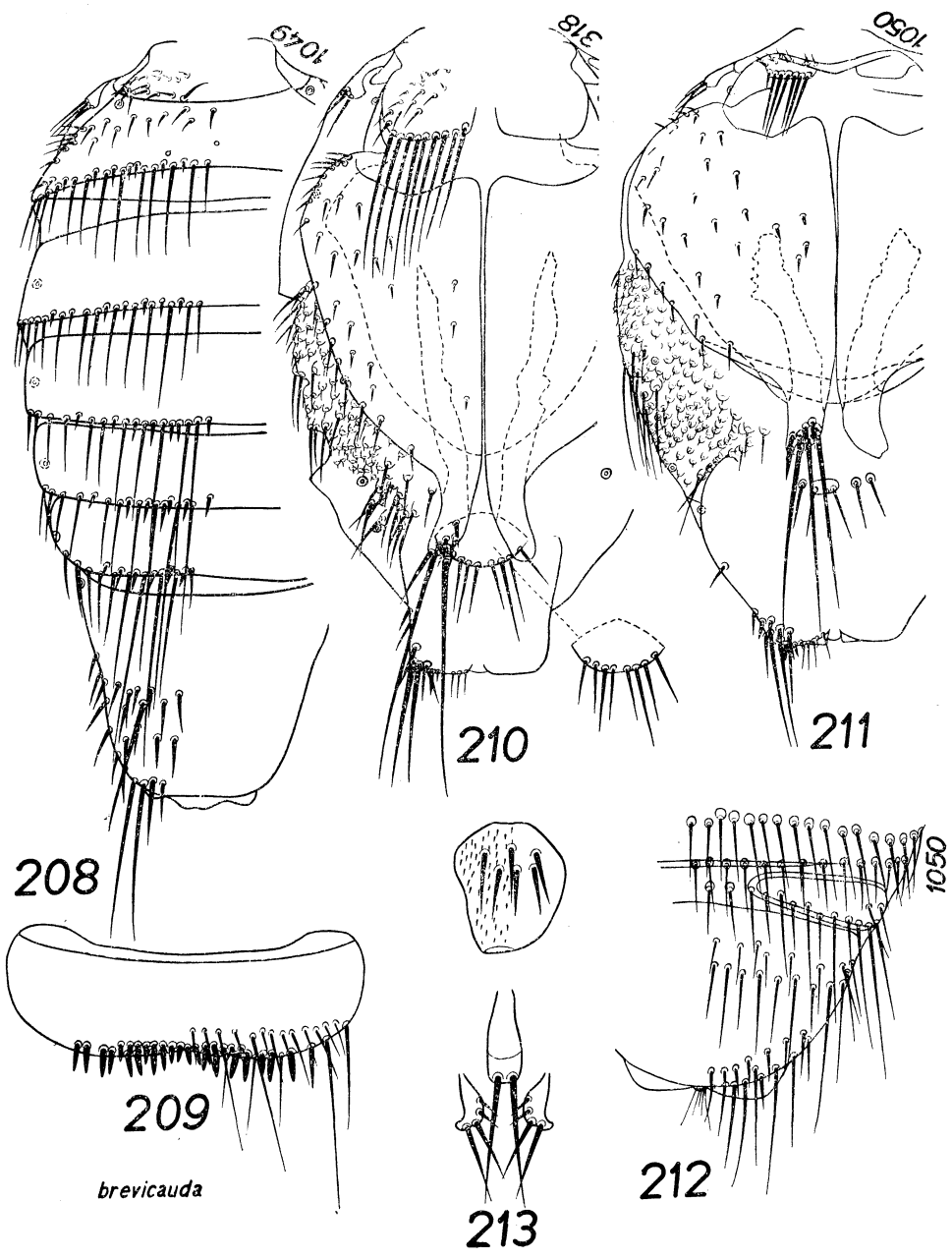


Fig. 208-213. *Basilia brevicauda* Musgr. ♂ Abdomen, dorsal view (208), ♂ synsternite 5+6 (209), ♀ abdomen, dorsal (210-211), ♀ abdominal apex, ventral (212), ♀ postgenital, infra-anal and adanal plates (213). Note the long setae on lateral connexiva near apical lobes of tergite 2; the presence of these setae serves as a criterion for the recognition of ♀ of this species; compare fig. 210 and 211 for relative lengths of apical bristles of tergite 1.

brevicauda. The name *elongata* is at any rate unavailable here since the ♂, obviously belonging to a different genus, is designated in this paper as the lectotype. See discussion under *Nycteribia parilis vicaria*.

Prof. Theodor (loc. cit.) considered the ♂ and ♀ of Musgrave's *brevicauda* to be of 2 different species and suppressed the name as synonyms of *troughtoni* and *falcozi*, respectively. In correspondence (28. X. 1968), he kindly added: "I have examined a paratype of *brevicauda* and it was in my opinion identical with *troughtoni* (♂). The differences given by Musgrave between *brevicauda* and *falcozi* consist in small differences in the number of setae on tergites 1 and 2 and are in my opinion not significant. It is, of course, possible that other paratypes [sic] of *brevicauda* are different and that examination of more material will show that *brevicauda* is valid." The type series of *brevicauda* is, as clearly mentioned in the original description, composed of the holotype ♂ (K 49848), allotype ♀ (K 49850) and paratype ♂ (K 49849). They were each mounted on a slide. I briefly examined in 1966 the paratype at Prof. Theodor's laboratory and more carefully so in 1968 the holo- and allotypes at the Australian Museum as well as fresh material at my own laboratory. It is convincing that Musgrave has correctly associated the 2 ♂♂ with the single ♀ and that *brevicauda* is quite distinct from *troughtoni* and *falcozi* (see below). In fact Musgrave in 1925 deliberately selected ♂♂ as holotypes of his new species and only in 1927, selected ♀♀ as holotypes. Consequently, were the synonymy of *brevicauda* with *troughtoni* justified, the former, rather than the latter name would have priority.

Affinities. The ♀ sex of *brevicauda* can easily be singled out from other members of the Group Brevicauda by the presence of an oblique series of long setae on the lateral connexivum lying immediately laterad to the apical lobe of the tergite 2, and by the small normal tergite 6. It can hardly be mistaken for *falcozi* which belongs to a quite different species-group (see couplet 3 of the key). The ♂ sex differs from that of *troughtoni* in having the body much more slender, tergites less richly setose, anal segment shorter, aedeagus shorter and straighter, and genital deckplate narrower. From that of *musgravei*, it differs in having the thoracic sternal plate longer, dorsal surface of anal segment more richly spinose, aedeagus straighter.

This species is somewhat variable in certain respects. Generally ♀♀ ex *Nyctophilus timoriensis* differ from those ex *N. geoffroyi* in having the apical bristles of tergite 1 (fig. 210) longer and finer. The former slightly simulates *falcozi* and the latter, *musgravei*. The 2 extremes of the variation are sharply distinct from each other but there exists a series of intergradations. The variation in details of the ♂ genitalia is partly shown in fig. 146 and 157. The single ♀ ex alcohol-preserved *Nyctophilus* sp. (AMNH 155395-400), Shipton's Flat, perhaps does not belong here. Its thoracic sternal plate is narrower in proportion (42×51), 1st row of ventral bristles of tibiae arising basad to tibial midlength, and setae on abdominal venter stouter (apical bristles of tergite 1 long and fine as in average specimens ex *N. timoriensis*).

Description. Body brownish, slender, length 1.9 ± mm. *Head* dorsally with 4 setae on, and 2 slightly behind, anterior margin. Labial theca much longer than wide and ca 1.5-2 × as long as labella. *Thorax* moderately short. Sternal plate (fig. 60) 41×52 in ♂, 42×57, in ♀, oblique sutures forming 95° angle at middle, median suture widened at middle; posterior margin gently concave,

hardly produced at middle, lined with many short setae plus 4 pairs of much longer ones. *Legs* (fig. 96, 109) moderately short, relative lengths of ♂ femora 1-3 and tibiae 1-3 as 41: 53: 52 and 36: 40: 39; relative widths of same, 16: 18: 17 and 9.5: 10: 10. Anterior surface of femur 1 sparsely unevenly setose, upper 1/2 with fewer setae and with a fairly large bare area at middle; anterior surface of femora 2-3 clearly less setose than femur 1, upper 2/3 almost entirely bare, in ♂ each with patch of sensory pores near base; femur 3 in ♀ with upper margin gently convex. Tibia 3 ca 4× as long as wide, 1st row of ventral bristles arising from tibial midlength, 3rd row apically slightly surpassing level of tibial apex. Basitarsus 3 ca 2/5 as long as width of thoracic sternal plate and 1.6× as long as 4 apical tarsomeres together.

Abdomen of ♂ (fig. 208, 209) sparsely setose. Tergite 1 slightly shorter than wide, surface with 7 ± small setae (in 1-2 rows) on each side, posterior fringe medially interrupted, composed of 7 ± pairs of strong erect setae. Surface of tergite 2 with 2 setal rows on anterior 1/2, posterior 1/2 either bare, or with 4 or 5 small preapical spines; surface of tergites 3-6 entirely bare; posterior fringes of tergites 2-3 composed largely of long setae, with few short stout spines; posterior fringes of tergites 4-6 each with 2-3 pairs of outstandingly long bristles, spines of posterior fringes of tergites 4-6 much longer and stouter than those of tergites 2-3; posterior fringe of tergite 6 usually with narrow gap at middle. Anal segment moderately long, anterior 1/2 of dorsal surface bare, posterior 1/2 richly spinose, anterior margin often with angular notch at middle. Synsternite 1+2 rather long, 19×39, ctenidium with 55 ± long, slender, closely arranged teeth and not flanked by strong setae on sides; lateralmost ctenidial tooth ca 1/2 as long as median or submedian teeth. Relative median lengths of sternite 3, 4 and 5+6 as 7: 7: 10; surface of sternite 3 medially bare, laterally with 2-3 rows of fine, largely pale setae, surface of sternite 4 entirely bare besides 1-2 setae at posterolateral corner, synsternite 5+6 with 1 row of preapical setae, its posterior margin weakly wavy, with 18-28 spines in 2 rows, posterior fringes of these 3 sternites composed of loosely arranged setae of varied length. Ventral surface of anal segment moderately setose. Clasper normal. Genitalia (fig. 134, 146, 157) normal for Group Brevicauda; deckplate shorter than wide, anteriorly gently emarginate, laterally evenly curved; aedeagus short, broad, straight along upper surface; aedeagal apodeme short, gently curved; paramere unilobed and broadly rounded at apex.

Abdomen of ♀ (fig. 210-212) also sparsely setose. Tergite 1 slightly shorter than wide, anteriorly slightly narrowed, each side of surface with 10 ± spines of varied length and robustness arranged in 2 oblique series, posterior fringe medially interrupted, with 7 ± pairs of closely arranged bristles which are either much shorter than or as long and almost as robust as, those on apical corners of anal segment. Tergite 2 as long as wide, surface with fine scattered spines; median line pale, hardly sclerotized; lateral darkened stripes well definable; lateral margin gently evenly curved, with several well spaced setae at intermediate section; apical lobes long, narrow, not diverging apicad, with 5 ± spines and 3 ± bristles; these bristles 1.5-3 × as long as and slightly more robust than bristles of tergite 1. Tergite 6 small, undivided (in 1 atypical specimen, as in fig. 211, divided into 5 very tiny plates each bearing 1 or more setae), with rather short setae in single arcuate series. Lateral connexivum, in addition to its numerous short pustulate spines, with 1 patch of long setae at each end and at middle, and with an oblique series of 2-6 long setae beneath or (when abdomen fully engorged) laterad to apical lobe of tergite 2 and arranged in parallel to lateral marginal setae of that tergite. Anal segment hardly shorter than wide, usually slightly narrowed apicad, lateral surface rather poorly setose. Synsternite 1+2 (fig. 73) fairly long, 31×51, otherwise similar to that in ♂. Sternite 3 with moderately long setae on surface, those on lateral areas distinctly longer stouter than on median area; posterior fringe composed of rather loosely arranged long setae. Sternite 4 represented by single row of long setae; sternite 5 short, medially interrupted, with similar setal row, plus 1 or 2 preapical setae at each lateral corner; sternite 6 also medially interrupted, much larger than 5, surface with 1 irregularly arranged transverse series of moderately fine setae, posterior margin fringed with long setae. Sternite 7 very large, paler and weakly sclerotized along anterior 2/3 of median line; setae strong, those of posterior fringe closely arranged, uneven in length, with

median ones shorter than lateral ones; posterior margin broadly rounded. Postgenital plate (fig. 213) small, surface microspinose, with 6 ± small setae. Adanal plate as wide as infra-anal plate, with 2-4 setae.

Basilia musgravei Theodor Fig. 61, 74, 97, 110, 123, 135, 147, 158, 214-218.

Basilia (*Tripselia*) *musgravei* Theod., 1967: 330, fig. 555, ♀, key, orig. des., holotype ♀ in Brit. Mus. Nat. Hist.

B. musgravei: Allison & Middleton, 1971: 29, fig. 6, rec.

Previous Records. 1 ♀ (type), ex *Vespadelus pumilus*, Inkerman; 1 ♂, 1 ♀ (Allison et al. 1971), same host, Chillagoe Caves.

New Material. 52 ♂♂, 75 ♀♀.

Ex *Vespadelus pumilus:* 2 ♂♂, 5 ♀♀ (ANIC), Gorge Ck.; 33 ♂♂, 53 ♀♀, Mt Iron Pot; 3 ♂♂, 7 ♀♀ (ANIC), Rivertree ; 1 ♂ (AMNH), Somerset; 2 ♂♂, 1 ♀ (SAM), Viator Cave.

Ex *Nycticeius rueppellii:* 1 ♂ (ANIC), Peacock Ck. — Ex "bat": 3 ♂♂, 3 ♀♀ (UQD), Mt Alford; 1 ♂ (ANIC), Brindabella; 1 ♂ (AMNH), Pink's Cave; 3 ♂♂, 5 ♀♀ (NSWA), Wyan; 2 ♂♂, 1 ♀ (ANIC), Worbuh.

Habitat. Evidently confined to *Vespadelus pumilus* (Vespertilionidae: Vespertilioninae); at present known from Queensland (Mt Alford, Chillagoe Caves, Inkerman, Mt Iron Pot, Pink's Cave, Somerset, Viator Cave, Worbuh) and New South Wales (Brindabella, Gorge Ck., Peacock Ck., Rivertree, Wyan). The southernmost record is from Brindabella (ca 35° 20′ S).

Affinities. Evidently *musgravei* occupies an intermediate position between *brevicauda* and *troughtoni*. For its differences from those 2 species, see the key and discussions under *troughtoni*. In Theodor's figure for the ♀, the lateral connexivum was drawn as if uniformly covered with very short pustulate spines, whereas the tergite 6 was drawn as if inverted **Y** - shaped. In the long series of specimens before me, the former has a conspicuous patch of long setae between levels of hind margins of sternites 3 and 5, first-row setae (i.e., the row at level of abdominal ctenidium) slightly longer than in following rows, and there are usually 1 - 3 long setae between abdominal spiracles 6 - 7; tergite 6 is medially broadly membranous, and its lateral lobes are each ca 2× as wide as long. The ♂ is hereby described for the first time.

Description. *Body* brownish, slender, length 2.0-2.1 mm. *Thorax* moderately short, sternal plate 42×55 (in ♀, 41×58), posterior margin hardly produced at middle. *Legs* moderately short, relative lengths of femora 1-3 and tibiae 1-3 as 44: 55: 56 and 40: 43: 43; relative widths of same, 16: 17: 15 and 8: 9: 8. Anterior surface of femur 1 finely evenly setose all over, distinctly more richly setose than in femora 2-3, which are largely bare at basal 1/3 and each of which has patch of sensory pores near base. Tibia 3 ca 5.4× as long as wide, 1st row of ventral bristles arising from a point slightly basad to tibial midlength; 3rd row apically slightly surpassing level of tibial apex. Basitarsus 3 ca 2/5 as long as width of thoracic sternal plate and 2× as long as 4 following tarsomeres together.

Abdomen of ♂ (fig. 214, 215) sparsely setose. Tergite 1 slightly shorter than wide, surface with 10 ± small setae, posterior fringe broadly interrupted at middle, composed of 12 ± strong erect setae. Tergite 2 with 2 setal rows on anterior 1/2 of surface, posterior 1/2 bare; surface of tergites

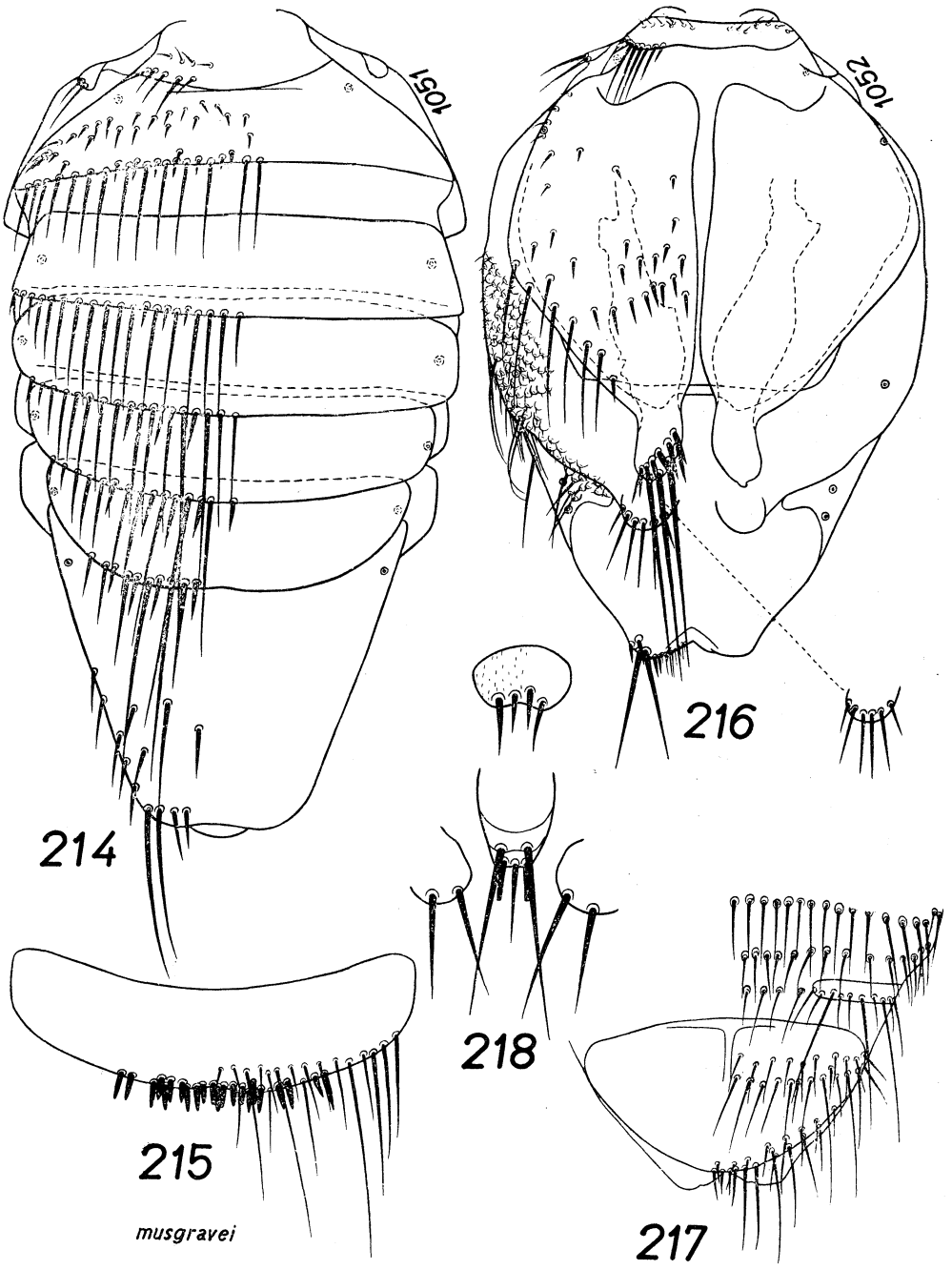


Fig. 214-218. *Basilia musgravei* Theod. ♂ Abdomen, dorsal view (214), ♂ synsternite 5+6 (215), ♀ abdomen, dorsal (216), ♀ abdominal apex, ventral (217), ♀ postgenital, infra-anal and adanal plates (218).

3-6 entirely bare; posterior fringes of these 5 tergites composed largely of long setae, with a number of short spines on tergites 2-3, with long spines and 2-3 pairs of long bristles on each of tergites 4-6; posterior fringe of tergite 6 usually with wide gap at middle. Anal segment moderately long, anterior 1/2 of dorsal surface bare, posterior 1/2 poorly spinose, anterior margin gently concave. Synsternite 1+2 ca 17×40 (in ♀ 27×46); ctenidium with 55 ± long slender closely arranged teeth and usually not flanked by strong setae on sides; lateralmost ctenidial tooth ca 1/2 as long as median or submedian teeth. Relative median lengths of sternites 3, 4 and 5+6 as 7: 6: 9.5; surface of sternite 3 laterally with 2-3 rows of fine pale setae, that of sternite 4 entirely bare; synsternite 5+6 with 1 row of fine preapical setae, its posterior margin very gently convex, with 20-25 spines in 2 rows; posterior fringes of these 3 sternites composed of fine setae. Ventral surface of anal segment moderately setose. Clasper normal. Genitalia (fig 135, 147, 158) normal for Group Brevicauda; deckplate moderately short, both anterior and lateral margins gently curved; aedeagus short, broad, weakly curved in S-shape; aedeagal apodeme gently curved along upper margin; paramere unilobed and broadly rounded at apex.

Basilia troughtoni (Musgrave) Fig. 62, 75, 98, 111, 124, 136, 148, 159, 219-223.

Nycteribia (*Acrocholidia*) *oceanica* (misidentification, nec Bigot): Speis., 1901: 41, ♂, redes., rec., key.
N. (*Nycteribia*) *troughtoni* Musgr., 1927: 265, pl. 22 (1-4), ♀ ♂, key, orig. des., holotype ♀ in Aust. Mus., Sydney.
Basilia (*Basilia*) *troughtoni:* Maa, 1965: 380, list.
B. (*Tripselia*) *troughtoni* (=*brevicauda* ♂): Theod., 1967: 336, fig. 564-566, ♂ ♀, key, redes., rec.

Previous Records. 1 ♂ (Speis. 1901), ex *Chalinolobus gouldi*, Smithfield. 1 ♂, 4 ♀ ♀ (type series of *troughtoni*), ex *Ch. gouldi*, Glenroy, Smithfield & Munni; 3 ♂ ♂, 6 ♀ ♀, (paratypes), ex "bat," Lucindale. 1 ♂ (Theod. 1967), ex "*Pteropus*" *gouldi*, Parramatta.

New Material. 18 ♂ ♂, 37 ♀ ♀.

Ex *Chalinolobus gouldi:* 2 ♂ ♂ (AM), Berrima; 1 ♂, 1 ♀, Black Mt; 1 ♂, Braidwood; 1 ♂ (WAM), Brown Bone Cave; 1 ♀ (ANIC), Canberra; 1 ♀ (ANIC), Eltham; 6 ♂ ♂, 7 ♀ ♀ (WAM), Katanning; 1 ♀ (SAM), Kiata Lowan Sanctuary; 1 ♀ (SPH), Orchard Hills; 1 ♂ (GNV), Perth; 1 ♀ (SAM), Seven Hills; 4 ♂ ♂, 16 ♀ ♀, Mt Tinderry; 1 ♂, 2 ♀ ♀ (ANIC), Wallaby Nob.

Ex *Rhinolophus megaphyllus:* 1 ♀ (ANIC), Rivertree. — Ex "bat": 1 ♂, 5 ♀ ♀ (SAM), Waterfall Gully.

Habitat. Apparently confined to *Chalinolobus gouldi* (Vespertilionidae: Vespertilioninae) which also serves as host of *falcozi* but in no case have these 2 *Basilia* species ever been found together. The odd record ex *Rhinolophus* is obviously accidental, and that ex "*Pteropus*" *gouldi*, apparently an error for *Chalinolobus gouldi*. Widespread in the temperate zone of the Subcontinent, at present known from New South Wales (Berrima, Braidwood, Glenroy, Munni, Orchard Hills, Parramatta, Rivertree, Seven Hills, Smithfield, Mt Tinderry, Wallaby Nob), Australian Capital Territory (Black Mt, Canberra), Victoria (Eltham, Kiata Lowan Sanctuary), South Australia (Lucindale, Waterfall Gully) and Western Australia (Brown Bone Cave, Katanning, Perth). The northern- and southernmost records are from Rivertree (ca 28° 38′ S) and Eltham (ca 37° 43′ S) respectively.

Synonymy. The incorrectness of Speiser's (1901) determination of 1 ♂ ex *Chalino-*

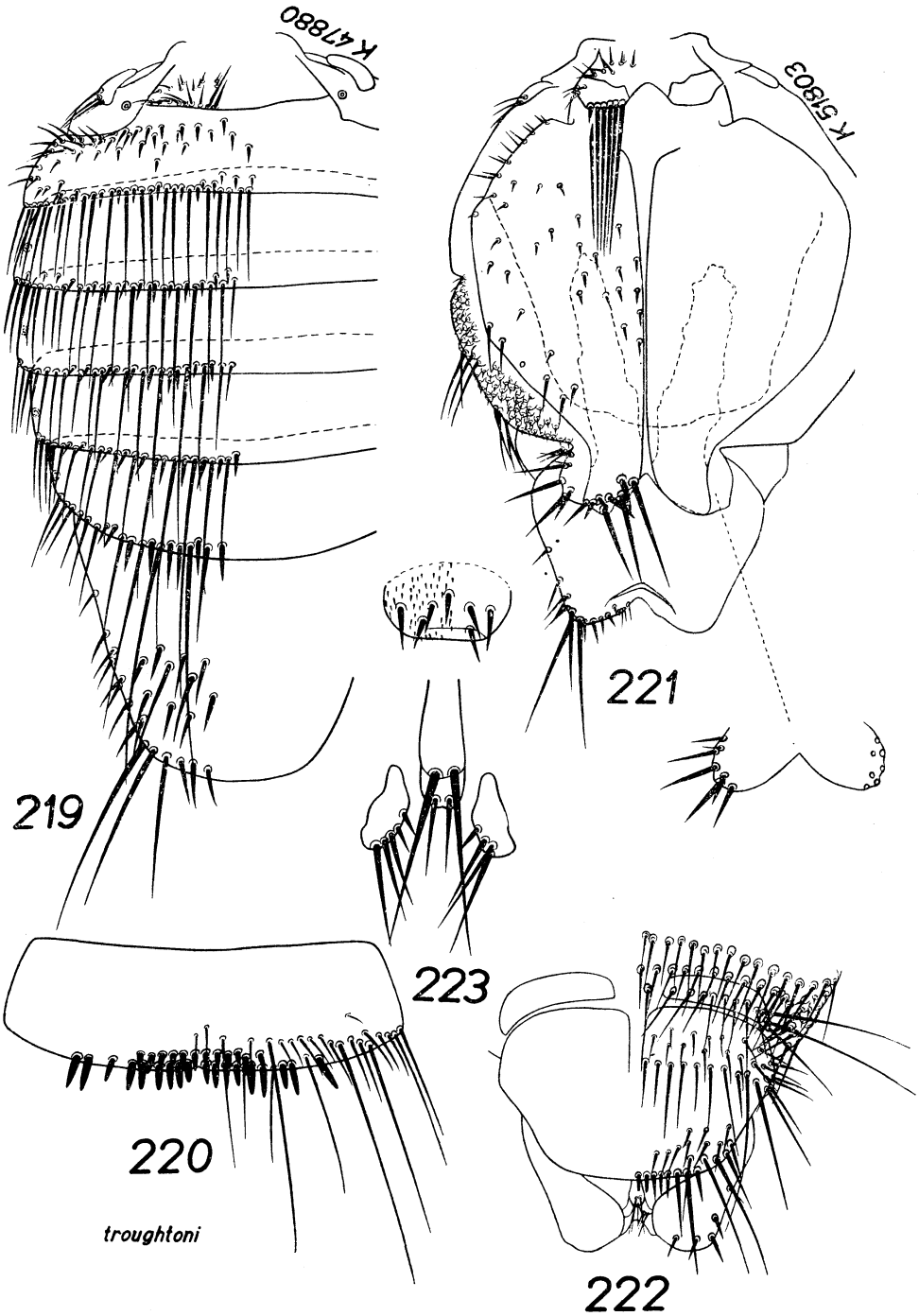


Fig. 219-223. *Basilia troughtoni* Musgr. ♂ Abdomen, dorsal view (219), ♂ synsternite 5+6 (220), ♀ abdomen, dorsal (221), ♀ abdominal apex, ventral (222), ♀ postgenital, infra-anal and adanal plates (223).

lobus gouldi, Australia: Smithfield as *Nycteribia* (*Acrocholidia*) *oceanica* was first pointed out by Falcoz (1923: 86) but without going into the question about the true taxonomic status of that very specimen. A little later, Musgrave (1925: 289, 292; 1927: 265), while stating his specimens of *falcozi* to be in agreement with Speiser's description, listed *oceanica* of Speiser as a possible synonym of *falcozi*. This was followed by Theodor (1967: 315) who placed *oceanica* of Speiser in synonymy with *falcozi*, without retaining Musgrave's question mark. Apparently Musgrave and Theodor reached their conclusions largely on the strength of the host record given by Speiser. A review of the last author's description revealed that the body size (length 2.6 mm) and tergal chaetotaxy (compare fig. 219 vs 191-192) in Speiser's specimen clearly agree with *troughtoni* rather than *falcozi*. Quite adequately, the tergite 2 ("erst Abdominalsegment" of Speiser obviously referred to both tergites 1 and 2) was described "auf der Fläche beborstet und zwar auf deren *vorderer Hälfte* mit 3 unregelmässigen Reihen ganz kurzer Börstchen; am Hinterrand stehen, ziemlich regelmässig abwechselnd *immer 2 lange und eine ganz kurz Borste*" and the 4 following tergites were "auf der Fläche *kahl*" (italics mine). In *falcozi*, the tergite 2 is rather evenly setose on its entire surface, its posterior fringe is composed of nearly equal numbers of long and short setae, and the surface of its 3 following tergites are clearly setose. Therefore even by such macroscopic characters, Speiser's description cannot be mistaken for any known *Basilia* species of Australia other than *troughtoni*. Speiser's specimen was from Smithfield which is, coincidentally, one of the type localities of *troughtoni*.

Theodor (1967) concluded that the ♂ paratypes of *longispinosa* and *brevicauda* were both referable to *troughtoni*. I cannot agree with his view (cf. discussions under *brevicauda*). It is true that ♂♂ of Australian *Basilia* species are closely similar to each other even in synsternite 5+6, claspers and genitalia. But, as shown in the key, ♂♂ of these 3 species can be separated rather easily.

Affinities. This is the largest, most robust and outstanding species of the Group Brevicauda. The ♀ can immediately be distinguished from that of any of its congeners by the strongly projecting, subcylindrical lateral lobes of tergite 6 (fig. 221). The long, fairly slender, very closely arranged apical bristles on tergite 1 are also very conspicuous. The ♂ can easily be distinguished from other members of the Group by the much more robust body and richer stronger abdominal setae (fig. 219). Although the apical lobes of the ♀ tergite 6 are about as strongly protruding as in *burrelli*, and in the key, it is placed next to the latter species, *troughtoni* obviously stands most close to *musgravei*. This is supported by the similarities in the nature and distribution of femoral and tergal setae (fig. 98, 221) and the details of ♂ genitalia (fig. 136, 148, 159). From *musgravei*, the species is readily recognizable by the shape of tergites 2 and 6, and the relative length of apical bristles of the tergite 1 in ♀, and by the more numerous spines on the dorsal surface of the anal segment and the much shorter genital deckplate in ♂. For its difference from *brevicauda* which was considered a synonym by Theodor (loc. cit.), see discussions under that species. The following relative measurements were made from 2 paratypes (K 47880, 51803): Thoracic sternal plate 48×60 (♂) or 48×64 (♀); relative lengths of ♂ femora 1-3 and tibiae 1-3 as 49: 60: 58 and 43: 47: 46; basitarsus 3 ca 3/8 as long as width of thoracic sternal plate and 2 × as long as 4 apical tarsomeres together; synsternite 1+2 in ♂ 16×42, in ♀

33×55; relative median lengths of ♂ sternites 3, 4, 5+6 as 9: 8: 13.

Basilia burrelli (Musgrave)

Fig. 63, 76, 79, 79a, 85, 86, 99, 112, 125, 137, 149, 160, 224-228.

(?) *Nycteribia varipes* Rudow, 1817: 123, ♀, orig. des., type lost; 1872: 408, ♀, translation of 1871 des. — Speis., 1908: 303, listed under Polynesian subregion. — Theod., 1967: 495, saying "not recognizable."

Nycteribia (*Nycteribia*) *burrelli* Musgr., 1927: 272, pl. 23 (4, 5, 9, 12), ♀ ♂, key, orig. des., holotype ♂ in Aust. Mus., Sydney.

Basilia (*Basilia*) *burrelli:* Maa, 1965: 380, list.

B. (*Tripselia*) *burrelli:* Theod., 1967: 310, key, Musgrave's des. modified.

Previous Record. 1 ♂, 1 ♀ (type series), ex *Chalinolobus morio*, Caermarthen.

New Material. 6 ♂♂, 5 ♀♀.

Ex *Chalinolobus morio:* 5 ♂♂, 5 ♀♀ (SAM), Punyelroo Cave.

Ex *Miniopterus schreibersii blepotis:* 1 ♂ (SAM), Bool Lagoon.

Habitat. Probably confined to *Chalinolobus morio* (Vespertilionidae: Vespertilioninae); the odd record ex *Miniopterus* should be regarded as accidental. At present known only from New South Wales (Caermarthen) and South Australia (Bool Lagoon, Punyelroo Cave).

Synonymy. It is slightly possible that the dubious species *varipes* might be referable here. From Rudow's inadequate description, it seems likely that his original material was derived from preserved bats, not those freshly collected in field. No locality was given. Since the type host *Miniopterus morio* (=*Chalinolobus morio*) is an Australian bat, Australia may be accepted as the type locality. In the checklist of Diptera Pupipara, Speiser (loc. cit.), without giving any reason, placed *varipes* under the Polynesian rather than the Australian Subregion. The type was long lost and has never been re-examined by any subsequent worker. As one may gather from the type host and from the description of abdominal apex (terminal segment with 2 outwardly directly warts [of tergite 6] at sides and with 2 approximated ones [of tergite 2] in the middle), *varipes* sounds similar to *burrelli*. By omitting passages on color pattern, the German version (1871) of Rudow's description may be quoted as follow: "*Nycteribia varipes*. Zur Gruppe II gehörig, mit winkelleisten und dünnen Tibien. Farbe... Kopf...Thorax...Ctenidien von dem Thoraxrande etwas abstehend 25 zähnig, Zähne fast gleichlang mit Ausnahme der äussersten. Abdomen des Weibchens 5 gliedrig. Erstes Segment schmal, zweites sehr lang und breit, drittes fast so breit aber nur ¼ so lang, die beiden letzten schmaler. Endglied mit 2 nach aussen gerichteten Eckwarzen, zwei nahestehenden in der Mitte, alle mit langen Borsten besetzt. Oberseite mit einzelnen langen Borsten zwischen dichten Haaren, Seiten mit kurzen Wimpern, Segmentecken mit dichten Haarquasten besetzt. Segmentirung dunkler gefärbt. Ctenidium 50 zähnig, incht deutlich. Füsse zehr lang. Schenkel flach elliptisch, Schienbein schmal, Tarsus

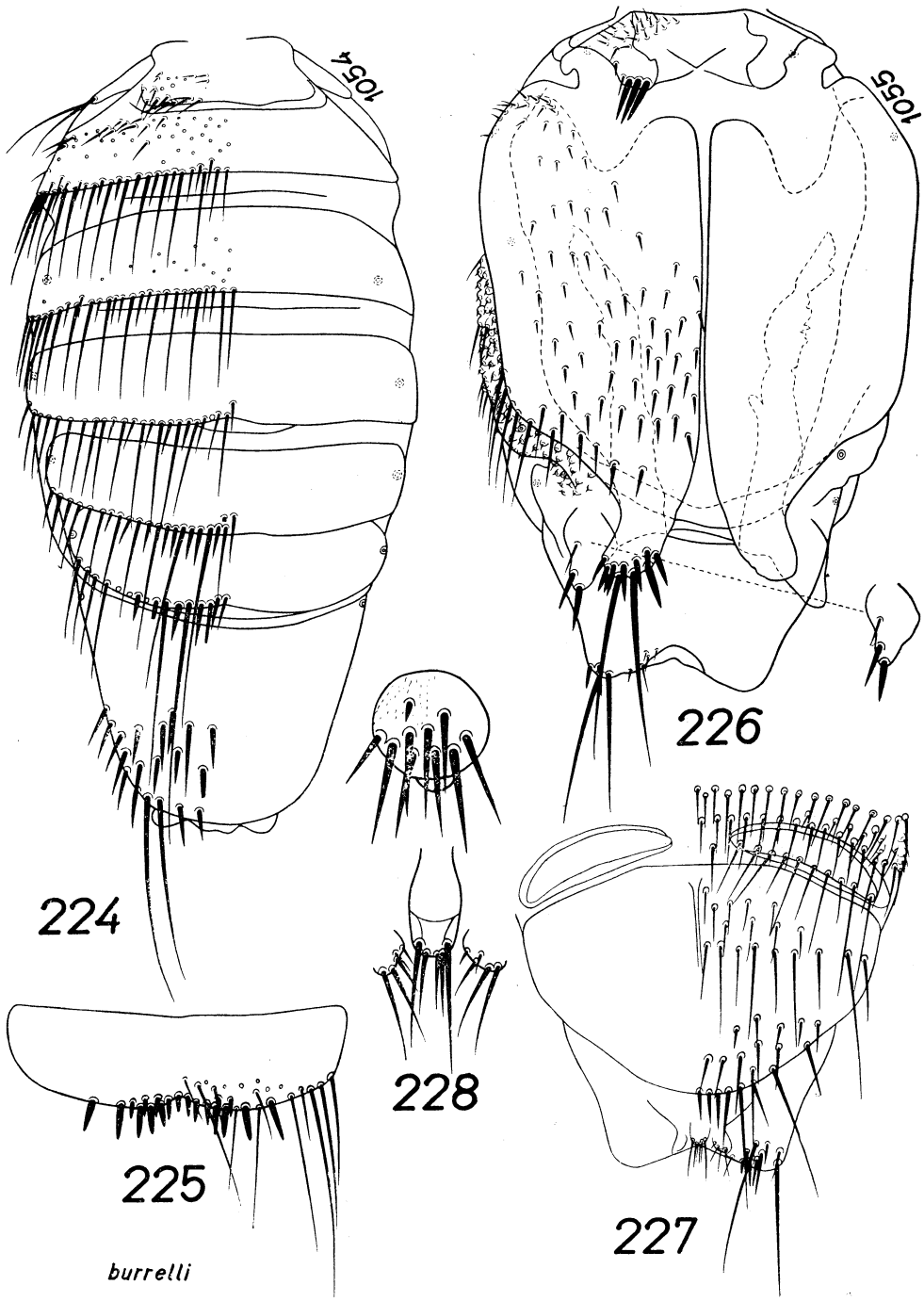


Fig. 224-228. *Basilia burrelli* Musgr. ♂ Abdomen, dorsal view (224), ♂ synsternite 5+6 (225), ♀ abdomen, dorsal (226), ♀ abdominal apex, ventral (227), ♀ postgenital, infra-anal and adanal plates (228).

lang, starkklauig, fein, aber dicht behaart, an den Gelenken mit langen Borsten. Schenkel und Schienbein der vordern Beine an den Gelenken fast abgestutzt, höckrig, mit sehr kleiner Gelenkstelle. Grösse [in English version, this was wrongly translated as length] 0, 4 M. M. Auf *Miniopterus morio*. Durch den breiten Hinterleib hinlänglich von andern unterschieden."

AFFINITIES. This species is somewhat atypical for the Group Brevicauda. The ♀ can immediately be separated from other members of that Group by: lateral margins of tergite 1 shining black, apical bristles of tergite 1 replaced by very heavy spines, setae on lateral margin of tergite 2 concentrated near its posterior section, apical lobes of tergite 2 widened and divergent apicad, those of tergite 6 cone-shaped, apical series of long setae on lateral connexivum entirely missing; whereas the ♂, by: tergite 2 very profusely setose, genital deckplate very short and paramere apically bilobed. The femora in both sexes are more profusely setose on the anterior surface than in its relatives. The species is heretofore known only from the type series and original description, a redescription is given below.

Description. *Body* brownish, moderately slender, length 2.0-2.3 mm. *Head* dorsally with 4 setae on anterior margin and 2 slightly behind them. Labial theca much longer than wide, ca 1.5× as long as labella. *Thorax* short. Sternal plate (fig. 63) 43×59 in ♂, 42×60 in ♀, oblique sutures forming 110° angle at middle, median suture widened at middle; posterior margin gently concave, hardly produced at middle, lined with many short setae plus 4 pairs of much longer ones. *Legs* (fig. 79, 79a, 85, 99, 112) moderately short, relative lengths of ♂ femora 1-3 and tibiae 1-3 as 46: 57: 56 and 42: 45: 44; relative widths of same, 18: 20: 18 and 10: 10: 10. Anterior surface of femur 1 evenly densely setose; that of femur 2 with apical 2/3 similarly setose as in femur 1, with basal 1/3 extensively bare near upper margin; anterior surface of femur 3 with finer, less numerous setae than in 1-2, basal 1/2 largely bare; anterior surface of femora 2-3 in ♂ with patch of sensory pores near base; upper margin of femur 3 in profile in ♀ gently evenly convex. Tibia 3 ca 4.5 × as long as wide, 1st row of ventral bristles arising from tibial midlength, 3rd row apically much surpassing level of tibial apex. Basitarsus 3 ca 3/10 as long as width of thoracic sternal plate and 1.8 × as long as 4 apical tarsomeres together.

Abdomen of ♂ (fig. 224, 225) sparsely setose. Tergite 1 slightly shorter than wide, surface with 20 ± small setae, posterior fringe medially broadly interrupted, composed of 6 ± pairs of strong erect setae. Surface of tergite 2 with 4-5 setal rows, posterior 1/3 largely bare; tergite 3 with small patch of discal setae, tergites 4-6 entirely bare. Posterior fringes of tergites 2-6 composed of long setae and short spines, tergites 4-6 each with 2-3 pairs of oustandingly long bristles, posterior fringe of tergite 6 with very narrow gap at middle and with its spines almost as robust as those on dorsal surface of anal segment. Anal segment moderately long, anterior 1/2 of dorsal surface bare, posterior 1/2 moderately spinose, anterior margin straight. Synsternite 1+2 short, 18×40, anterior margin notched at middle, ctenidium (fig. 86) with 55 ± long slender closely arranged teeth and not flanked on sides by strong setae, lateralmost ctenidial tooth ca 1/2 as long as median or submedian teeth. Relative median lengths of sternites 3, 4 and 5+6 as 7: 7: 10; surface of sternite 3 with 3-4 rows of fine setae which are largely pale, surface of sternite 4 bare except 1-2 setae at posterolateral corner, synsternite 5+6 with 1 row of preapical setae; posterior fringes of these 3 sternites composed of loosely arranged setae of varied length; posterior margin of synsternite 5+6 shallowly incised at middle and with 20-30 blunt spines in 2 rows. Ventral surface of anal segment (fig. 125) poorly setose. Clasper normal. Genitalia (fig. 137, 149, 160) normal for Group Brevicauda but paramere in profile bilobed at apex. deckplate very short; anteriorly moderately emarginate, laterally weakly curved in

S-shape, posteriorly with broad knob; aedeagus moderately long, slender and weakly curved in S-shape; aedeagal apodeme short, rather strongly curved along upper margin.

Abdomen of ♀ (fig. 226, 227) also sparsely setose. Tergite 1 slightly shorter than wide, anteriorly hardly narrowed, each side of surface with 15 ± spines of varied length and arranged in 3 rows, lateral margin gently evenly curved, shining black, posterior fringe very broadly interrupted at middle, and composed of 5 ± pairs of short, stout, very closely arranged spines. Tergite 2 longer than wide, gently narrowed apicad, posterior 2/3 of surface rather evenly setose; median line depressed but not paler nor less sclerotized than neighboring areas, lateral dark stripes indistinct except near bases of apical lobes; lateral margin obliquely straight, curved at both ends, marginal setae concentrated at apical end; apical lobes widened and distinctly divergent apicad, with 8 ± spines and 2 ± bristles. Tergite 6 widely interrupted at middle, lateral lobe conical, with 3 ± strong spines. Lateral connexivum with, besides numerous very short pustulate spines, 2-3 short rows of long setae at level of abdominal ctenidium and at and slightly behind level of posterior margin of sternite 3, no such long setae near abdominal spiracles 6-7. Anal segment shorter than wide, gently narrowed spicad, lateral surface largely bare. Synsternite 1+2 (fig. 76) ca 27×46, otherwise similar to that of ♂. Sternite 3 with 4-5 rows of uniform short setae on surface, those on median area practically as short as on lateral area; posterior fringe, as that of sternites 4-5, composed of long, rather closely arranged setae. Sternites 4-5 bare on surface, latter short and medially interrupted. Sternite 6 large, also medially interrupted, anterior 1/2 of surface bare, posterior 1/2 with 2 rows of fine setae, setae of posterior fringe more loosely arranged than in sternites 3-5. Sternite 7 very large, almost evenly sclerotized and pigmented, surface with 2 rows of rather irregularly arranged fine setae, posterior margin broadly rounded, fringed with 10 ± strong spines and 6 ± long setae. Postgenital plate moderately large, roundish, with 10 ± setae. Adanal and infra-anal plates similar in width, each with 4 ± strong setae.

[**Basilia forcipata** Ferris, 1924]

This species occurs in western North America (British Columbia, Montana, California, Colorado, New Mexico, Lousiana, Sinaloa, San Luis Potosi) and is parasitic normally on *Myotis californicus*, *M. thysanodes* and *M. volans*. In the collection of the Mus. Comp. Zool., Harvard, there is 1 ♀ labeled as "Millaa Millaa, Queensland, 25000 (sic) ft., Apr., Darlington." Obviously it is referable to *forcipata* and the labelling is wrong.

Basilia transversa Maa, new species Fig. 64, 77, 100, 229-232.

MATERIAL. 1 somewhat teneral ♀. Holotype in Aust. Nat. Ins. Colln.

Ex *Vespadelus pumilus:* Gungahlin.

HABITAT. At present known only from *Vespadelus pumilus* (Vespertilionidae: Vespertilioninae) in Australian Capital Territory. The host record needs verification.

AFFINITIES. This is an isolated species; readily recognizable by the combination of characters given in the key, couplet 2. The absence of the tergite 3, which is a feature common to 33 out of 37 New World species, is very rare among the Old World ones. The uniformly narrow median suture of the thoracic sternal plate, the rather short broad femora and tibiae, the apically positioned ventral tibial bristles, the broad tergite

1, the broad apical lobes of tergite 2, the ample synsternite 1+2 as well as the small infra-anal plate are similar to that in most New World species but little comparable to Old World ones. Perhaps *transversa* should be considered as a species either with Notogean affinities or converging toward the Neotropical forms. In the scheme of Guimarães & D'Andretta (1956, *Arquivos d. Zool. S. Paulo* **9:** 156-57, 171) and Theodor (1967: 247) for the classification of the New World *Basiliae*, this species may be assigned to the Group Ferruginea but differs in having undefinable eyes, regular setal arrangement on sternite 7 and unusually large postgenital plate. The name *transversa* refers to the shape of the tergite 1 and to the transoceanic relationship of an Australian species with S. American ones.

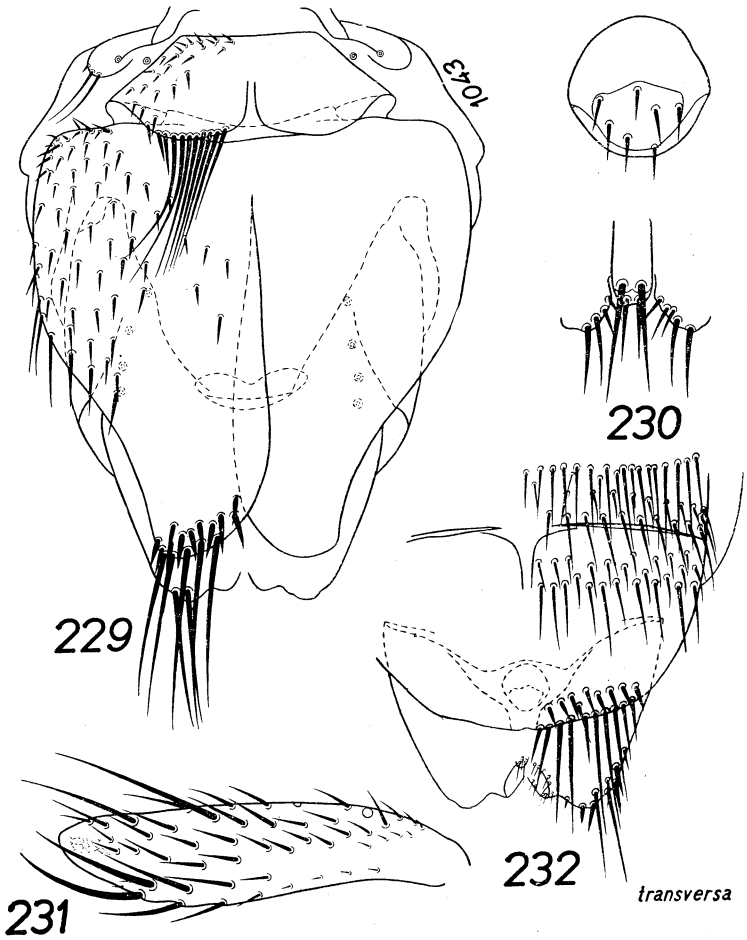


Fig. 229-232. *Basilia transversa* n. sp., holotype ♀ (teneral). Abdomen, dorsal view (229), postgenital, infra-anal and adanal plates (230), tibia 3, anterior surface (231), abdominal apex, ventral (232).

Description. *Body* brownish, robust, length 2.4 mm. *Head* anterodorsally with 6 setae, 4 of which lie on anterior margin. Labial theca longer than wide and about 2× as long as labella. *Thorax* short. Sternal plate (fig. 64) 45×72, oblique sutures forming 110° angle at middle, median suture uniformly narrow, surface very finely setose, posterior margin gently concave, lined with rather uniform short setae, 2 pairs of which slightly longer. *Legs* (fig. 100, 231) moderately short, relative lengths of femora 1-3 and tibiae 1-3 as 51: 64: 66 and 47: 49: 48, respectively; relative widths of same, 23: 24: 22 and 11: 12: 12. Anterior surface of femur 1 evenly setose all over, femur 2 similar but upper and lower marginal areas with rather scattered setae, femur 3 largely bare at upper marginal area and at basal 1/2, its upper margin evenly weakly convex. Tibia 3 ca 4× as long as wide, with small patch of pale setulae near apex on anterior surface, 1st row of ventral bristles arising from a point clearly apicad to tibial midlength, 3rd row apically surpassing level of tibial apex. Basitarsi ca 1/3 as long as width of thoracic sternal plate and 1.5× as long as 4 apical tarsomeres together.

Abdomen of ♀ (fig. 229) sparsely setose, no darkened stripes (? constant) on tergites 1-2. Tergite 1 much wider than long, strongly widened posteriorly, lateral margin strongly curved, surface with 20 ± fine setae on each half, posterior margin straight; posterior fringe broadly interrupted at middle, each lateral section with 7 bristles which are about as long as but less robust than those on tergite 2. Tergite 2 longer than wide, surface with fine scattered setae, lateral margin very weakly curved; apical lobe unusually wide, with a preapical row of 10 ± spines and apical row of 5 ± bristles. Tergite 6 apparently not definable. Anal segment hardly narrowed posteriorly, posterior margin weakly concave, lateral surface largely bare. Laterite 1 lined with 2-3 setae and some spinules. Lateral connexivum largely covered with very short pustulate setae, anteriorly and posteriorly each with 2 rows of slightly longer heavier setae, and at level of hind margin of sternite 3, with a row of bristles which are almost as long as those on tergite 1. Synsternite 1+2 (fig. 77) large, 31×53, anterior margin notched at middle, ctenidium composed of 73 teeth and not flanked by strong setae, lateralmost ctenidial tooth slightly shorter than median or submedian teeth. Sternite 3 represented by 4 ± (at middle) to 7 ± rows (on side) of short setae and 1 row of long setae, setae of anterior rows at middle distinctly shorter, finer than those on sides; sternites 4-5 each represented by 1 (at middle) or 2 rows (on side) of setae; sternite 6 represented by 2-3 rows of setae; sternite 7 large, posteriorly with 2 rows of neatly arranged strong setae, its posterior margin broadly rounded. Postgenital plate (fig. 230) large, roundish, well sclerotized, with 7 ± setae in 2 rows near anterior (upper) margin, no microsetae on surface. Infra-anal plate small, with 4 setae in 2 rows; adanal plate elongate, much wider than infra-anal plate. ♂ unknown.

Genus **Penicillidia** Kolenati 1863

This genus is parasitic chiefly on Vespertilionidae, and the Australian forms exclusively on *Miniopterus* (Vespertilionidae: Miniopterinae). Three of the forms belong to the subgenus *Penicillidia* s. s., Group Jenynsii, while the fourth form belongs to the subgenus *Eremoctenia* which is unique within the entire family in having no thoracic and abdominal ctenidia and is confined to the Wallacea, Papuan and Australian Subregions. One of the forms, *tectisentis* n. sp., is endemic.

Key to Australian Penicillidia Species

1. Thoracic and abdominal ctenidia entirely undefinable; notopleural setae numerous, well developed, in several rows, forming small patch on each side; notopleurite almost even in width; thoracic sternal plate with anterior margin rounded off into anterolateral margins; lst and 2nd rows of ventral bristles of tibiae (fig. 246) recumbent, poorly developed; spines of ♂ synsternite 5+6 (fig. 248-249) in 4-5 rows and forming a triangular patch. Subgenus *Eremoctenia*..... ....**vandeuseni**

Thoracic and abdominal ctenidia present; 2-12 notopleural setae in single column, sometimes

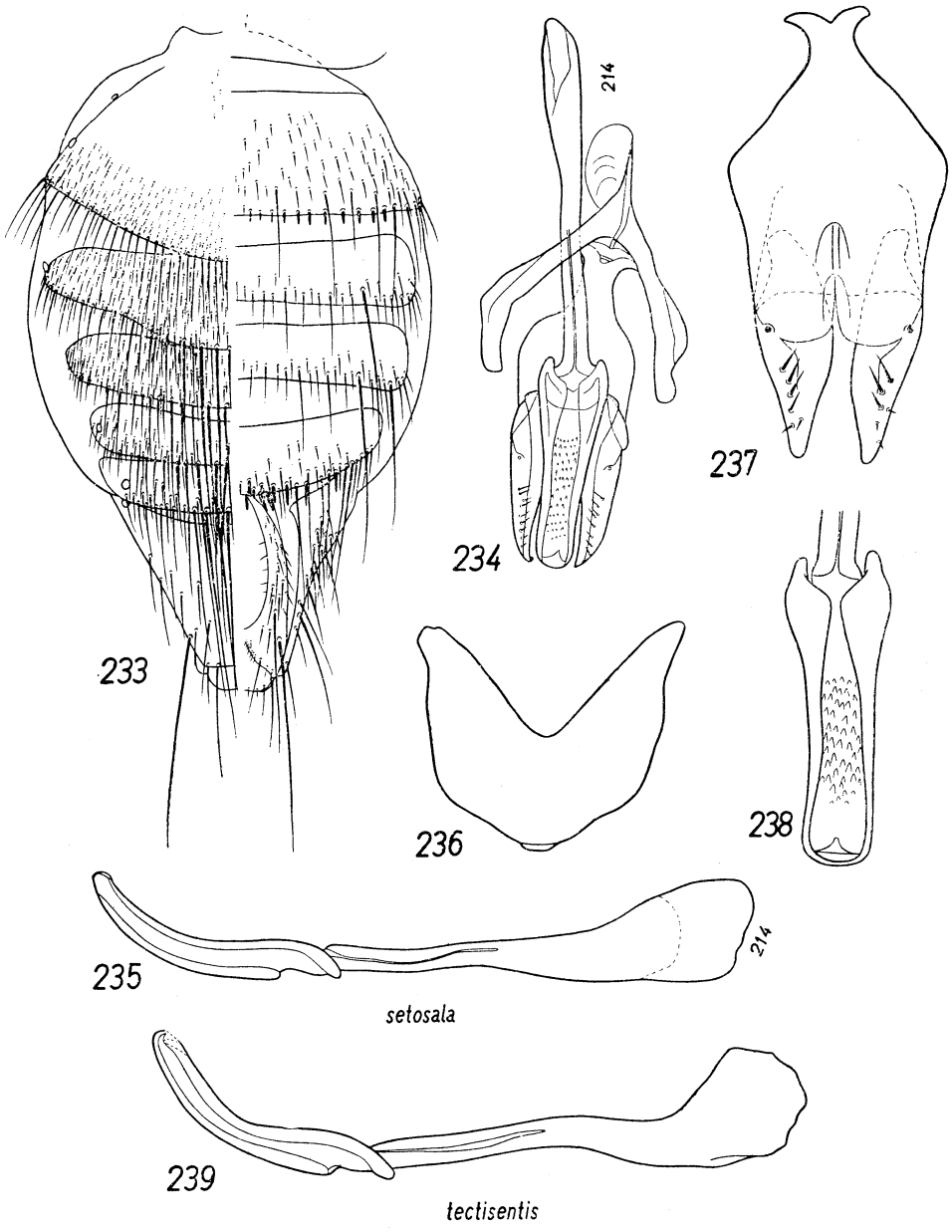


Fig. 233-239. *Penicillidia*, ♂♀. Abdomen, dorsal and ventral views (233), genitalia (234), genital deckplate (236), phallobase and parameres (237), aedeagus, ventral view (238), aedeagi and aedeagal apodemes (235, 239). Fig. 233-235, ***P. setosala*** n. sp., slide #214; fig. 236-239, ***P. tectisentis*** n. sp., slide #1128.

absent or hardly developed; notopleurite markedly narrowed anteriorly; thoracic sternal plate with anterior margin clearly angulate to anterolateral margins; lst and 2nd rows of ventral bristles of tibiae erect, well developed; spines of ♂ synsternite 5+6 in 2-3 rows. Subgenus *Penicillidia* s.s. 2

2. Thorax with 4-12 notopleural setae on each side; aedeagus in ventral view evenly broad, posterior margin of ♂ synsternite 5+6 distinctly convex; ♀ lateral connexivum with black stout spines or moderately long setae between tergite 2 and synsternite 1+2, tergal plate 3 very narrowly or widely interrupted at middle 3

Thorax lacking notopleural setae, at most with single such seta on each side; aedeagus in ventral view slightly narrowed apicad, posterior margin of ♂ synsternite 5+6 virtually straight; ♀ with only colorless microscopic spinules on lateral connexivum between tergite 2 and synsternite 1+2, tergal plate 3 entire..... **oceanica**

3. Notopleural setae in ♂ largely very short (ca as long as their interspace); in ♀, tergite 1 lacking posterior fringe, tergal plate 3 widely interrupted at middle, lateral connexivum (fig. 244) anteriorly with erect spines and intermediately with mixture of short spines and moderately long setae, side-piece of sternite 5 bare on anterior 1/2 of surface and with only 1 row of preapical setae..... **tectisentis**

Notopleural setae in ♂ uniformly long; in ♀, tergite 1 with posterior fringe at middle, tergal plate 3 slight interrupted at middle, lateral connexivum (fig. 241) anteriorly with moderately long setae and intermediately with patch purely of short spines, side-piece of sternite 5 setose extensively, with 3 rows of setae before posterior fringe..... **setosala**

Penicillidia (**Penicillidia**) **oceanica** (Bigot) 1885 Fig. 289.

Nycteribia oceanica Bigot, 1885, *Ann. Soc. Ent. Fr.* **1885**: 246, orig. des., type ♂ in Brit. Mus. Nat. Hist.
Penicillidia oceanica: Scott, 1932: 21, rec. — Allison & Middleton, 1971: 30, fig. 5, ♂, des.
P. (*Penicillidia*) *oceanica oceanica*: Theod., 1967: 389, fig. 659-663, 665-666, 668, key, redes, rec.

Previous Records. 2 ♂♂, 4 ♀♀, ex *Miniopterus schreibersii*, Mossman; no host, Townsville (Scott 1932). 6 ♂♂, 5 ♀♀, ex *M. schreibersii*, Cape York, Mossman, and islands of Torres Strait; no host, Gordonvale and Townsville; ex *Pteropus conspicillatus*, Cairns (Theod. 1967). The type is from New Caledonia, no host.

New Material. 500 ♂♂, 494 ♀♀.

Ex *Miniopterus* 456 ♂♂, 474 ♀♀, in 61 lots, Ashford Cave, Ashford Downs, Avalon, Back Ck. Mine, Bamaga, Bannockburn Oval, Belfery Cave, Bonalbo Colliery, Bulladelah, Bungonia Caves, Burrinjuck Dam, Canungra, Carrai Cave, Cheitmore Cave, Chillagoe Caves, Colong Caves, Cudgigong, Darwin, Drum Cave, Elizabeth Bay House, Endless Cave, Fig Tree Cave, Gable Cave, Greenhouse Cave, Grill Cave, Hill End, Holy Jump Cave, Ingham, Innisfail, Johanssen's Cave, Kalumburu, Kempsey, Lindeman I., Mallacoota, Melrose, N Sydney Rly. Tunnel, Piano Cave, Possession I., Prospect Tunnel, Punchbowl Cave, Rise & Shine Mine, Spring Ck. Cave, Spurgeon, Sydney, Thursday I., Timor Cave, Tooloom, Wallaby Ck., Warragamba Dam, Waterfall Gold Mine, Willi-Willi Cave, Wombeyan Caves, Yessabah Cave.

Ex *Rhinolophus megaphyllus:* 4 ♂♂, 6 ♀♀, Bonalbo Colliery, S. Johnston Stn., Willi-Willi Cave. — Ex *Macroderma gigas:* 1 ♀, Johanssen's Cave. — Ex "bat": 17 ♂♂, 13 ♀♀, Ashford Cave, Brisbane, Carrai Cave, Cooktown, Dayboro, Helen's Hill, Timor Cave, Wee Jasper Cave, "Cape York". — In mine shaft: 2 ♂♂, 1 ♀, Kingsgate.

— Ex "*Acrobates pygmaeus*" (Marsupialia !): 2 ♂♂, Tooloom.

HABITAT. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). A most widespread and dominant species of the genus in Australia, at present known from Queensland (Bamaga, Brisbane, Cairns, Canungra, Chillagoe, Cooktown, Dayboro, Gordonvale, Helen's Hill, Holy Jump Cave, Ingham, Innisfail, Johanssen's Cave, Lindeman I., Mossman, Possession I., S. Johnston Stn., Spurgeon, Thursday I., Townsville, "Cape York", "Torres Strait islands"), Northern Territory (Darwin), New South Wales (Ashford Cave, Ashford Downs, Avalon, Back Ck. Mine, Bannockburn Oval, Belfery Cave, Bonalbo Colliery, Bulladelah, Bungonia, Burrinjuck Dam, Carrai Cave, Cheitmore Cave, Colong Caves, Cudgegong, Drum Cave, Elizabeth Bay House, Endless Cave, Fig Tree Cave, Gable Cave, Hill End, Kempsey, Kingsgate, Piano Cave, Prospect Tunnel, Punchbowl Cave, Rise & Shine Mine, Sydney, Timor Cave, Tooloom, Wallaby Ck., Warragamba Dam, Waterfall Gold Mine, Wee Jasper Cave, Wombeyan Caves, Yessabah Cave), Victoria (Greenhouse Cave, Mallacoota, Spring Ck. Cave), South Australia (Melrose) and Western Australia (Kalumburu). The southern and westernmost records are from Mallacoota (ca 37° 30' S) and Kalumburu (ca 126° 40' E), respectively. This species is the only Melanesian batfly found in Australia. In most caves in South Australia, it is replaced entirely by *tectisentis*. Extralimital distribution: New Caledonia.

AFFINITIES. This species is most closely related to *acuminata* Theod. (ex *Miniopterus schreibersii*, Philippines) which was considered as a subspecies of *oceanica* by Theodor (1963, 1967). Since there is a very wide gap between known ranges of the 2 forms (even though the New Guinean *Penicillidia* fauna has been intensively surveyed in recent years) and since there exist some apparently constant differentiating characters, I consider them specifically distinct. *Oceanica* differs from *acuminata* chiefly in being smaller in size, and in having less abundant setae and bristles, and shorter and less strongly curved aedeagus. In the ♀, the posterior fringe of the thoracic sternal plate is much weaker; that of the tergite 2 is composed of more numerous but averagedly slightly shorter bristles; setae on the lateral connexivum uneven in length, those of hindmost row much longer; the abdominal ctenidium more poorly developed, usually with 4-5 short spines on each side; the sternites 1+2 and 4 and anterolateral areas of the dorsum of the anal segment more scantly setose.

The setae on the surface of ♀ tergite 2 vary greatly in number as well as in extent. Generally the northern specimens have fewer, and the southern ones have more abundant setae. When the setal pattern is arbitrarily separated into 6 forms, their relative frequency in 182 ♀♀ from Cape York Peninsula (chiefly from Possession I.) may be shown as in fig. 289. An examination of about 60 ♀♀ from New Caledonia revealed that these setae also varied individually. Theodor (loc. cit.) remarked that the Australian specimens differed in some details and might eventually prove to be a separate subspecies. He did not specify any of these details besides illustrating aedeagi and parameres of representatives from these 2 countries. The only differences I noticed are that in the Australian form, the aedeagus in profile is slightly more strongly curved at apex, the paramere in profile apically blunter, the ♀ tergal plate 3 is slightly larger, setae on the ♀ lateral connexivum as well as tergal

plate 3 are generally slightly stronger. But it seems impossible to draw a clear-cut dividing line between these 2 races.

In Theodor's (loc. cit.) figures and redescription of this species, the spines-setae near spiracles 3-5 on the ♀ lateral connexivum were not drawn out nor mentioned. They are different from those in the 2 following species as well as an undescribed one from the Loyalty Is. The spines are arranged around the spiracle 3 and are each hardly longer than the diameter of their respective basal papillae, while the setae are fairly long (those of the hindmost row as long as setae on the posterior margin of the sternite 4) and form a large transverse patch extending from the horizontal level of spiracles 4 and 5, downward to level of the lateral margin of the sternite 5 and posteriorly about to the level of the posterior margin of the sternite 4 thereby joining a patch of dense erect setae which lies between spiracles 6-7 and sternite 6.

Among the Australian specimens, some abnormalities were noted: 5 ♂♂, 3 ♀♀, each with 1 long notopleural seta on either the right or left side; 1 ♂, 1 ♀, each with 1 such seta on both sides; 9 ♀♀, each with 1 long seta on disc of tergite 1; 1 ♀, with 4 long setae on same disc; 1 ♀, 3 strong setae between tergite 2 and tergal plate 3, and 1 strong seta on the left side between tergal plate 3 and the anal segment; 1 ♀, without tergal plate 3; 6 ♀♀, each with 3-5 setae on the postgenital plate and with the setae on the right and left sides uneven in number.

Penicillidia (Penicillidia) setosala Maa, new species Fig. 233-235, 240-242.

MATERIAL. 2 ♂♂, 6 ♀♀ (plus 127 ♂♂, 189 ♀♀ from New Guinea). Holotype ♀ (BISHOP 8464), ex *Miniopterus*, NE New Guinea, Bulolo R., IV. 1968, J. L. Gressitt & T. C. Maa, in Bishop Mus.

Ex *Miniopterus:* 2 ♂♂, 4 ♀♀, Phoenician Mine, Samford, Thursday I., Willi-Willi Cave.

Ex "bat": 2 ♀♀, Finch Hatton Gorge, Fingal Point Cave.

[New Guinea records. Ex *Miniopterus:* 72 ♂♂, 121 ♀♀ in 17 lots, Bulolo R.; 9 ♂♂, 9 ♀♀ in 2 lots, Cape Vogel Penin., Dabora; 1 ♀, Cape Vogel Penin., Menapi; 2 ♂♂, 5 ♀♀, Chimbu Distr., Chuave; 17 ♂♂, 16 ♀♀, Edie Ck. nr Wau; 2 ♂♂, 1 ♀, Fak-Fak, Danowaria Cave; 3 ♀♀ in 2 lots, Finschhafen; 1 ♂, 1 ♀, Gurakor; 1 ♀, Huon Penin., Mt Rawlinson; 2 ♂♂, 2 ♀♀ in 2 lots, Humboldt Bay nr Hollandia; 2 ♂♂, 1 ♀, Javarere Cave nr Port Moresby; 1 ♂, Kassam nr Kainantu; 2 ♂♂, 1 ♀ in 2 lots, Kratke Mts, Karunka Ck.; 2 ♂♂, Milne Bay, Sinaeada; 3 ♂♂, 5 ♀♀ in 3 lots, Okapa nr Kainantu; 2 ♂♂, 4 ♀♀ in 2 lots, Sinofi nr Kainantu; 8 ♂♂, 16 ♀♀ in 2 lots, no locality, field nos. BBM-NG 20091-20105.]

[Ex *Myotis adversus:* 1♀, Putei limestone cave. — Ex *Hipposideros* sp.: 1 ♀, Finschhafen Subdistr., Nineia. — Ex "bat": 1 ♂, Cromwell Mts, Mt Ulur; 1 ♂, Finschhafen.]

HABITAT. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). Found sparingly in Australia, at present known only from Queensland (Finch Hatton Gorge, Phoenician Mine, Samford, Thursday I.) and New South Wales

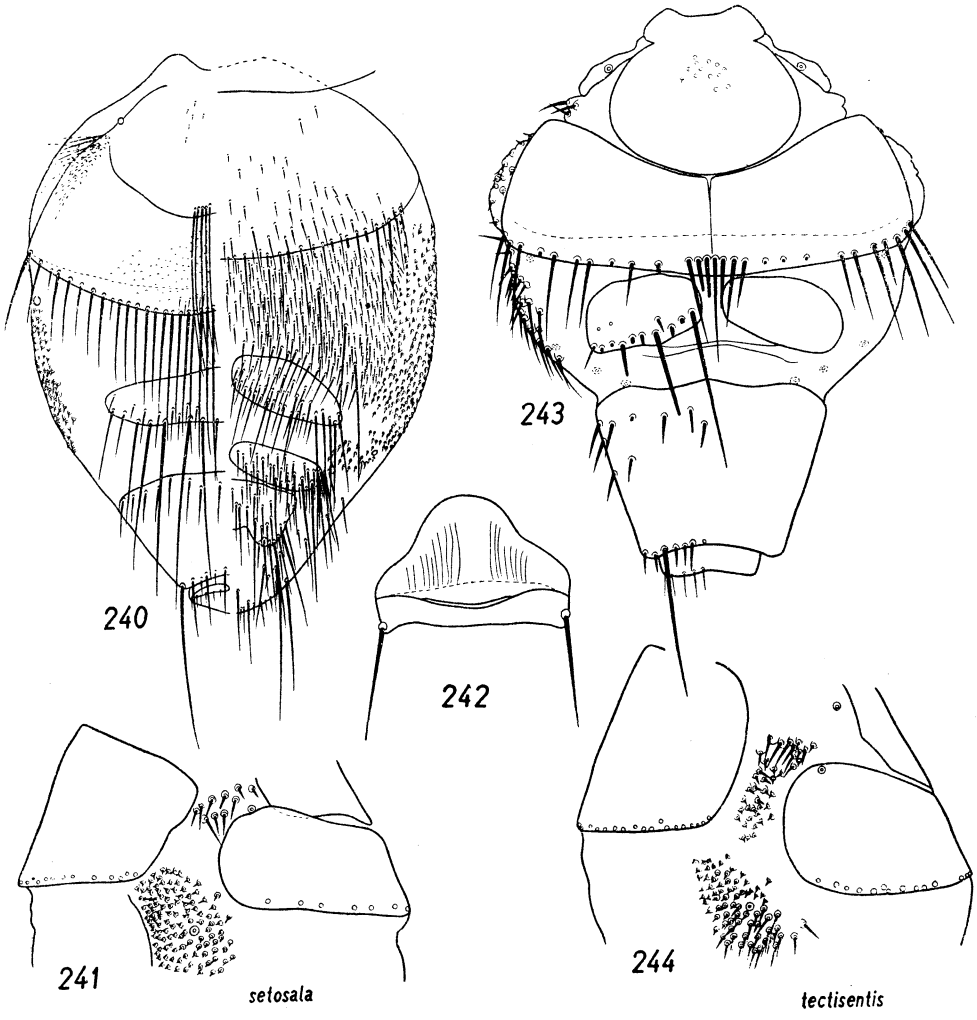


Fig. 240-244. *Penicillidia.* ♀♀. Abdomen, dorsal and ventral views (240), abdominal bases, lateral view (241, 244), postgenital plate (242), abdomen, dorsal (243). Fig. 240-242, ***P. setosala*** n. sp., slides ♯ 212 and 1131; fig. 243-244, ***P. tectisentis*** n. sp., slides ♯1129 and 1130.

(Fingal Point Cave, Willi Willi Cave); further south, it is replaced by *tectisentis* n. sp. The southernmost record is from Willi Willi Cave nr Kempsey (ca 31° 10′ S). In New Guinea, it is the only *Penicillidia* s. s. on *Miniopterus* and is known from Onion Penin. (Fak-Fak) in the west, Huon Penin. in the northeast and Cape Vogel Penin. in the southeast.

Affinities. This species is closely related to the next species from which it can immediately be distinguished by the characters enumerated in the key. Superficially,

setosala bears a certain degree of resemblance to *jenynsii* Wwd. (China, Japan) and *oceanica* Bigot (see above) but they can readily be distinguished from one another by comparing the notopleural setae of both sexes and lateral connexival setae of the ♀. The name *setosala* (Latin, *setosus*, hairy; *ala*, an armpit) refers to the setal patch of the ♀ between the tergite 2 and synsternite 1+2.

Description. *Body* brownish, robust, length 3 ± mm. *Head* in dorsal aspect with straight anterior margin and large setal patch (latter extending posteriorly slightly beyond level of eyes), in lateral aspect about as long as high, surface of gena virtually bare, only with 2-5 submarginal setae. Labial theca ca 1/2 longer than wide and 2× as long as labella. *Thorax* short, notum strongly narrowed posteriorly, notopleurite fairly wide, 2-7 long notopleural setae in both sexes, ctenidium with 14 ± teeth. Sternal plate 57×76, oblique sutures forming 90° angle at middle. *Legs* similarly setose as in *oceanica*, relative lengths of femora 1-3 and tibiae 1-3 in ♀ 67: 75: 76 and 58: 61: 61; relative widths of same, 24: 26: 26 and 12: 12: 13. *Abdomen* of ♂ (fig. 233) densely setose on surface of tergites 2-6 and with strong bristles fringing tergites 3-6; tergite 1 posteriorly hardly definable from 2, surface with 20 ± setulae; surface of tergites 5 and 6 with 3-4 and 1-2 setal rows respectively. Anal segment moderately long, anterior margin moderately concave, anterior 1/2 of dorsal surface bare, posterior 1/2 sparsely setose. Synsternite 1+2 ca 22×49, anterior margin not notched at middle, surface evenly sparsely setose; ctenidium with 25 ± teeth. Relative lengths of sternites 3, 4 and 5+6 as 8: 7: 10; posterior margin of synsternite 5+6 distinctly convex, with 2-3 rows of spines of varied length. Genitalia as in fig. 234-235. *Abdomen* of ♀ (fig. 240) dorsally poorly setose; tergite 1 distinctly shorter than wide, discally with patch of 15 ± setulae, posteriorly fringed with 10 ± long, closely arranged setae; tergite 2 bare on surface, sometimes slightly paler along anterior part of median line, posterior margin fringed with strong setae, with median setae more or less longer and more robust than lateral ones; tergal plate 3 very narrowly interrupted at middle, with strong fringe and 1 row of preapical setae. Anal segment short, surface extensively bare, anteriorly with 1-2 setal rows. Lateral connexivum (fig. 241) anteriorly with small patch of erect strong setae between spiracles 1 and 2, intermediately with very large patch of uniformly short spines, posteriorly with small patch of 20 ± erect setae between spiracle 6 and sternite 6; interspace between spiracles 5 and 6 and that between 6 and 7 with very small patch of short spines. Synsternite 1+2 ca 28×68, ctenidium with 20 ± small teeth; sternite 3 represented by 8-9 setal row at middle and more numerous rows (plus 3 pairs of long erect setae) on sides; sternite 4 represented by 1-2 (at middle) or 3 (on sides) setal rows (plus 1 pair of long erect setae), setae of hindmost row much longer; sternite 5 widely interrupted at middle, each side-piece bearing 3-4 rows of setae of varied length before posterior fringe; sternite 6 short, entire, with 3 setal rows before posterior fringe; sternite 7 posteriorly strongly bilobed, richly setose on surface. Pregenital plate long, narrow, slightly widened at extreme base; postgenital plate (fig. 242) as in *oceanica*, usually bearing 1 pair of setae; infra-anal plate very small, with 2 setae.

Penicillidia (Penicillidia) tectisentis Maa, new species Fig. 236-239, 243-244.

MATERIAL. 64 ♂♂, 54 ♀♀. Holotype ♀, selected from the Naracoorte (X.1961, P. Aitken) series, in S. Aust. Mus.

Ex *Miniopterus:* 61 ♂♂, 50 ♀♀: Allansford, Bool Lagoon, Naracoorte, Rockhampton, Tomato-Stick Cave, Willi-Willi Cave.

Ex *Rhinolophus megaphyllus:* 1 ♂, Willi-Willi Cave. — Ex "bat": 2 ♂♂ 2 ♀♀, Naracoorte. — On surface of wet guano: 1 ♀, Naracoorte. — On cave wall: 1 ♀, Grassmere Cave.

HABITAT. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). Endemic to Australia and found chiefly in the southeast, at present known only from Queensland (Rockhampton), New South Wales (Willi-Willi Cave), Victoria (Allansford, Grassmere Cave) and South Australia (Bool Lagoon, Naracoorte, Tomato-Stick Cave). The northern- and southernmost records are from Rockhampton (ca 23° 20′ S) and Allansford (ca 38° 20′ S) respectively. The former record is represented by a single ♂ (BVP) collected in winter (2. VIII. 1954) and found in association with *P. vandeuseni* (2 ♂♂, 6 ♀♀), *Nycteribia parilis vicaria* (1 ♂) and *Brachytarsina amboinensis uniformis* (3 ♂♂), but no *P. oceanica*. Most probably the occurrence of *tectisentis* in such a northerly place is either occasional or seasonal, and the normal northernmost limit of this species is at Kempsey (ca 31° 10′ S) where *tectisentis* meets *oceanica* and *setosala*.

AFFINITIES. This species is most closely related to *buxtoni* Scott (New Hebrides) from which it differs in having degenerated notopleural setae in the ♂; no posterior fringe on the tergite 1, longer and more uniform setae on the posterior margin of the tergite 2, numerous spines between the tergite 2 and synsternite 1+2, much fewer setae on the anal segment and more numerous teeth on the abdominal ctenidium in ♀. Another close relative is *setosala* n. sp. which can be separated by using the characters given in the key. Details of the ♂ genitalia of these 3 species are also different. The name *tectisentis* (Latin, *tectus*, concealed, *sentis*, a thorn-bush) refers to the spines between the tergite 2 and synsternite 1+2 of the ♀.

Description. ***Body*** brownish, robust, length 3 ± mm. ***Head*** in dorsal aspect with straight anterior margin and large setal patch (latter extending posteriorly beyond level of eyes), in lateral aspect about as long as high, surface of gena with single series of rather irregularly arranged submarginal setae. Labial theca slightly longer than wide and ca 2 × as long as labella. ***Thorax*** short, notum strongly narrowed posteriorly, notopleurite fairly wide; 6-10 notopleural setae which show strong sexual dimorphism, in ♀ all long robust and always in single series, in ♂ mostly short fine (about as long as interspaces of setal bases), with only outermost 1-3 (generally 2) of normal length, usually in single series but occasionally with 1-3 short fine ones out of alignment near outer margin of notopleurite; ctenidium with 15 ± teeth. Sternal plate 55×71, oblique sutures forming 90° angle at middle. ***Legs*** similarly setose as in ***oceanica***, relative lengths of femora 1-3 and tibiae 1-3 in ♀ about 70: 80: 81 and 58: 61: 61; relative widths of same, 24: 26: 26 and 12: 13: 13. ***Abdomen*** of ♂ densely setose on surface of tergites 2-6, with strong bristles fringing tergites 3-6; tergite 1 posteriorly hardly definable from 2, disc of surface with small patch of 20 ± setulae; surface of tergites 5 and 6 with 3-4 and 2-3 setal rows, respectively. Anal segment moderately long, anterior margin of dorsal surface strongly concave. Synsternite 1+2 ca 21×55, anterior margin not notched at middle, surface evenly sparsely setose; ctenidium with 25 ± teeth. Relative length of sternites 3, 4 and 5+6 as 11: 9: 14; posterior margin of synsternite 5+6 distinctly convex, with 2-3 rows of spines of varied length. Genitalia as in fig. 236-239. ***Abdomen*** of ♀ (fig. 243) dorsally poorly setose; tergite 1 trapezoidal, hardly shorter than wide, discally with patch of 15 ± setulae, no posterior fringe; tergite 2 slightly shorter at middle than on sides, surface bare, median line slightly paler and less sclerotized than elsewhere, setae on posterior margin fairly uniform in length; tergal plate 3 widely interrupted at middle, each side-piece bearing 1 row of preapical setae, posterior fringe composed of 3-5 strong bristles plus similar number of robust setae. Anal segment short, surface extensively bare, with only few setae on and near anterior and posterior margins. Lateral connexivum (fig. 244) anteriorly with numerous erect strong spines, intermediately with large patch of short spines (at lower 1/2) and moderately long setae (at upper 1/2), posteriorly with small

patch of moderately long setae on side of sternite 6. Synsternite 1+2 ca 22×64, ctenidium with 20 ± very small teeth; sternite 3 represented by 5-7 setal rows at middle and slightly more numerous rows plus 3 pairs of long erect sublateral setae on sides; sternite 4 represented by 2 (at middle) or 3 (on sides) setal rows plus 1 pair of erect sublateral setae, setae of hindmost row much longer; sternite 5 widely interrupted at middle, each side-piece bearing posterior fringe of long setae and 1 row of erect preapical setae; sternite 6 short, entire, with 2 rows of preapical setae; sternite 7 posteriorly bilobed, richly setose on surface. Postgenital plate as in *oceanica*, usually bearing pair of setae; infra-anal plate very small, with 2 setae.

[**Penicillidia** (**Penicillidia**) sp.]

Off 2 preserved specimens of *Macroderma gigas* (AMNH 162671, 162674) from Johanssen's Cave nr Rockhampton, Qld., I removed in 1961 a pair of *Penicillidia*. The ♀ is apparently referable to *oceanica* Bigot although the postgenital plate is a little shorter than in average specimens of that species. The ♂ is slightly damaged, and has 3-4 short fine notopleural setae on each side. It is evidently not conspecific with the accompanying ♀ and stands very close to *jenynsii* Wwd. (China, Japan) but details of synsternite 5+6 and genitalia are not identical. Since both the distribution and host records are to be verified, the ♂ specimen is left unnamed. Very likely it originated from a country other than Australia.

Penicillidia (**Eremoctenia**) **vandeuseni** (Maa) 1962 Fig. 245—251.

Eremoctenia vandeuseni Maa, 1962: 423, fig. 3-7 ♂♀, orig. des., type ♂ in Bishop Mus.
Penicillidia vandeuseni: Allison & Middleton, 1971: 29, fig. 3-4, ♂, rec., des.

Previous Record. 1 ♂ (Allison et al. 1971) ex *Miniopterus* sp., Chillagoe Caves. The type is ex *M. schreibersii*, New Guinea: Onion Penin., Danowaria nr Fak-Fak.

New Material. 96 ♂♂, 98 ♀♀.

Ex *Miniopterus:* 90 ♂♂, 96 ♀♀, Bamaga, Herberton, Hodges Cave, Kempsey, Mareeba, Nambour, Possession I., Rise & Shine Mine, Rockhampton, Rocky Scrub, Royal Arch Cave, Willi-Willi Cave.

Ex *Vespadelus pumilus:* 1 ♀, Rocky Scrub. — Ex "bat": 3 ♂♂, 1 ♀, Finch Hattan Gorge, Fingal Point Cave, Helen's Hill. — In mine shaft: 1 ♂, Kingsgate.

Habitat. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). Found rather sparingly in Australia; at present known only from Queensland (Bamaga, Chillagoe Caves, Finch Hattan Gorge, Helen's Hill, Herberton, Mareeba, Nambour, Possession I., Rockhampton, Rocky Scrub, Royal Arch Cave), New South Wales (Fingal Point Cave, Kempsey, Kingsgate, Rise & Shine Mine, Willi-Willi Cave) and South Australia (Hodges Cave). The southernmost record is from Hodges Cave nr Joanna (ca 37° 10' S). The population density is almost always much lower than *Penicillidia* s. s. Extralimital distribution: New Guinea.

Affinities. This species differs from the only other member of the subgenus i.e., *progressa* Muir (ex *Miniopterus schreibersii*, Amboina) (fig. 252-256), chiefly in the following points. Body size smaller (length ♂ 1.5 ± mm vs 2.4 ± mm), lst and 2nd

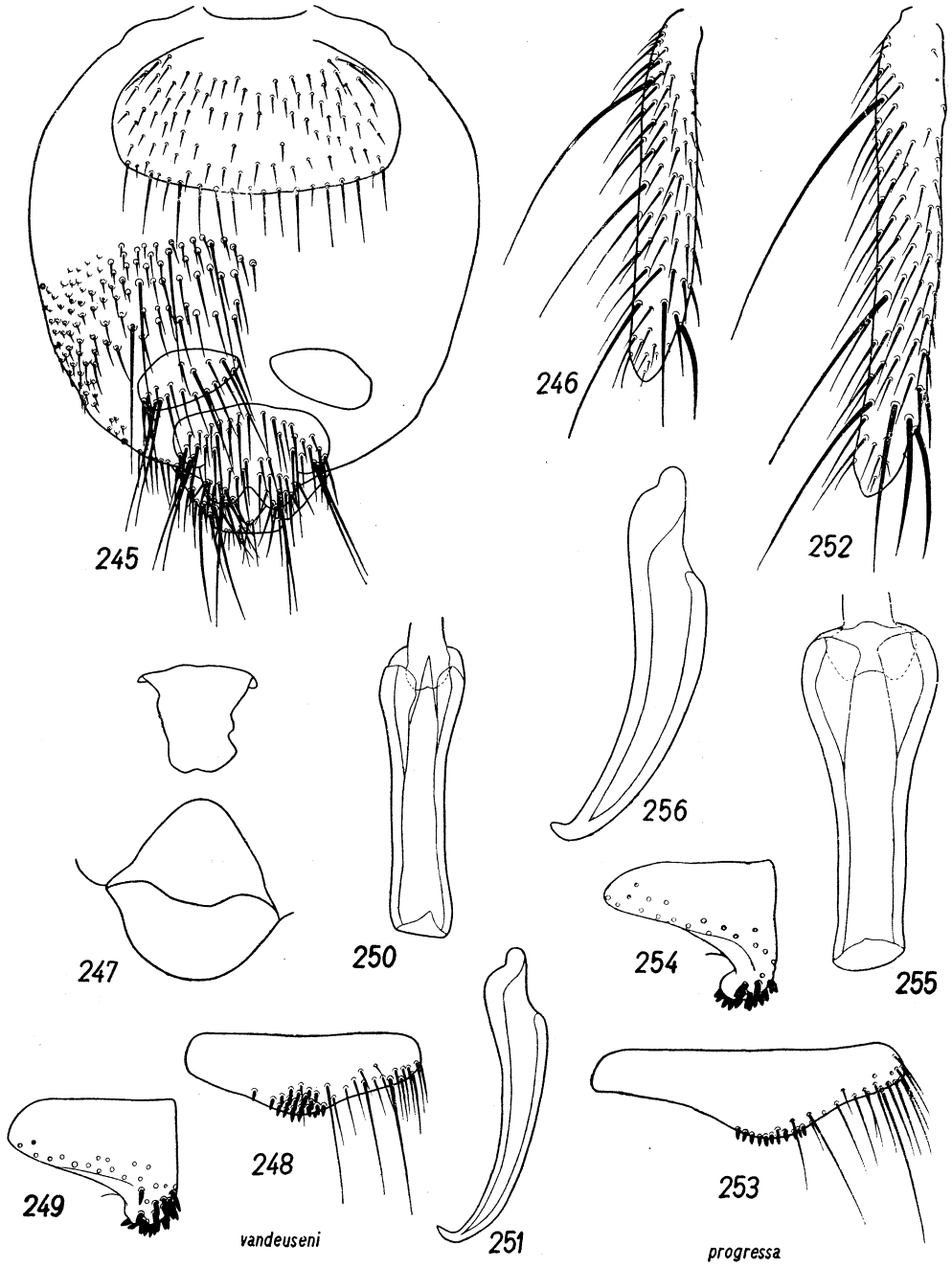


Fig. 245-256. *Penicillidia* (*Eremoctenia*). ♀ Abdomen, ventral view (245), ♂ tibiae 3, anterior surface (246, 252), ♀ genital plates (247), ♂ synsternites 5+6, ventral view (248, 253), ♂ synsternites 5+6, lateral view (249, 254), aedeagi, ventral view (250, 255), aedeagi, lateral view (251, 256). Fig. 245-251, *P.* (*E.*) ***vandeuseni*** Maa, slides ♯1174 (♂) and 1176 (♀); fig. 252-256, *P.* (*E.*) ***progressa*** Muir, Amboina, slide ♯1173. Each figure and its counterpart drawn to same scale.

rows of ventral bristles of tibiae very poorly developed, recumbent, not erect; ♂: spinose area of synsternite 5+6 well exposed, not very strongly decurved, paramere longer and narrower; ♀: tergite 1 usually with only 2-3 bristles on posterior margin (in *progressa*, 10-15), synsternite 1+2 shorter in proportion, and posteriorly fringed only with setae, no spines (few spines are present in the unique ♀ *progressa* at hand). The ♀ sternite 6 of *progressa* was described and figured by Scott (1917) and Theodor (1967) as amalgamated with sternite 7. In fully pigmented ♀♀ of *vandeuseni*, it is well definable from sternite 7 and often interrupted at middle. The genitalia of both sexes of this species are here illustrated for the first time.

Genus **Phthiridium** Hermann 1804

Theodor and several other workers called this genus *Stylidia* Wwd. 1840 which is evidently a synonym of *Phthiridium* and is antedated by the latter name (see Maa 1965: 381). The genus is parasitic normally on Rhinolophidae (including Hipposideridae) and is widespread in the Old World. Two species are known from Australia. Both belong to the Group Biarticulatum, and spread to New Guinea.

Phthiridium torresi (Theodor) Fig. 257-259, 263, 265.

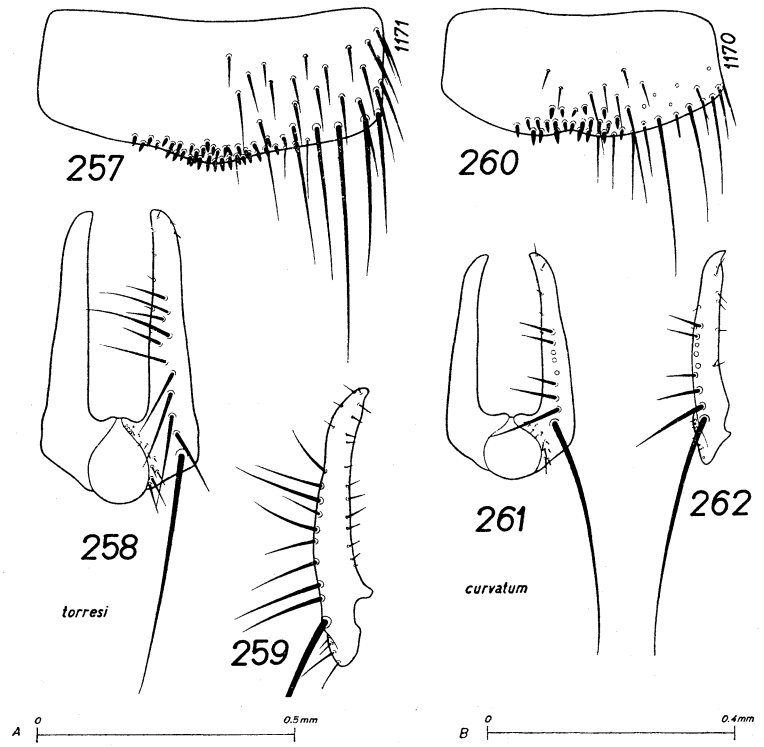


Fig. 257-262. *Phthiridium*, ♂ synsternites 5+6 (257, 260), claspers, ventral and lateral views (258, 259, 261, 262). Scale A for claspers, B for synsternites 5+6.

Stylidia torresi Theod., 1967: 180, fig. 285-288, ♂ ♀, orig des., type ♂ in Brit. Mus. Nat. Hist.

PREVIOUS RECORD. 1 ♂, 1 ♀ (type series), ex *Hipposideros cervinus* [*galeritus*] "Cape York."

NEW MATERIAL. None.

HABITAT. Cave-dwelling, probably confined to *Hipposideros* (Rhinolophidae: Hipposiderinae). Rare in Australia, at present known only from Queensland (Cape York); extralimital distribution: New Guinea.

AFFINITIES. This species is related to *curvatum* Theod., differing chiefly in the following points. Body-size larger (length 2.5 ± mm), more robust; ♂: tergites 2 and 3 (excluding extreme lateral areas of latter) densely setose all over, setae of their posterior fringes closely arranged, clasper (fig. 258) in ventral view blunter at apex, aedeagus moderately curved, genital deckplate (fig. 265) longer, with straight lateral margins; ♀: surface of tergite 2 extensively setose, setae of its posterior fringe as long and robust as those on median part of dorsal connexivum, lateral connexival setae (fig. 263) around and above (dorsad to) abdominal spiracles 3-7 uniform, very small (shorter than or as long as diameter of their respective basal papillae) and in strong contrast to long strong setae on median area of dorsal connexivum and lower (ventral) area of lateral connexivum, anal segment very small and usually only with 1 pair of bristles, sternite 6 larger and entire, sternite 7 distinctly emarginate posteriorly. The ♂ genital deckplates of this and the next species are illustrated here for the first time. See discussions on ♂ synsternite 5+6 and claspers under next species.

Phthiridium curvatum (Theodor) Fig. 51, 260-262, 264, 266.

Stylidia curvata Theod., 1967: 137, fig. 205-208, ♂ ♀, orig. des., type ♂ in Field Mus. Nat. Hist., Chicago.

PREVIOUS RECORD. 1 ♂ (paratype), ex *Rhinolophus megaphyllus*, "Cape York." The type is ex *Hipposideros* sp., New Guinea: Misima I.

NEW MATERIAL. 53 ♂♂, 34 ♀♀.

Ex *Rhinolophus megaphyllus:* 45 ♂♂, 34 ♀♀, Bonalbo Colliery, Bramston Beach, Bullio Cave, Cliefden, Cooktown, Iron Range, Junction Cave, Mabel Cave, Rise & Shine Mine, Rockhampton, S. Johnston Stn., Tanja Gold Mine, Temagog Cave, Timor Cave, Wallaby Ck., Willi-Willi Cave, "Cape York." — Ex *Rh. philippinensis:* 2 ♂♂, Chillagoe.

Ex *Miniopterus:* 2 ♂♂, 1 ♀, Kempsey, Rocky Scrub. — Ex *Chalinolobus gouldi:* 2 ♂♂, Eltham. — Ex *Hipposideros semoni:* 1 ♂, Bramston Beach. — Ex "bat": 1 ♂, 1 ♀, Eacham Lake, Woolooga.

HABITAT. Cave-dwelling, evidently confined to *Rhinolophus* particularly *Rh. megaphyllus* (Rhinolophidae: Rhinolophinae). Widespread in the Subcontinent, at present known from Queensland (Bramston Beach, Cooktown, Eacham Lake, Iron Range, Rockhampton, Rocky Scrub, S. Johnston Stn., Woolooga, "Cape York"), New South Wales (Bonalbo, Bullio Cave, Cliefden, Junction Cave, Kempsey, Rise & Shine Mine,

Tanja Gold Mine, Temagog Cave, Wallaby Ck., Willi-Willi Cave) and Victoria (Eltham, Mabel Cave). The southernmost limit of distribution is about 37° 40′ S near Eltham. Extralimital distribution: New Guinea.

AFFINITIES. The species differs from *torresi* Theod. as follows. Body size smaller (length 2.0 ± mm), less robust, notopleural setae usually paler than abdominal setae; ♂: tergites 2 and 3 medially with setal patch, laterally bare, setae of their posterior fringes loosely arranged, clasper in ventral view sharper at apex, aedeagus very strongly curved at apex, genital deckplate (fig. 266) shorter, with strongly curved lateral margin; ♀: surface of tergite 2 medially setose, laterally extensively bare, setae of its posterior fringe distinctly longer, stouter than most of those on dorsal connexivum, dorsal and lateral connexiva not sharply contrasted in their chaetotaxy, former with setae of varied length and robustness while latter with moderately long setae on anterior and lower (ventral) areas and with very small spine-like ones near abdominal spiracles 6 and 7, anal segment larger, usually with 4-5 bristles, sternite 6 interrupted at middle, posterior margin of sternite 7 nearly straight. In the original description, the ♂

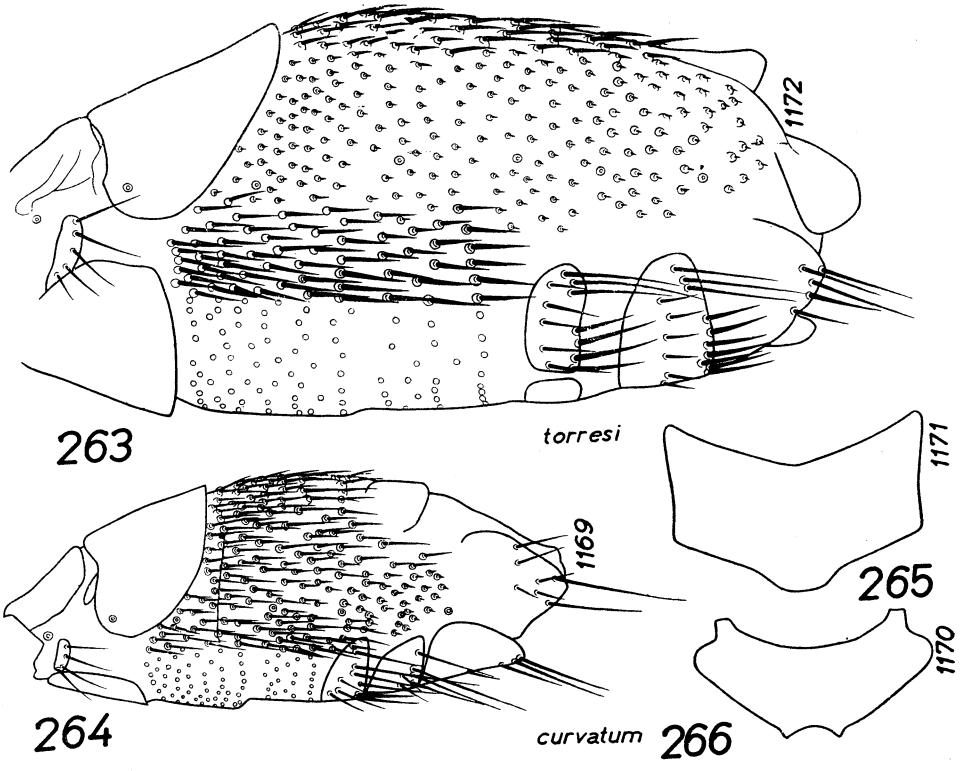


Fig. 263-266. *Phthiridium*, ♀ abdomens, lateral view (263, 264), ♂ genital deckplates (265, 266). Note that the abdomen in fig. 263 is somewhat tilted ventrad, while that in fig. 264, slightly dorsad. Setae on ventral connexiva are represented by punctures (sockets); fig. 263 drawn to same scale as 264; fig. 265, as 266.

synsternite 5+6 of this species was drawn as if about 1/2 as long as wide, posterior margin angulately notched at the middle and most of its marginal spines long and sharp; the clasper, as if markedly different in shape from that of the preceding species; whereas the ♀ lateral connexivum, as if uniformly covered with short setae. On the other hand, the posterior spines of ♂ synsternite 5+6 of *torresi* were drawn as if markedly finer than those of *curvatum*. These are not true for the fresh specimens at hand. As shown in fig. 257-262, the synsternite 5+6 and claspers of these 2 species do not show much difference.

Genus **Nycteribia** Latreille 1796

This genus is parasitic exclusively on Vespertilionidae and is widespread in the Old World. One of the Australian forms belongs to the Group Pedicularia, whereas the remaining ones all belong to the Group Parilis. The former group is as widespread as the genus; the latter is confined to the Wallacea, Papuan, Melanesian and Australian Subregions.

Key to Australian Nycteribia Species

1. In ♂, clasper in ventral view evenly curved and narrowed apicad, with apex acuminate and anteriorly not reaching level of setal patches on venter of anal segment; posterior margin of synsternite 5+6 with few long heavy spines; anal segment in dorsal view ca 1.5 × as long as wide, suddenly narrowed apicad from a point of about basal 1/4. In ♀, abdomen with single median tergal plate between tergite 2 and anal segment, bristles of the plate clearly premarginal; setal patch behind tergite 2 very large, distinctly extending posterolaterally to sides of above-mentioned median tergal plate; anal segment distinctly bilobed posteriorly (i. e., anus lying before abdominal apex), with an elongate dorsomedian plate bearing anus at end; posterior margin of sternite 7 (fig. 272) straight; postgenital plate (fig. 273) well sclerotized, with strong spines on and near posterior margin. Group Pedicularia..... ..... **allotopa meridiana**

   In ♂, clasper (fig. 288) in ventral view somewhat L-shaped, distinctly angulate at about a point of basal 1/3, hardly or unevenly narrowed apicad, apex either obliquely truncate or blunt and shallowly bifurcate, anteriorly reaching or surpassing level of setal patches on venter of anal segment, posterior margin of synsternite 5+6 with no or only few short spines; anal segment in dorsal view not or hardly longer than wide, evenly, very gently narrowed apicad. In ♀, abdomen (fig. 282) with 2 median tergal plates between tergite 2 and anal segment, bristles of those plates marginal and in line with posterior marginal spines or very nearly so; setal patch behind tergite 2 very small, not or hardly extending posterolaterally to sides of tergal plates 3; anal segment not bilobed (i. e., anus lying at level of apices of side-pieces of anal segment), lacking above described dorsomedian plate; posterior margin of sternite 7 distinctly produced at middle; postgenital plate hardly definable, bare. Group Parilis 2

2. Surface of synsternite 1+2 with 2 pairs of outstandingly long robust setae; apical 2/3 of ♂ clasper in ventral view evenly broad, obliquely subtruncate near apex, weakly bifurcate at extreme apex; posterior margin of ♂ synsternite 5+6 lacking spines; median part of ♀ sternite 3 with only 2 setal rows before posterior fringe; spines on dorsal surface of ♀ anal segment in 2-3 transverse series; surface of ♀ tergite 2 with large patch of 35-45 setae..... **bakeri**

Surface of synsternite 1+2 with uniformly short setae; ♂ clasper and synsternite 5+6 not in above combination; median part of ♀ sternite 3 with 3-4 setal rows before posterior fringe; spines on dorsal surface of ♀ anal segment arranged either in single transverse or inverted V-shaped series; surface of ♀ tergite 2 with small patch of 5-20 setae.....3

3. In ♂, apical 2/3 of clasper (fig. 288) in ventral view broad, straight, broadest before apical oblique truncation, apex pointed and strongly decurved; posterior margin of synsternite 5+6 with few short strong spines. In ♀, posterior fringe of tergite 2 (fig. 287) composed of short and long spines, no setae; spines on dorsal surface of anal segment arranged before inner margins of side-pieces and usually in transverse series; setae between tergite 2 and tergal plate 3 about as long as those on posterior margin of tergite 1; sternites 5 and 6 posteriorly without strong spines.....**alternata**

In ♂, apical 2/3 of clasper in ventral view narrow, distinctly curved, evenly narrowed apicad, no apical oblique truncation, apex weakly bifurcate, weakly decurved; posterior margin of synsternite 5+6 lacking spines. In ♀ (fig. 282), posterior fringe of tergite 2 composed of long setae and short spines; spines on dorsal surface of anal segment arranged in an inverted V-shaped series (i. e., along inner margins of side-pieces); setae between tergite 2 and tergal plate 3 ca 2 × as long as those on posterior margin of tergite 1; sternites 5 and 6 posteriorly with strong spines.....**parilis vicaria**

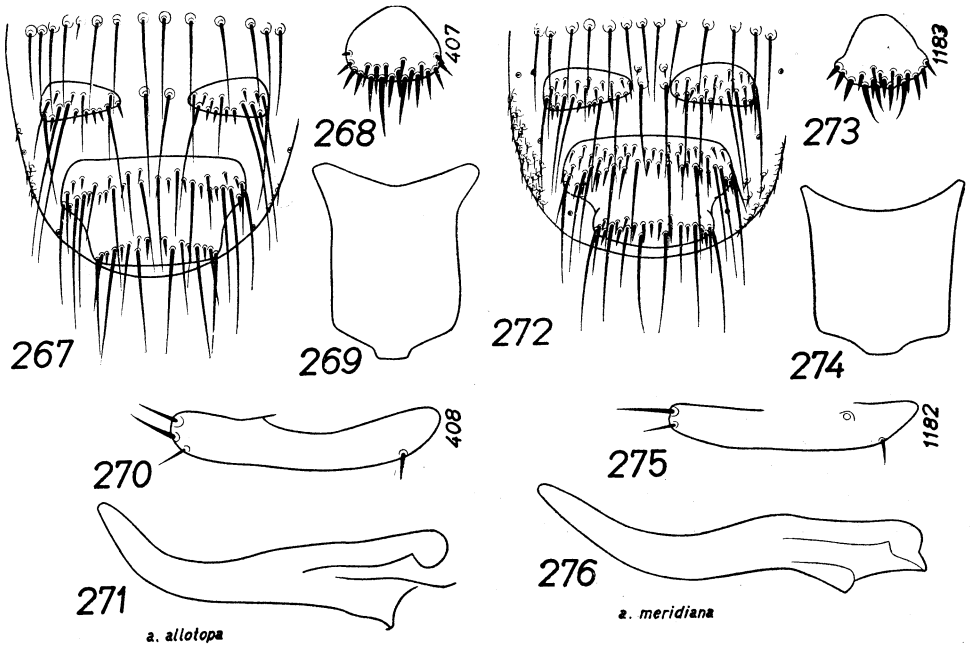


Fig. 267-276. *Nycteribia allotopa allotopa* Speis. (topotypes) vs. *N. allotopa meridiana* n. ssp. (paratypes). ♀ Abdominal apices, ventral (267, 272), ♀ postgenital plates (268, 273), ♂ genital deckplates (269, 274), parameres (270, 275), aedeagi (271, 276). Each figure and its counterpart drawn to same scale.

Nycteribia allotopa meridiana Maa, new subspecies Fig. 272-276.

MATERIAL. 8 ♂♂, 13 ♀♀. Holotype ♀ in Aust. Nat. Ins. Colln.

Ex *Miniopterus:* 7 ♂♂, 10 ♀♀, Bonalbo Colliery, Carrai Cave, Herberton, Kempsey, Mareeba, Mooloolah, Rockhampton, Whitsunday I., Willi-Willi Cave, Yessabah Cave.

Ex *Vespadelus pumilus:* 1 ♀, Rocky Scrub. — Ex alcohol-preserved *Taphozous australis:* 1 ♀ (holotype), Pink's Cave. — Ex "bat": 1♂, 1 ♀, Stanuary Hills, Tweed R.

HABITAT. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). Found sparingly in Australia, at present known from Queensland (Herberton, Mareeba, Mooloolah, Pink's Cave, Rockhampton, Rocky Scrub, Stanuary Hills, Whitsunday I.) and New South Wales (Bonalbo Colliery, Carrai Cave, Kempsey, Tweed R., Willi-Willi Cave, Yessabah Cave). The southernmost limit of distribution is, as in *alternata*, at about 31° S at Kempsey. The nominate subspecies was originally described from Sumatra: Lian si Paghe and is known from the Malaysian Subregion.

AFFINITIES. This species belongs to the Group Pedicularia. It is very closely related to *allotopoides* Theod. (Burma, Philippines) and differs from the latter only in the shape of the anal segment, aedeagus, parameres and ♀ postgenital plate, and in the number and relative length of ♀ abdominal setae. It is very widely distributed in the Oriental Region and is divisible into several weakly definable subspecies chiefly by details of genitalia of both sexes. *Meridiana* (Latin, *meridianus*, southern) represents the southernmost geographical race.

Description. Differing from nominotypical *allotopa* Speis. and an undescribed New Guinean subspecies in the following points. Body slightly smaller and more slender generally. ♂: Aedeagus (fig. 276) shorter and less curved, paramere (fig. 275) and genital deckplate (fig. 274) also shorter in proportion. ♀: Sternite 5-7 (fig. 272) more profusely, finely setose, postgenital plate (fig. 273) narrower and less spinose.

Nycteribia parilis vicaria Maa, new subspecies Fig. 282-286.

(?) *Nycteribia elongata* Rudow, 1871: 122, ♂ (excl. ♀), orig. des., types lost; 1872: 408, ♂ (excl. ♀), translation of 1871 des. — Speis., 1902a: 160, remarks on ♂ type; 1908: 303, listed under Polynesian subregion. — Theod., 1967: 494, saying "clearly a species of Parilis group."

Nycteribia (*Listropodia*) *parilis:* Scott (pt.), 1914: 230, 234, rec. — Musgr., 1925: 298, list; 1927: 276, rec.

N (*Nycteribia*) *parilis:* Theod. (pt.), 1967: 99, fig. 148-151, ♂♀, key, redes., rec.

N. parilis: Allison & Middleton, 1971: 29, fig. 1-2, rec.

PREVIOUS RECORDS. 1 ♂ (Scott 1914), "Australia," no host record. 2 ♂♂, 1 ♀ (Musgr. 1927), ex *Miniopterus*, Prospect Reservoir. 2♂♂, 1 ♀ (Theod. 1967), ex *Miniopterus*, Cooktown and Mossman. 7♂♂, 5 ♀♀ (Allison et al. 1971) ex *Miniopterus*, Chillagoe Caves.

NEW MATERIAL. 473 ♂♂, 477 ♀♀. Holotype ♀ from Naracoorte (X. 1956, E. Hamilton-Smith) in S. Aust. Mus.

Ex *Miniopterus*: 437 ♂♂, 423 ♀♀. Qld.: Bamaga, Canungra, Chillagoe Caves, Mt Garnett, Goondi, Herberton, Innisfail, Koombaloomba Ck., Kuranda, Nambour, Phoenician Mine, Pilkington Cave, Possession I., Rockhampton, Spurgeon Mt, S Johnstone, Stanuary Hills, Whitsunday I. N.S.W.: Ashford Cave, Ashford Downs, Back Ck. Mine, Bonalbo Colliery, Bulladelah, Bullio Cave, Bungonia Caves, Burrinjuck Dam, Carrai Cave, Cheitmore Cave, Colong Caves, Cootamundra, Elizabeth Bay House, Endless Cave, Fig Tree Cave, Gable Cave, Hill End, Narrengullen, N. Sydney Railway Tunnel, Piano Cave, Prospect Tunnel, Punchbowl Cave, Rise & Shine Mine, Signature Cave, Timor Caves, Wallaby Ck., Warragamba Dam, Waterfall Gold Mine, Wee Jasper Caves, Willi-Willi Cave, Wombeyan Caves, Yessabah Cave. Vict.: Allansford, Mallacoota, Spring Ck. Cave. S.A.: Bool Lagoon, Hodges Cave, Naracoorte, Tomato Stick Cave. W. A.: Kalumburu.

Ex *Rhinolophus megaphyllus:* 1 ♀, Mabel Cave.

Ex "bats": 22 ♂♂, 26 ♀♀, Brisbane, Carrai Cave, Cowie Bay Cave, Helen's Hill, Long I., Naracoorte, Pink's Cave, Stanuary Hills, Wee Jasper Caves.

On cave-roof and cave-wall, 4 ♂♂, 6 ♀♀, Cheitmore Cave, Grassmere Cave, Timor Cave. — On surface of wet guano: 4 ♂♂, 2 ♀♀, Hodges Cave, Punchbowl Cave.

Habitat. Cave-dwelling, obviously confined to *Miniopterus* (Vespertilionidae: Miniopterinae); the odd record ex *Rhinolophus* is apparently a result of contamination. Often found together on the same individual bats with *Nycteribia alternata*, *N. allotopa meridiana*, *Penicillidia* (*Penicillidia*) *oceanica*, *P.* (*P.*) *setosala*, *P.* (*P*). *tectisentis* and *P.* (*Eremoctenia*) *vandeuseni* over which *N. parilis vicaria* often outnumbers. Widely spread over all of Australia, the southernmost limit of distribution is at about 38° 20′ S which shows a more extensive range than in *allotopa* and *alternata*. The lack of any records from Northern Territory and Tasmania may be attributed, respectively, to insufficient collecting and unfavorable climatic conditions.

Synonymy. The ♂, but not ♀, of *elongata* Rudow is here selected as lectotype and considered as a possible synonym of *vicaria*. As in *varipes* Rudow (see under *Basilia burrelli*), the original material of *elongata* seems to have been derived from preserved bats, the types are lost, no type locality was mentioned in the original description and the species was wrongly listed by Speiser (1908) under Polynesian Subregion. Since the type host *Nyctophilus geoffroyi* is an Australian bat, Australia may perhaps be accepted as the type locality. The ♂ type, formerly in the Hamburg Mus., has been reëxamined by Speiser (1902) who noted its strongly dilated tibiae and rather long thorax and believed it to be a member of the subgenus *Listropodia* [=*Nycteribia* s. s.] The same author compared it with *blasii* Klnt. [= *kolenatii* Theod. & Mosc.] of Europe and suggested that it possibly represents the ♂ of *parvula* Speis. of Sumatra (then known from the ♀ sex only). The posterior margin of synsternite 5+6 was said "gleichmässig gerundet und nur mit feineren, teils langen, teils kürzeren Borsten besetzt. ohne stachelartige Borsten" and the claspers "seitlich ausgebogen, an ihrer Basis viel weiter, fast dreimal so weit von einander entferent, als jede einzelne breit ist, die Spitzen zu einander geneigt." From these characters, the ♂ *elongata* apparently sounds either identical with or very closely similar to *parilis*, and the host record is

apparently incorrect. The ♀ type has never been noted by any subsequent worker. Its possession of 2 truncated tubercles on sides and 2 rounded ones in the middle of the abdominal apex strongly suggests a *Basilia* species. If the type host is correct for the ♀, and if the description of the thorax and legs of *elongata* is largely or entirely based on the ♂, the ♀ *elongata* is possibly referable to *B. brevicauda* Musgr. By omitting passages on color pattern, the German version of Rudow's description may be quoted as follows: "*Nycteribia elongata.* Zur Gruppe I von Kolenati gehörig ohne Winkelleisten am Thorax und ganzrandigem vorderen Theile desselben. Farbe...Kopf... Thorax eirund, ...Seitenctenidien 17 zähnig, den Rand fast erreichend. Füsse lang borstig, Schenkel elliptisch, Tibien keulenförmig, beide an der Unterseite strahlig. Tarsus... Abdomen langgestreckt eiförmig. Am Rande jedes Segmentes mit einem Stachelbüschel. Farbe···Vorderes Ctenidium 45 zähnig. Analsegment des Männchens ziemlich breit, mit kurzer Zange und langen dünnen äussern Horndecken, stark behaart. Analsegment des Weibchens an der Seite mit 2 abgestutzten, in der Mitte mit rundlichen Höckern. Grösse [in English version, this was wrongly translated as length; Speiser gave 1.5 mm as its body length] 0,5 M.M. Auf *Nyctophilus Geoffroyi.*"

Affinities. This species is probably the most generalized of the Group and is chiefly characterized by the shape of claspers and parameres in the ♂, and the arrangement of setae-spines on the tergite 2, anal segment (dorsal surface) and sternite 7 in the ♀. The closest relative is *papuensis* Theod. (no host, New Guinea), in the ♀ of which the posterior marginal setae of the tergite 2 are much shorter, the setal patch between the tergite 2 and tergal plate 3 is much larger, the tergal plate 4 much wider and more richly spinose, spines on the dorsal surface of the anal segment are not arranged in an inverted V-shape, and the sternite 7 is not produced posteriorly at middle. The ♂ is less distinctive and the differences are chiefly with the single (not double) row of marginal setae on the tergite 1, the nearly uniform long marginal setae on the tergite 2, the scattered setae on the tergites 5 and 6, the shorter anal segment and the longer narrower parameres.

The difference in size of the Australian and Amboinese forms was first noted by Musgrave (1927) who did not go further into the differences in the chaetotaxy and ♂ genitalia. Generally, specimens from northern Australia are hardly separable in size and structure from those from Amboina and New Guinea (this probably explains why Theodor in 1967 did not mention any differnces in his 2 ♂♂, 1 ♀ from northern Queensland) but they become gradually larger and more richly setose on approaching southern Australia. For practical reasons, both the northern and southern populations in Australia are here treated as a single subspecies. The name (Latin, *vicarius,* vicarious, taking the place of a person or thing) refers to the geographical replacement of typical *parilis* in Australia. The following description is based on material from S. Australia: Naracoorte.

Description. Differing from nominotypical ***parilis*** in the following points· Size larger, ♂ 2.0-2.1 mm long (in 6 ♂♂ from Amboina, 1.6-1.7 mm). Abdominal ctenidium (fig. 285) with longer, stouter, more numerous (36 or more) (counts in 6 ♂♂ from Amboina, 31, 31, 31, 31, 32, 36) and more closely arranged teeth, and usually flanked on each side with 1 seta (not so in Amboina specimens examined). In ♂, shorter ones of marginal setae on tergite 3 (fig. 284) slender, not spine-like; tergite 4 with 20 ± (in Amboina specimens, 15 ±) marginal setae; sternite 4 usually with 3 setal

rows (in Amboina specimens examined, all only 2) before posterior fringe; synsternite 5+6 with rather incomplete row of premarginal setae (in Amboina specimens examined, complete and continuous); genitalia as in fig. 283, 286. In ♀, surface of tergite 2 with more numerous setae generally, tergal plate 3 (fig. 282) flanked on each side by 3-5 setae (in Amboina specimens examined, at most 1); lateral surface of anal segment with more numerous (usually 4-5) spines generally; lateral part of sternite 4 with 2, not 1, setal rows before posterior fringe, pair of setae on submedian lobes of sternite 7 more apart from each other.

[**Nycteribia bakeri** Scott]

Nycteribia (*Listropodia*) ***bakeri*** Scott, 1932: 21, ♂♀, orig. des., type ♂ in Brit. Mus. Nat. Hist.
N. (*Nycteribia*) ***bakeri***: Theod., 1967: 103, ♂♀, key, redes., rec.

PREVIOUS RECORD. 1 ♀ (Theod. 1967), ex *Miniopterus schreibersii blepotis*, Qld.: Chillagos (error for Chillagoe). The type is ex *Miniopterus australis*, New Hebrides: Tanna.

NEW MATERIAL. None.

REMARKS. This species can easily be recognized by the presence of 2 pairs of outstandingly long setae on the synsternite 1+2. The ♂ simulates that of *alternata* in the general outline of claspers (ventral view), and the ♀, that of *parilis* in the presence of long setae between the tergite 2 and tergal plate 3, and strong spines on sternites 5 and 6. For the differences from those 2 species, see key, couplet 2. The species is obviously endemic to the New Hebrides and the odd record of its occurrence in Australia is very likely a result of mislabelling.

Nycteribia alternata Maa Fig. 287, 288.

Nycteribia (*Listropodia*) ***sarasini*** Falcoz (pt.), 1921, ***Bull. Soc. Ent. Fr.*** 1921: 237, ♂♀, orig. des. (Australian rec. only); 1923: 89, fig. 9-12, ♂♀, redes. as n.sp., rec.
N. (*L.*) ***sarasini*** (misidentification): Musgr., 1925: 299, list; 1927: 276, rec.
N. ***alternata*** Maa, 1962 ***Pacif. Ins.*** **4:** 418, fig. 8-15, ♀, orig. des., type in Basel Mus., "ex ***Eidolon helvum***, Kamerun" (obvious mislabelling).
N. (*Nycteribia*) ***spinosa*** Theod., 1967: 110, figs. 155, 169-171, ♂♀, orig. des., type ♀ in Brit. Mus. Nat. Hist. **n. syn.**

PREVIOUS RECORDS. Unnumbered specim. (Falc. 1921, 1923) ex *Miniopterus schreibersii*, Mossman; 2 ♂♂, 2 ♀♀ (Musgr. 1927), ex *M. schreibersii*, Mossman; 5 ♂♂, 2 ♀♀ (type series of *spinosa*), ex *M. schreibersii*, Mossman. 1 ♂, 1 ♀ (paratypes of *spinosa*), ex *M. schreibersii*, Utingu.

NEW MATERIAL. 345 ♂♂, 336 ♀♀.

Ex *Miniopterus:* 329 ♂♂, 321 ♀♀, in 25 lots, Ashford Cave, Back Ck. Mine, Bamaga, Bonalbo Colliery, Bramston Beach, Canungra, Chillagoe Caves, Darwin, Goondi, Helen's Hill, Ingham, Innisfail, Kalumburu, Mossman, Phoenician Mine, Possession I., Rise & Shine Mine, Rockhampton, Rocky Scrub, Spurgeon, Thursday I., Whitsunday I., Willi-Willi Cave.

Ex *Rhinolophus megaphyllus:* 2 ♂♂, 6 ♀♀, Coen, Bonalbo Colliery, Willi-Willi Cave. — Ex "bat": 12 ♂♂, 5 ♀♀, Cooktown, Helen's Hill, Long I., Pink's Cave. — Ex "*Acrobates pygmaeus*" (Marsupialia !): 1 ♂, Tooloom.

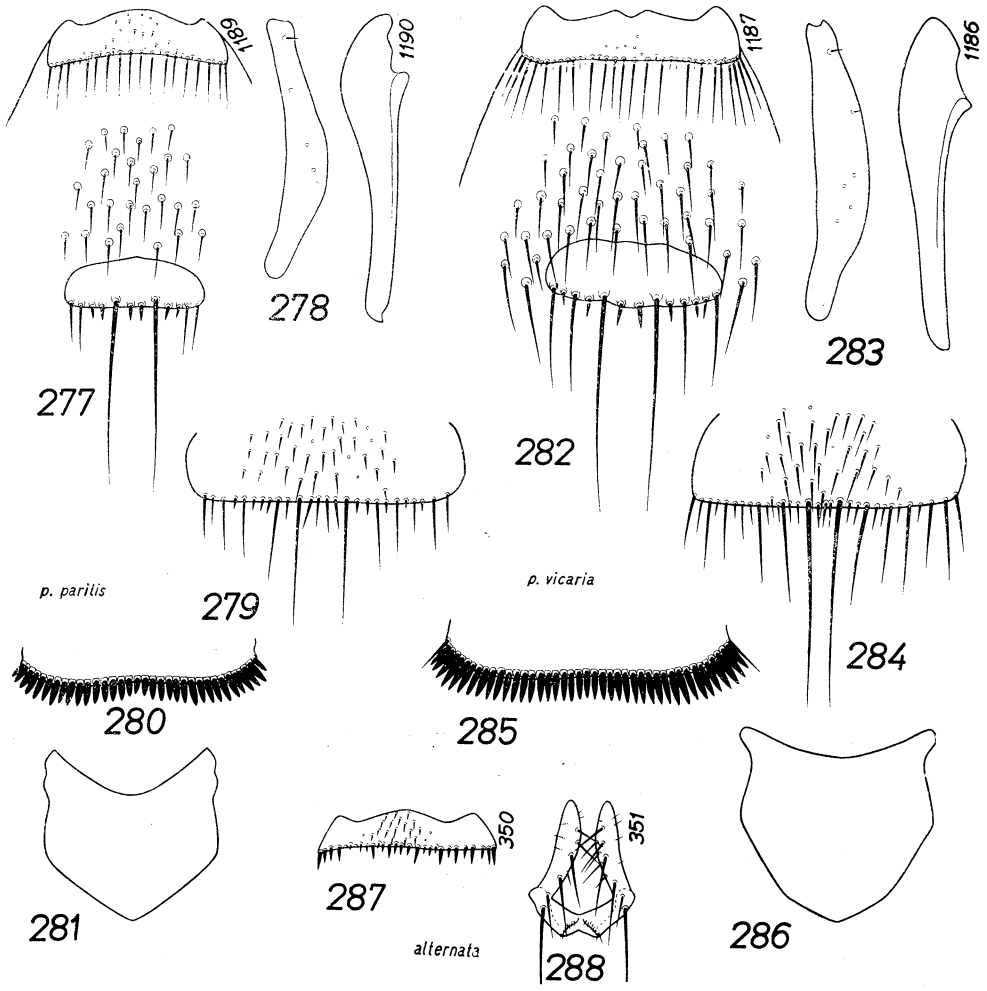


Fig. 277-286. *Nycteribia parilis parilis* Wk. (NE New Guinea) vs. *N. parilis vicaria* n. ssp. (S. Australia: Naracoorte). ♀ Abdomens in part, dorsal view (277, 282), parameres and aedeagi, lateral view (278, 283), ♂ tergite 3 (279, 284), ♀ abdominal ctenidia (280, 285), ♂ genital deckplates (281, 286). Each figure and its counterpart drawn to the same scale. **Fig. 287-288.** *N. alternata* Maa (Queensland: Phoenician Mine), ♀ tergite 2 and ♂ claspers.

Habitat. Cave-dwelling, evidently confined to *Miniopterus* (Vespertilionidae: Miniopterinae). Widespread in northern Australia, penetrating southward a little beyond Queensland. At present known from Queensland (Bamaga, Bramston Beach, Canungra, Chillagoe Caves, Coen, Cooktown, Goondi, Helen's Hill, Ingham, Innisfail, Long I., Mossman, Phoenician Mine, Pink's Cave, Possession I., Rockhampton, Rocky Scrub,

Spurgeon, Thursday I., Utingu, Whitsunday I.), Northern Territory (Darwin), New South Wales (Ashford Cave, Back Ck. Mine, Bonalbo Colliery, Rise & Shine Mine, Tooloom, Willi-Willi Cave) and Western Australia (Kalumburu). The southernmost limit of distribution is at about 31° S at Kempsey. Extralimital distribution: New Guinea, where it is very common and widespread. The unique type (of *alternata*) has obviously been mislabelled, and was found, upon direct comparison, to be identical with fresh specimens from New Guinea and Australia.

AFFINITIES. This species is closely related to *sarasini* Falc. (New Caledonia) with which it has been confused in the literature. The most distinctive characters are the shape of the ♂ claspers and the spinoseness of the ♀ tergite 2; characters of minor importance are the slightly upcurved aedeagus and broad parameres in the ♂, a small patch of short setae between the tergite 2 and tergal plate 3, a median pair of very long bristles on the tergal plate 3, transversely arranged setae on the sternite 7, and absence of strong spines on sternites 5 and 6 in the ♀.

DISTRIBUTIONAL PATTERN

Faunal Affinities, Dispersal Routes

Obviously the Australian batfly fauna is a southeastern continuaton of that of the Oriental Region. As shown in Table 2, none of the genera involved is endemic to Australia, and only the Group Transversa is at present unknown outside the country.

Table 2. Distribution of species-groups of Australian batflies.

Genus	Species-group	Distributional Range outside Australia	Southernmost Record in Australia (S. Lat.)
Brachytarsina	Minuta	Papuan, Melanesian Subregions	36° 40′
//	Amboinensis	W to India, N to Japan, SE to New Caledonia	34°
Raymondia	Pagodarum	W to W Africa, E to Solomon Is.	17° 20′
Ascodipteron	Phyllorhinae	W to W Africa	17° 10′
//	Speiserianum	W to India, N to Japan	23° 20′
Cyclopodia	Sykesii	W to India, E to Fiji	34°
//	Inflatipes	W to Malaya, E to Solomon Is.	28° 10′
Archinycteribia	Actena	W to Malaya, E to New Britain	14°
Penicillidia	Jenynsii	W to Madagascar, N to Japan, SE to New Caledonia	38° 20′
//	Progressa	Wallacea, Papuan Subregions	37° 10′
Basilia	Transversa	endemic	35° 20′
//	Blainvillii	W to W Africa	23° 20′
//	Falcozi	W to India, E to New Britain	42° 50′
//	Brevicauda	W to Thailand	37° 40′
Phthiridium	Biarticulatum	W to Europe, W Africa	37° 40′
Nycteribia	Pedicularia	W to Europe, W Africa	31° 10′
//	Parilis	Wallacea, Papuan, Melanesian Subregions	38° 20′

In the past, the north- and southward spreading of these genera and species-groups from and into Australia most probably has been largely via the Torres Strait route, i.e., to and from New Guinea. Insofar as the scarcely known batfly faunae of the

Lesser Sunda Is. are concerned, spreading via the Timor Sea route seems almost negligible. From that of New Guinea, the batfly fauna of Australia differs markedly in the presence of *Basilia* (Groups Transversa and Blainvillii, but the latter is expected to be found in New Guinea) as well as the absence of *Megastrebla, Brachytarsina* (Group Buxtoni), *Eucampsipoda, Leptocyclopodia* (*Oncoposthia*), *Cyclopodia* (Group Pembertoni), *Penicillidia* (Group Dufourii), *Stereomyia, Basilia* (Groups Nattererii, Dispar, Quadrata and an undescribed one, Ventriosa) and *Nycteribia* (Group Parvula). Among the latter, *Stereomyia* and *Basilia* (Groups Quadrata and Ventriosa) are endemic to New Guinea while *Basilia* (Group Dispar) is endemic to New Guinea and the Bismarck Arch. These differences show that (a) the New Guinean fauna is much more complicated than the Australian, (b) only part of the northern or Oriental elements have successfully penetrated into and established in Australia, and (c) even at the level of species-groups, the strong diversity and endemism in the genus *Basilia* bear zoogeographical significance, with some groups spreading southward and others northward. The affinities of the Australian and Melanesian faunae are much weaker, only 7 of the 16 species-groups are common to both subregions.

At the species level, the endemism is fairly high, and only 14 of the 33 species (i. e., 42%) spread beyond the limits of Australia (Table 1). Of these 14 species, 1 occurs also in New Caledonia, 12 occur also in New Guinea (5 of them even further westward) and 4 are each represented in Australia by an endemic subspecies. Thus at subspecies level, only 10 of the forms are non-endemic, and the rate of endemism is 71.4%. A comparison of the batfly faunae of Australia and her neighboring countries is given in Table 3.

While the Australian batfly fauna is largely an extension of the New Guinean one, it may be noted that none of the *Basilia* species (Australia, 16 species; New Guinea, 9 species, 7 of which are undescribed) is common to both countries, and that Australia is the present-day distributional center of the Groups Falcozi and Brevicauda. The former group is represented in New Guinea by 2 species (both undescribed); in Borneo, 3; in Sumatra, 1; in Malaya, 3; in India, 1; and the latter group, in New Guinea, 2; in Thailand, 1. These, together with the occurrence of the remarkable Group Transversa, may perhaps be attributed partly to the composition of the host (bat) fauna (see discussions under Host Relationships) and, as in many other animals, partly to the long isolation of Australia from the Sunda land-mass. The Melanesian faunal elements in Australia are represented by *Brachytarsina amboinensis uniformis* and *Penicillidia oceanica*. The former subspecies stands more close to *Br. a. surcoufi* Falc. of New Caledonia than to representatives of the Group Amboinensis in the Moluccas and New Guinea, while the latter species is confined to Australia and New Caledonia but not elesewhere. These may, at best, be interpreted as results of an east- or westward dispersal of these 2 genera as well as their host (*Miniopterus australis australis* Tomes) either from Australia to New Caledonia or vice versa, when these 2 countries were united or very close to each other. Since *Miniopterus, Brachytarsina* (Group Amboinensis) and *Penicillidia* (Group Jenynsii) are rare or unknown from the island chain of Admiralty Is. -Bismarck Arch. -Solomon Is. but are abundant and well represented in Moluccas-New Guinea-Australia-New Caledonia-New Hebrides, it seems likely that the dispersal route of *uniformis-surcoufi* and *oceanica* has been secondary (primary route, from the north, i. e., New

Table 3. Batfly faunae of Australia and neighboring countries*.

Genus	Species-group	Moluccan Is.	New Guinea	Australia	New Caledonia	New Hebrides
Megastrebla	Gigantea	?	*gigantea, parvior*	—	—	—
Brachytarsina	Amboinensis	*a. amboinensis*	ssp. "K"	*a. uniformis*	*a. surcoufi*	*a. pretiosa*
//	Minuta	?	spp. "I" "D" & "E"	*mackeani, verecunda*	—	—
//	Buxtoni	—	sp. "B"	—	—	—
//	Rouxi	—	—	—	*rouxi*	—
Raymondia	Pagodarum	?	*pagodarum*	sp.nr *pseudo-pagodarum*	—	—
Ascodipteron	Phyllorhinae	?	sp. "P"	*archboldi*	—	—
//	Speiserianum	*speiserianum*	*speiserianum*	*australiense*	—	—
Eucampsipoda	Inermis	?	*inermis*	—	—	—
Leptocyclopodia	Macrura	*m. ambonae*	*m. macrura*	—	—	—
Cyclopodia	Sykesii	*albertisii*	*albertisii, bougainvil-lensis, similis*	*albertisii, australis*	*oxycephala*	*oxycephala*
//	Pembertoni	?	*aspinosa, ligula*	?	?	*planipyga*
//	Inflatipes	*tenuis*	*inflatipes, s. sycophanta*	*s. euronoti*	—	—
Archinycteribia	Actena	*actena*	*actena*	*actena*	—	—
Penicillidia	Dufourii	?	sp. "F"	—	—	—
//	Jenynsii	?	*setosala*	*oceanica, setosala, tectisentis*	*oceanica*	*buxtoni*
//	Progressa	*progressa*	*vandeuseni*	*vandeuseni*	—	—
Stereomyia	Armata	—	*armata*, sp. "I"	—	—	—
Basilia	Nattererii	*magnoculus*	sp. "J"	—	—	—
//	Blainvillii	?	?	*techna*	—	—
//	Falcozi	?	spp. "M" & "X"	8 spp.	—	—
//	Brevicauda	?	spp. "R" & "U"	6 spp.	—	—
//	Dispar	—	*dispar*, sp. "H"	?	—	—
//	Quadrata	—	*quadrata*	—	—	—
//	Ventriosa	—	sp. "V"	—	—	—
//	Transversa	—	—	*transversa*	—	—
Phthiridium	Biarticulatum	*curvatum, phthisicum*	*curvatum, torresi*, sp. "A"	*curvatum, torresi*	—	—
Nycteribia	Pedicularia	*allotopa* ssp.	*allotopa* ssp.	*a. meridiana*	—	—
//	Parvula	*parvula*	*parvula*	—	—	—
//	Parilis	*p. parilis*	*p. parilis, alternata, papuensis*, spp. "G", "Q" & "T"	*p. vicaria, alternata*	*sarasini*	*bakeri*
Genera, total*		8	12(1)	9	4	4
Species-groups, total*		12	27(3)	17(1)	5(1)	5
Species, total		13	46	35	5	5

* Total numbers of endemic genera and species-groups are in parentheses. The batflies of the Lesser Sunda Is. other than the Moluccas are so little known that they are not tabulated here; the only species recorded from there are *Brachytarsina amboinensis* ssp., *Leptocyclopodia zelotypa* and *Cyclopodia horsfieldi* belonging to Groups Amboinensis, Macrura and Sykesii, respectively.

Guinea) and from Australia to New Caledonia. In short, the dispersal of the Australian batflies has been in primarily north- (in Australian elements) and southward (in Oriental elements) directions and secondarily, on the part of the Oriental elements, has extended eastward to southern Melanesia.

The southernmost records of the various species-groups are given in Table 2. Those of the Streblidae agree with the conclusion reached by Jobling (1951: 225, map 1) that these flies do not occur beyond the winter isotherm of + 10° C, i. e. the critical temperature below which their hosts begin to hibernate. Among the Nycteribiidae, the occurrence of 2 *Basilia* species in Tasmania, down to 42° 50' S represent the southernmost record for the family in the Southern Hemisphere (in S. America, the southernmost record was of *B. silvae* Brèthes at Mulchen, ca 37° 40'; in S. Africa, *Eucampsipoda africana* Theod., *Penicillidia fulvida* Bigot and *Phthiridium scissum* Speis. at Knysna, ca 34° 40'). Also notable are that in Australia, *Raymondia*, *Ascodipteron* and *Archinycteribia* are strictly tropical, and that *Basilia* is obviously a genus with a most extensive longitudinal distributional range.

Diversification, Vicariism

The local distribution and northern- and southernmost records of the various species and subspecies are shown in fig. 233, 289 and 290, and Table 4. The northern states are apparently richer in genera, species-groups and species than are the southern ones;

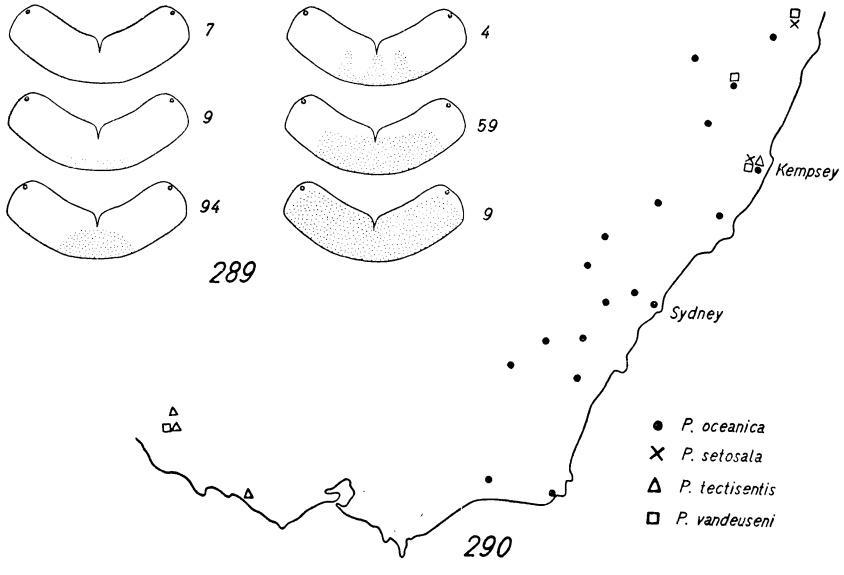


Fig. 289. *Penicillidia oceanica* Bigot, frequency of setal variation of tergite 2 in 182 ♀ ♀ from Possession I. Small-lettered numerals at the right side indicate the numbers of ♀ ♀ for the 6 forms. **Fig. 290.** Distributional ranges of *Penicillidia* species in SE part of Australia.

the same is also true for the eastern vs western states. In the former case, the difference is probably in connection with, both directly and indirectly, the climate, while in the latter case, it is partly due to insufficient collecting but largely to the much simpler biotic and abiotic ecological factors. The overlapping of distributional ranges of the batflies ex *Miniopterus* in eastern Australia is shown in fig. 290 and 292. It may well be less extensive in the colder seasons. Unfortunately the available data do not permit a clearer drawing of seasonal pictures of the overlapping of ranges. Although the extent of the overlapping varies with the species in question, the overlapping area for members of both *Penicillidia* and *Nycteribia* lies almost entirely between Brisbane (ca 27° 25′ S) and Kempsey (ca 31° 10′ S), i.e., in the transient zone between the Oriental and Australian Regions. The exact nature of the comparative adaptabilility of batflies to their environments as well as that of their competition on the same species or individuals of bats is not clear, but the geographical variation in faunal composition and relative abundance of flies appears to be fairly significant. The composition and abundance may more or less be affected by seasonal and other conditions. And the unusually rich fauna in Kempsey as shown in Table 5 might be partly due to its geographical position and partly to the more favorable season when most of the samples were taken.

As in the dispersal routes, the diversification and vicariism (geographical replacement) of the Australian batflies are mainly in a longitudinal direction. They may be arbitrarily allotted into 6 categories:

(a) Species not showing significant diversification among populations in Australia against those in neighboring countries: *Cyclopodia albertisii, Archinycteribia actena, Penicillidia oceanica, P. setosala, P. vandeuseni, Phthiridium torresi, Ph. curvatum, Nycteribia alternata.*

(b) Species with Australian forms subspecifically distinct from forms occurring in neighboring countries: *Cyclopodia sycophanta, Nycteribia allotopa, N. parilis.*

(c) Species in Australia which are apparently vicariiants of those found in neighboring countries: *Brachytarsina mackeani* (vs. an undescribed New Guinean species), *Br. amboinensis uniformis* (vs. *Br. a. surcoufi*), *Ascodipteron archboldi* (vs. an undescribed New Guinean species), *As. australiense* (vs. *As. speiserianum*), *Penicillidia tectisentis* (vs. *P. setosala* which is, however, found in northern Australia also). In all such cases, the vicariiant and their respective counterparts occur on the same species of bats.

(d) Species diversified into 2 or more species or races within Australia: *Basilia hamsmithi - aitkeni, B. barbarae - falcozi* (major plus minor forms). In these cases, the hosts of a given species and its counterpart(s) are often either identical or very closely related.

(e) Species apparently having no close relatives in neighboring countries: *Cyclopodia australis, Basilia transversa, B. nodulata, B. troughtoni, B. burrelli.*

(f) Species having moderately close relatives in neighboring countries: *Brachytarsina verecunda, Basilia techna, B. longispinosa, B. multispinosa, B. halei, B. musgravei.*

While some of the species may necessitate re-assignment to other categories when

Table 4. Distributional ranges of Australian batflies.

Species	Local Distribution							Southernmost Record (S. Lat.)	Northernmost Record (S. Lat.)
Br. verecunda	Qd	—	NSW	—	—	—	—	Bega, 36°40′	
Br. mackeani	Qd	—	—	—	—	—	—	Kuranda, 16°51′	
Br. amboinensis uniformis	Qd	—	NSW	—	—	WA	—	Sydney, 34°	
R. sp.nr *pseudopagodarum*	Qd	—	—	—	—	—	—	Eacham Lake, 17°20′	
As. archboldi	Qd	—	—	—	—	—	—	Chillagoe, 17°10′	
As. australiense	Qd	—	—	—	—	—	—	Rockhampton, 23°20′	
C. albertisii	Qd	NT	NSW	—	—	WA	—	Sydney, 34°	
C. australis	Qd	NT	NSW	—	—	WA	—	Sydney, 34°	
C. sycophanta euronoti	Qd	—	NSW	—	—	—	—	Kingscliff, 28°10′	
Ar. actena	Qd	—	—	—	—	—	—	Coen, 14°	
B. techna	Qd	NT	—	—	—	—	—	Rockhampton, 23°20′	Wollogorang, 16°10′
B. longispinosa	Qd?	—	NSW	—	—	—	—	Bonalbo, 28°40′	
B. multispinosa	Qd	—	NSW	—	—	—	Tas	Hobart, 42°50′	McPherson Rge, 28°30′
B. hamsmithi	Qd	—	NSW	—	—	—	—	Griffith, 34°10′	Samford, 27°20′
B. aitkeni	Qd	—	NSW	—	—	—	—	Sydney, 34°	Mitchell, 26°25′
B. barbarae	—	—	NSW	Vic	—	—	Tas	Maydena, 42°40′	Lake George, 35°
B. falcozi	Qd	NT	NSW	—	SA	WA	—	Wagga Wagga, 35°10′	Nourlangie Camp, 12°50′
B. halei	Qd	NT	NSW	—	SA	WA	—	Arkaba, 31°40′	
B. nodulata	—	—	NSW	—	—	—	—	(Blue Mts), 33°30′	
B. brevicauda	Qd	—	NSW	Vic	—	—	—	Inglewood, 36°30′	

Table 4 (*cont'd*)

Species	Local Distribution							Southernmost Record (S. Lat.)	Northernmost Record (S. Lat.)
B. musgravei	Qd	—	NSW	—	—	—	—	Brindabella, 35°20′	
B. troughtoni	—	—	NSW	Vic	SA	WA	—	Eltham, 37°40′	Rivertree, 28° 38′
B. burrelli	—	—	NSW	—	SA	—	—	Bool Lagoon, 37°10′	Manilla, 30°40′
B. transversa	—	—	NSW	—	—	—	—	(Canberra), 35°20′	
P. oceanica	Qd	NT	NSW	Vic	SA	WA	—	Mallacoota, 37°30′	
P. setosala	Qd	—	NSW	—	—	—	—	Kempsey, 31°10′	
P. tectisentis	Qd	—	NSW	Vic	SA	—	—	Allansford, 38°20′	Rockhampton, 23°20′ (? seasonal)
P. vandeuseni	Qd	—	NSW	—	SA	—	—	Joanna, 37°10′	
Ph. torresi	Qd	—	—	—	—	—	—	(Cape York), 10°40′	
Ph. curvatum	Qd	—	NSW	Vic	—	—	—	Eltham, 37°40′	
N. allotopa meridiana	Qd	—	NSW	—	—	—	—	Kempsey, 31°10′	
N. parilis vicaria	Qd	—	NSW	Vic	SA	WA	—	Allansford, 38°20′	
N. alternata	Qd	NT	NSW	—	—	WA	—	Kempsey, 31°10′	
Total no. of species	28	7	26	7	8	9	2		

Note: For simplicity, Australian Capital Territory is here included in New South Wales, and the northernmost records are given only for more localized species. *B. transversa* and *Ph. torresi* are each known from a single locality which is here enclosed in parenthesis.

Table 5. Faunal composition of some samples of *Miniopterus**.

Species	N. Qld.: Possession I., VIII. 1925	N.S.Wales: Kempsey, Willi-Willi Cave, XII. 1962	N.S. Wales: Sydney, Prospect Tunnel & Elizabeth Bay House, VII. 1927	S. Aust.: Naracoorte, cave, 1958-1964
Brachytarsina amboinensis uniformis	74	26(40.7%)	12	—
Penicillidia oceanica	360(32.1%)	18(28.1%)	59(31.4%)	—
Penicillidia setosala	—	2	—	—
Penicillidia tectisentis	—	4	—	45(22.1%)
Penicillidia vandeuseni	157(14.6%)	6	—	—
Nycteribia allotopa meridiana	—	1	—	—
Nycteribia parilis vicaria	5	6	117(62.2%)	159(78.9%)
Nycteribia alternata	521(46.6%)	1	—	—
Species, total	5	8	3	2
Specimens, total	1117	64	188	204

* Percentages are given only for the first 2 or 3 most abundant species in each locality.

the batfly-fauna of neighboring countries is more adequately explored, a few others are difficult to assign properly. For instance, *Penicillidia setosala* may go to categories (a) and (c); *Cyclopodia albertisii, Basilia falcozi, B. brevicauda, Penicillidia oceanica,* and *Nycteribia parilis vicaria* do show geographical variation in Australia in average dimensions and setal numbers but it seems difficult or unpracticable to clearly define such geographical races. The most interesting case of vicariism among the Australian species is with *Basilia falcozi* vs. *B. barbarae.* The former species is found almost all over the subcontinent and is chiefly parasitic on *Chalinolobus gouldi,* whereas the latter is confined to Tasmania and the southeast part of the subcontinent and is probably confined to *Vespadelus pumilus* which serves as a normal host of a quite different species, *B. musgravei,* in the north.

Endemism

The rate of endemism of the Australian batflies, at the species or subspecies-level, is at present rather high (see above). Since 23 species of the Australian bats (*Pteropus* 1 species, *Dobsonia* 1, *Macroglossus* 1, *Syconycteris* 1, *Nyctimene* 1, *Taphozous* 3, *Rhinolophus* 2, *Hipposideros* 2, *Tadarida* 2, *Pipistrellus* 1, *Myotis* 1, *Chalinolobus* 1, *Nycticeius* 2, *Miniopterus* 2, *Phoniscus* 1, *Nyctophilus* 1) are also known to occur in New Guinea, the rate will almost certainly be reduced when flies on these and other bats are intensively and systematically collected in both countries. It would not be surprising if *Brachytarsina verecunda, Basilia techna* and *B. hamsmithi* are to be found in New Guinea, and the New Guinean species *Raymondia pagodarum* Speis. and *Basilia dispar* Speis. (=*hirsuta* Theod., =*horrida* Sch. Stkh.) to be found in Australia. From zoogeographical point, most of the endemic species occur in the southern part of the country. The more significant ones are *Cyclopodia australis, Penicillidia tectisentis, Basilia transversa, B. longispinosa, B. multispinosa, B. barbarae, B. nodulata, B. troughtoni* and *B. burrelli.* More endemic species are expected to be found on *Macroderma, Rhinonicteris, Nycticeius, Nyctophilus,* and possibly *Tadarida* and *Phoniscus.*

Host Relationships

Overall Host Range

The Australian bat fauna is at present composed of about 60 species belonging to 19 genera, 6 families. The batflies are definitely known from about 30 species of bats belonging to 13 genera and 4 families. There are also a number of records which are either apparently erroneous or doubtful. No batflies have been taken alive from the following genera of bats in Australia:

Macroglossus (Pteropodidae: Macroglossinae). In New Guinea and other Oriental countries, this is the host of *Cyclopodia inflatipes* Speis. and its relatives.

Nyctimene (Pteropodidae: Nyctimeninae). The genus was recorded as a host (in New Guinea) of *Cyclopodia ligula* Maa (Group Pembertoni). Otherwise its insect fauna is unknown.

Macroderma (Megadermatidae). There was an obviously unreliable record of *Penicillidia oceanica* Bigot (q. v.); otherwise the insect parasites are entirely unknown for the genus which is endemic to Australia. Its relatives, *Megaderma* (India etc.) and *Cardioderma* (tropical Africa), are hosts of *Brachyotheca* and *Raymondia* respectively.

Rhinonicteris (Rhinolophidae: Hipposiderinae). The genus is also endemic to Australia. Nothing is known about its insect parasites which are expected to be similar to those found on *Hipposideros* and *Rhinolophus.*

Tadarida (Molossidae). In Australia, no batflies have been found but in other countries, the genus is known as host of a *Raymondia,* a *Basilia* and several polyctenid (Hemiptera) and ischnopsyllid (Siphonaptera) species.

Phoniscus (Vespertilionidae: Kerivoulinae). The genus is exceedingly rare and nothing is known about its insect parasites. As in other Kerivoulinae, it is probably solitary, tree-dwelling and is unlikely to be a normal host for batflies other than *Basilia.*

A complete host index for the Australian batflies is given as Appendix B, and a summary of host preference is given in Table 1. From the index and summary, it is obvious that most batflies are found on gregarious and/or cave-dwelling bats which are more favorable for the establishment and propagation of the flies than are the solitary and tree-dwelling bats. The complete darkness in caves generally leads to multiple infestation, higher population, higher host specificity, weaker sclerotization and weaker pigmentation of the flies, and the co-habitation of several species of bats in the same caves. On the other hand, it contributes to a large number of erroneous and dubious host records. From an ecological standpoint, the Australian batflies fell into the following categories:

(a) On gregarious bats (*Pteropus*) roosting in the open. — *Cyclopodia* (Group Sykesii).

(b) On relatively solitary bats (*Syconycteris, ? Dobsonia*) roosting in the open. — *Cyclopodia* (Group Inflatipes), (?) *Archinycteribia.* The *Dobsonia* bats, normal hosts of *Megastrebla* (Group Gigantea), *Leptocyclopodia* (Group Macrura) and *Archinycteribia,* and generally known as gregarious cave- dwellers in New Guinea, etc., are reported as roosting in the open in Australia. If true, this would explain the absence of

the Groups Gigantea and Macrura in the latter country.

(c) On relatively solitary bats (*Taphozous, Pipistrellus, Chalinolobus, Vespadelus, Nycticeius, Nyctophilus*) roosting in trees, houses, shallow caves and similar environments in partial darkness. — *Basilia* (all species except *hamsmithi, musgravei*).

(d) On gregarious bats (*Rhinolophus, Hipposideros, Myotis, Vespadelus* in part, *Miniopterus*) roosting in deep caves and similar environments in complete darkness. — *Brachytarsina, Raymondia, Ascodipteron, Penicillidia, Basilia* (*hamsmithi, musgravei*), *Phthiridium, Nycteribia.*

The above classification is preliminary and more or less arbitrary. The sizes of colonies and sites of roosting in many bats vary with localities (and probably, with seasons also). For instance, *Dobsonia moluccensis,* as mentioned above, is generally gregarious and cave-dwelling in New Guinea (this is also true for *D. inermis* in the Solomon Is. and *D. praedatrix* in the Bismarck Arch.), but presumably not so in Australia; *Vespadelus pumilus,* on the other hand, is gregarious and cave-dwelling in Queensland, relatively solitary and house-dwelling in Tasmania, and solitary and tree-dwelling in the transient zone. The faunal composition of these 2 bats is different under different roosting environments. *D. moluccensis* in New Guinea harbors *Megastrebla gigantea, Leptocyclopodia macrura* and *Archinycteribia actena,* but in Australia only *Ar. actena. V. pumilus* in Queensland harbors *Basilia musgravei;* in Tasmania, *B. barbarae;* and in the transient zone, *B. halei.* Such difference in batfly-fauna may be interpreted as that either the batflies in question are more sensitive (i. e., less adaptable) to the roosts of their respective hosts, or these 2 bats, as currently accepted, are actually each composed of 2 or more cryptic or sibling species.

Host Specificity, Host Preference

Although the amount of available information is rather limited and there are a number of dubious and apparently erroneous host records, it is fairly clear that most of the Australian batflies are mono- or oligoxenous, none is truly polyxenous, and very few may perhaps be considered pleioxenous. Besides *Basilia transversa* and *B. nodulata,* of which the host is either unknown or uncertain, the remaining species may be classified as below according to the degree of their host specificity:

(a) Monoxenous (normally parasitic on a single host species). *Ascodipteron archboldi, Basilia longispinosa, B. hamsmithi, B. barbarae, B. musgravei, B. troughtoni, B. burrelli.* Perhaps *B. multispinosa* also belongs here.

(b) Oligoxenous (normally parasitic on 2 or more host species of the same genus). *Brachytarsina amboinensis uniformis, Ascodipteron australiense, Cyclopodia albertisii, C. australis, C. sycophanta euronoti, Basilia aitkeni, B. brevicauda, B. techna, Penicillidia oceanica, P. setosala, P. tectisentis, P. vandeuseni, Nycteribia allotopa meridiana, N. parilis vicaria, N. alternata.* In addition, *Brachytarsina verecunda, Br. mackeani, Raymondia* sp. nr *pseudopagodarum, Phthiridium torresi* and *Ph. curvatum,* although at present each known from a single species of host, are most probably in fact oligoxenous; *Archinycteribia actena* is monoxenous in Australia but must be classified as oligoxenous when its host range in other countries is considered.

(c) Pleioxenous (normally parasitic on 2 or more host genera of the same subfamily). Probably *Basilia falcozi* and *B. halei* belong here.

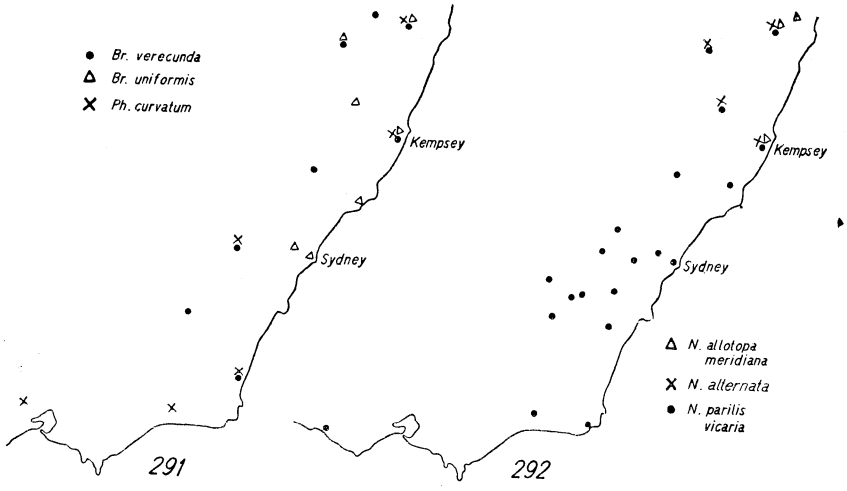
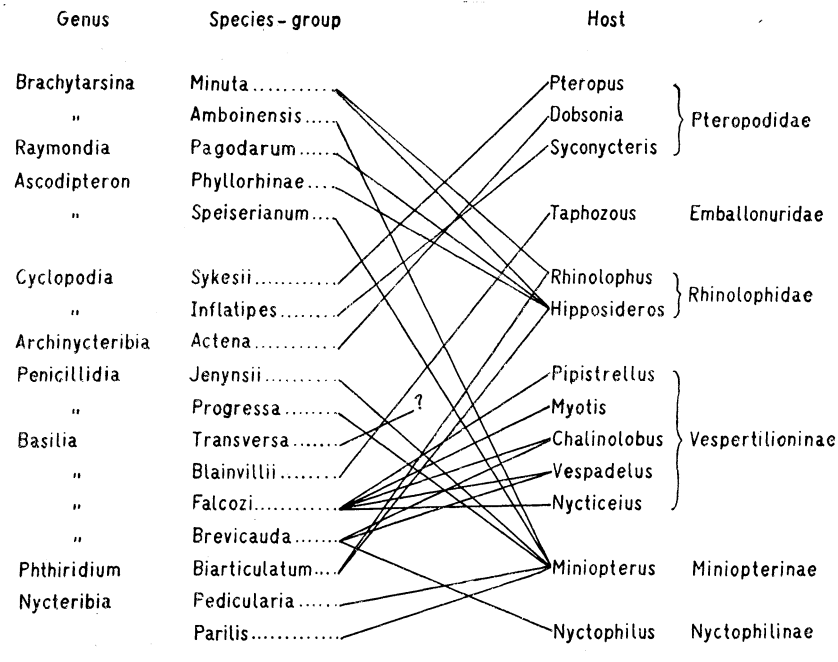


Fig. 291-292. Distributional ranges of *Brachytarsina* and *Phthiridium* species (291) and of *Nycteribia* species (292) in SE part of Australia.



293

Fig. 293. Host relationships of Australian batflies.

The host specificity is governed apparently by several factors, availability of appropriate host species, availability of appropriate sites for pupal development, and relative adaptability to varied environment. The last factor is, in particular, closely connected with both distribution and host ranges. Usually more widespread species have wider host ranges, and all non-monoxenous species show more or less pronounced host preference, even when the host species in question are very closely related. The most interesting examples for these phenomena are *Cyclopodia albertisii* and *C. australis*. The latter species is endemic while the former one is widespread and is known from 3 or 4 *Pteropus* species in other countries. In Australia, these 2 *Cyclopodia* species have almost identical distribution and host ranges but *albertisii* shows strong preference for *Pt. alecto gouldi* (32.3% of verified records) and *Pt. conspicillatus* (41.2%), and *australis* for *Pt. scapulatus* (63%). The host preference of a species is not necessarily the same in different places. Thus the preferred hosts of *albertisii* are *Pt. pelewensis* in the Palau Is., *Pt. conspicillatus* and *Pt. macrotis epularius* in New Guinea, *Pt. melanopogon* in the Kei Is., and as mentioned above, *Pt. alecto gouldi* and *Pt. conspicillatus* in Australia.

Multiple Infestation

Of the 13 Australian bat-genera with known batflies (see Appendix B and fig. 293), *Rhinolophus*, *Chalinolobus* and *Vespadelus* are normally infested by 2 genera of flies each; *Hipposideros* and *Miniopterus*, by 4 genera each; the remaining 8 bat-genera, by 1 genus each. Meanwhile, several *Pteropus*, *Chalinolobus*, *Vespadelus* and *Miniopterus* bats are normally infested by 2 or more flies belonging to the same genus, thus:

Pteropus poliocephalus, *Pt. scapulatus*, *Pt. alecto gouldi* and *Pt. conspicillatus*, each simultaneously by *Cyclopodia albertisii* and *C. australis* (both of Group Sykesii).

Chalinolobus gouldi, by *Basilia falcozi* and *B. troughtoni* (of Groups Falcozi and Brevicauda respectively).

Chalinolobus morio, by *Basilia halei* and *B. burrelli* (of Groups Falcozi and Brevicauda respectively).

Vespadelus pumilus, by *Basilia barbarae*, *B. halei* (both of Group Falcozi), and *B. musgravei* (of Group Brevicauda).

Miniopterus schreibersii and *M. australis*, each simultaneously by *Penicillidia* (*Penicillidia*) *oceanica*, *P.* (*P.*) *setosala*, *P.* (*P.*) *tectisentis* (all 3 species being of Group Jenynsii), *P.* (*Eremoctenia*) *vandeuseni*, *Nycteribia allotopa meridiana* (of Group Pedicularia), *N. parilis vicaria*, *P. alternata* (both of Group Parilis).

In some cases, the fly-congeners, whether of the same species-groups or not, may be found on the same individual bats. This is one of the outstanding features of the Australian batfly-fauna. The relative abundance of the different species of flies in question varies with places, and, from our experience in New Guinea, even with different colonies roosting in the sames caves. The nature of interspecific competition among the co-habitating flies on the same individuals or the same species of bats is yet to be clarified but in all cases, the relative abundance of fly-congeners is always sharply different, and in most cases, the dominance of one species over its closely related co-inhabitants is generally geographically significant. Thus *Penicillinia setosala*,

P. vandeuseni and *Nycteribia allotopa meridiana* are, as suggested by their very low population density in most or all parts of Australia, apparently relicts of northern faunal elements from New Guinea; *P. oceanica* and *N. alternata* are dominant over *P. tectisentis* and *N. parilis vicaria*, respectively, in the north, and reversely so in the south (Table 5). The dominance may also be related to intraspecific diversification of the host. For instance, the Naracoorte population of *Miniopterus schreibersii*, on which the only *Penicillidia* species was *tectisentis* (no *oceanica*, nor *setosala*), is believed by some mammalogists to be a 3rd subspecies (undescribed) in Australia. The above-mentioned phenomena suggest that each of the co-inhabitants has its own preference or adaptability to varying ecological requirements and that a sound subspecific classification of the host bats may help us to understand the true nature of multiple infestation.

Phoresy of Bat - Mites

On several occasions (Domrow 1958, 1961, 1963), *Cyclopodia albertisii* and *C. australis* were found in association with *Neolaelaps spinosus* Berlese and less frequently with *N. vitzthumi* Domrow (Acarina, Macronyssidae). The true relationship between these flies and mites is not clear, but is most probably phoretic, since the latter are proven blood-sucking parasites of *Pteropus* bats, and since there is no evidence that they take the bat blood indirectly from the flies. In almost all cases, the mites were found attached to the first 2 tergites of the flies. The host bats involved were *Pt. scapulatus*, *Pt. alecto gouldi* and *Pt. conspicillatus*. Besides adults, occasionally nymphs of the mites were also present.

Appendix A. Gazetteer and Local Faunal List

The following is an alphabetical list of localities in Australia where batflies have heretofore been collected. Batflies, together with their collectors and dates, known to each locality are enumerated. For brevity, month and year for each collector are both given in Arabic numerals, thus 7.63 stands for July 1963 (for materials collected in the 19th century, the year is written out in full), materials derived from preserved bats in museum collections are indicated by asterisk marks, and materials not seen by me, by square brackets. Abbreviations for generic names of batflies are *Ar.* = *Archinycteribia*, *As.* = *Ascodipteron*, *B.* =*Basilia*, *Br.* = *Brachytarsina*, *C.* = *Cyclopodia*, *N.* = *Nycteribia*, *P.* = *Penicillidia*, *Ph.* = *Phthiridium*, *R.* = *Raymondia*.

Adels Grove, gorge 5 km SW, nr Lawn Hill, Qld.: C. ***australis*** — B. J. Marlow 10.63. — See also under Louie Ck.

Alexandria, N. T.: [***B. falcozi***] — W. Stalker.

Alford (Mt), Qld.: ***B. musgravei*** — K. L. S. Harley 12.54.

Alice Springs, N. T.: ***B. falcozi.***

Allansford, Vict.: ***P. tectisentis, N. p. vicaria*** — B. Dew 8.61, J. Edge 9.61.

Amos (Mt), Qld.: See under Phoenician Mine.

Anna Bay, Port Stephens, N. S. W.: ***B. brevicauda*** — W. W. Thorpe 4.27.

Arkaba, 650 m, S. A.: ***B. halei*** — P. Aitken 9.61, H. M. Hale 9.24.

Armidale, N. S. W.: ***B. brevicauda*** — P. D. Dwyer 3.61. — See also under Back Ck. Mine.

Ashford Cave, 50 km S of Inverell, N. S. W.: ***Br. a. uniformis, Br. verecunda, P. oceanica, N. p.***

vicaria, N. alternata — P. D. Dwyer 8.60, 12.60; K. Renwick 4.62.

Ashford Downs, N. S. W.: *P. oceanica, N. p. vicaria* — J. G. de Warren.

Atherton, Qld.: *C. australis* — (? collector) 10.49.

Avalon, N. S. W.: *Br. a. uniformis, P. oceanica* — B. Dew 2.67.

Avoca (Mt), N. S. W.: See under Endless Cave.

Ayers Rock, N. T.: *B. halei* — J. M. Thompson 2.54.

Babinda Creek, Qld.: *C. albertisii* — H. C. Raven 11.21.

Back Creek Mine, 60 km SE of Armidale, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria, N. alternata* — P. D. Dwyer 5.60.

Bamaga, Cape York, Qld.: *Br. a. uniformis, P. oceanica, P. vandeuseni, N. p. vicaria, N. alternata* — B. Dew 10.68.

Bannockburn Oval, Turramurra, nr Sydney, N. S. W.: *Br. a. uniformis, P. oceanica* — B. Dew 6.66.

Barcaldine, Qld.: *C albertisii* — F. McKenzie 1961.

Barcarolle, 20 km S of Longreach, Qld.: *B. falcozi* — F. L. Berney.

Barrington R., 1500 m, N. S. W.: [*B. multispinosa*] — T. G. Campbell 1.25.

Batavia R., Qld.: See under Mapoon Mission Stn.

Bathurst, N. S. W.: See under Hill End.

Bauer's Mt, Qld.: See under Holy Jump Cave.

Bega, N. S. W.: See under Tanja Gold Mine.

Belfery Cave, Timor, NE of Scone, N. S. W.: *Br. a. uniformis, P. oceanica* — B. Dew 11.65, P. D. Dwyer 6.61.

Bendithera, N. S. W.: *B. multispinosa* — J. L. McKean 4.68.

Berrima, 900 m, N. S. W.: *B. multispinosa, B. troughtoni* — T. V. Sherrin 9.24.

Bicheno (as Bircheno on labels by Musgrave), E. Coast, Tasm.: *B. barbarae* — T. T. Flynn.

Biloela, Qld.: *Br. a. uniformis* — I. F. B. Common 2.45.

Blackfellow's Gully, N. S. W.: *B. aitkeni.*

Black Mt, A. C. T.: *B. brevicauda, B. troughtoni* — J. L. McKean 12.66, (? collector) 3.61

Blue Mts, N. S. W.: See under Hazelbrook.

Bonalbo, N. S. W.: See under Bonalbo Colliery, Gorge Ck., Peacock Ck.

Bonalbo Colliery, Bonalbo, N. S. W.: *Br. a. uniformis, Br. verecunda, P. oceanica, Ph. curvatum, N. allotopa meridiana, N. p. vicaria, N. alternata* — J. H. Calaby 8.60, 3.61.

Bonshaw, 13 km S, N. S. W.: *C. australis* — P. D. Dwyer 2.62.

Bool Lagoon, S. A.: *B. burrelli, P. tectisentis, N. p. vicaria* — H. H. Finlayson.

Border Waterfall, N of Camooweal, N. T.: *B. falcozi* — J. L. McKean 8.67.

Bornholm, W. A.: *B. brevicauda, B. falcozi* — D. Morgan.

Botany Bay, Sans Souci, nr Sydney, N. S. W.: *B. longispinosa* — J. H. Wright 9.23

Braidwood, 12 km NW, N. S. W.: *B. falcozi, B. troughtoni* — J. L. McKean 3.68.—See also under Cheitmore Cave.

Bramston Beach, 20 km N of Innisfail, Qld.: *Br. a. uniformis, Ph. curvatum, N. alternata* — J. L. Harrison 1.58, 7.58, 7.59.

Brindabella, N. S. W.: *B. musgravei* — D. F. Waterhouse 5.50.

Brisbane, Qld.: *Br. a. uniformis, C. albertisii, C. australis, P. oceanica, N. p. vicaria* — K. Barnard 6.61, C. Brooks 2.51, B. Champ 5.51, J. A. Woods 6.64, (? collector) 4.29. — See also under Fisherman's I.

Brown Bone Cave, 2 km N of valley of Nambung R., W. A.: *B. troughtoni* — N. Arches 3.68.

Buchan, Vict.: See under Greenhouse Cave, Mabel Cave, Spring Ck. Cave.

Bulladelah, in unused tunnel in alum mine, N.S.W.: *P. oceanica, N. p. vicaria* — R. D. Mackay 10.51.

Bullio Cave, Wombeyan, 65 km N of Bungonia, N. S. W.: *Br. verecunda, Ph. curvatum, N. p. vicaria* — B. Dew 10.65, L. Hall 1961.

Bungonia Caves, 225 km SSW of Sydney, N. S. W.: *P. oceanica, N. p. vicaria* — B. Dew 3.66 — See also under Bullio Cave, Drum Cave, Grill Cave.

Burren Junction, N. S. W.: *B. falcozi* — (? collector), 8.28.

Burrinjuck Dam, N. S. W.: *P. oceanica, N. p. vicaria* — B. Dew 8.60.

Byfield, nr Yeppoon, Qld.: *C. australis* — A. Musgrave 10.24, F. N. Ratcliffe 10.29.

Caermarthen, Manilla, N. S. W.: *B. burrelli, P. oceanica* — H. Burrell 11.23.

Cairns, Qld.: *Br. a. uniformis, C. albertisii, C. australis, P. oceanica* — J. F. Illingworth 1917, Pavlovic 1.65, [W. Y. H. Rosenberg 11.02] — See also under Freshwater, N Barnard Is., Spurgeon Mt.

Camooweal, Qld.: See under Border Waterhole.

Canberra, A. C. T.: *B. brevicauda, B. troughtoni* — J. H. Calaby 5.61, D. Purchase 2.61. — See also under Uriarra.

Cangai, Qld.: *As. australiense* — P. D. Dwyer 5.62.

Canungra, Qld.: *Br. a. uniformis, B. hamsmithi P. oceanica, N. p. vicaria, N. alternata* — R. G. Rees 5.66, R. G. Rees et al. 4.66.

Cape York Penin., Qld.: *Br. verecunda, P. oceanica, Ph. curvatum, Ph. torresi,* — *Archbold Exped. 5.48, Challenger Exped. 1882, J. P. Darlington, Jr. 6. 32, [R. Kemp 5.12.] — See also Cowie Bay Cave, Mt Garnett, etc.

Capella, Qld.: *B. techna* — W. Freeland 9.66.

Caroline Musgrave Mt Ranges, S. A.: *B. falcozi* — P. Aitken 2.66.

Carpentaria (Gulf of), Qld.: See Mapoon Mission Stn.

Carrai Cave, Kempsey, N. S. W.: *Br. a. uniformis, P. oceanica, N. allotopa meridiana, N. p. vicaria* — P. D. Dwyer 7.60, 12.61; D. K. McAlpine 7.64.

Casino, N. S. W.: See under Wyan.

Cavendish, Vict.: See under Rocklands Dam.

Cheitmore Cave, 40 km S of Braidwood, N. S. W.: *P. oceanica, N. p. vicaria* - G. M. Dunnett 6.57, D. Purchase 9.61, J. Webb 6.57.

Chillagoe, Qld.: *Br. a. uniformis, As. archboldi, C. australis, Ph. curvatum,* (?) [*N. bakeri*] — W. Campbell, [C. M. Hay 1.22], J. L. McKean 7.69, *R. F. Peterson 7.59. — See also under Chillagoe Caves.

Chillagoe Caves, Qld.: *Br. a. uniformis, B. musgravei, B.* sp., *P. oceanica, P. vandeuseni, N. p. vicaria, N. alternata* — *Archbold Exped. 2.48, J. L. Harrison 4.60, [F. R. Allison & G J. Middleton 8.69 & 2.70.] — See also under Pink's Cave, Royal Arch Cave, Chillagoe.

Cityan (Mt), NW Rockhampton, Qld.: *B. techna* — B. J. Marlow 12.60.

Cliefden, main cave, N. S. W.: *Br. verecunda, Ph. curvatum* — B. Dew 2.66, 12.67. — See also under Gable Cave.

Coburg Penin., N. T.: See under Smith Point.

Coen, Qld.: *C. albertisii, C. australis, Ar. actena, N. alternata* — P. J. Darlington, Jr. 6.32, B. J. Marlow 6.60, (? collector) 11.47. — See also under Lankelly Ck., Rocky Range, Rocky Scrub.

Colong Caves (incl. Piano Cave), Yerranderie, N. S. W.: *B. multispinosa, P. oceanica, N. p. vicaria* — C. Anderson et al. 7.27, K. Davey 1.66, N. J. B. Plomley.

Cooktown (and environs), Qld.: *Br. verecunda, C. albertisii, C. australis, B. brevicauda, P. oceanica, Ph. curvatum, N. p. vicaria, N. alternata* — *Archbold Exped. 10-11.49, 3.50; Great Barrier Reef Exped. 1896, N. C. Rothschild 11.02. — See also under Phoenician Mine, Shipton's Flat.

Cootamundra, N.S.W.: *N. p. vicaria* — D. Purchase 6.60.

Cowie Bay Cave, Cape York Penin., Qld.: *N. p. vicaria* — * Archbold Exped. 6.50.

Cudgegong, Swallow Cave, N.S.W.: *P. oceanica* — B. Dew 8.66.

Cudlee Creek, S.A.: *B. falcozi* — P. Aitken 5.65.

Cue, W.A.: See under Wilgie Mia.

Cunnamulla, Qld.: *B. falcozi, B. hamsmithi* — H. Hardcastle.

Daragee, nr Innisfail, Qld.: *C. albertisii* — J. L Harrison 3 59.

Darwin, N. T.: *C. australis, P. oceanica, N. alternata* — J. T. Tuney 9.02, W. P. Walsh & J. L. McKean 6.65. — See also under Mary R.

Dayboro, Qld.: *Br. a. uniformis, Br. verecunda, P. oceanica* — J. Cribb 5.62.

Dinner Creek, S of Ravenshoe, Qld.: [*B. falcozi*] — (? collector) 1922.

Doomadgee Mission Station, Qld.: *B. halei* — P Aitken 7.63.

Dorrigo, N. S. W.: *B. aitkeni* — P. J. Darlington, Jr. 2.32.

Drum Cave, Bungonia, N. S. W.: *Br. a. uniformis, Br. verecunda, P. oceanica, N. p. vicaria* — B. Dew 10.64, 11.65.

Dunedoo, Wheogo, 20 km E, N. S. W.: *B. brevicauda* — W. B. Gaden.

Eacham Lake, Qld.: *Br. verecunda, R.* sp., *Ph. curvatum* — R. Elder 9.64.

Eidsvold, Qld.: *C. australis* — H. Johnston 12.09.

Elizabeth Bay House, nr Sydney, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — C. Anderson et al. 7.27.

Eltham, Vict.: *B. troughtoni, Ph. curvatum* — R. M. Warnecke 8.63.

Emuvale, Qld.: See under Holy Jump Cave.

Endless Cave, Mt Avoca, Kincumber, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — D. Purchase 5.60.

Farina, S. A.: See under Lyndhurst.

Fingal Point Cave, Tweed R., N. S. W.: *P. setosala, P. vandeuseni* — T. Steel, (? collector) 4.1883.

Fig Tree Cave, Wombeyan, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — B. Dew 1961-1966, L. Hall 9.61.

Finch Hatton Gorge, via Finch Hatton, Qld.: *Br. a. uniformis, P. setosala, P. vandeuseni* — G. Monteith 8.66.

Fisherman's I., Brisbane, Qld.: *C. albertisii* —J. Nelson 9.51.

Fitzroy Vale, nr Rockhampton, Qld.: *Br. a. uniformis* — J. F. Miles 5.40.

Freshwater, nr Cairns, Qld.: *C. albertisii* — T. G. Campbell 8.59.

Gable Cave, Cliefden, N. S. W.: *P. oceanica, N. p. vicaria* — B. Dew 2.66.

Garnett (Mt), cave 5 km W, Cape York Penin., Qld.: *N. p. vicaria* — * Archbold Exped. 6.48.

George (Lake), N. S. W.: *B. barbarae* — J. L. McKean 4.67

Glenalbyn, nr Inglewood, Vict.: *B. brevicauda* — (? collector) 8.47.

Glenroy, Hartley, N. S. W.: *B. troughtoni* — R. Stein 4.23.

Goondi, nr Innisfail, Qld.: *N. p. vicaria, N. alternata* — J. L. Harrison 5.60.

Gordon Mine, Iron Range, Qld.: *As. archboldi* — * Archbold Exped. 6.48.

Gordonvale, N. Qld.: *C. albertisii, P. oceanica* — [J. F. Illingworth 1917], J. A. Woods 12.63.

Gorge Creek, Bonalbo, N. S. W.: *B. musgravei* — J. H. Calaby 3.61.

Gracemere, nr Rockhampton, Qld.: *C. australis* — F. N. Ratcliffe 10.29.

Grahamstown, nr Tumut, N. S. W.: *B. brevicauda* — J. H. Wright.

Grassmere Cave, nr Warnambool, Vict.: *N. p. vicaria, N. alternata* — R. J. Edge 12.61.

Green Ant Creek, N. T.: *B. techna* — W. P. Walsh 2.62.

Greenhouse Cave, Buchan, Vict.: *P. oceanica* — W. B. Hitchcock 9.61.

Green's Beach, at mouth of R. Tamar, 55 km N of Launceston, Tasm.: *B. barbarae* — R. H. Green 1962.

Griffith, N. S. W.: *B. hamsmithi* — J. L. McKean 8.66.

Grill Cave, Bungonia, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — B. Dew 4.68.

Gulargambone, N. S. W.: *B. hamsmithi* — B. Dew 8.66.

Gunbower, Vict.: *B. barbarae.*

Gungahlin, A. C. T.: *B. barbarae, B. brevicauda, B. transversa* — J. L. McKean 7.64, K. Simpson 5.62, (? collector) 11.56.

Hartley, N. S. W.: See under Glenroy.

Hazelbrook, Blue Mts, N. S. W.: *B. brevicauda, B. nodulata* — L. Abrahams 1.21.

Helen's Hill (= Mt Helen), 13 km S of Ingham, Qld.: *Br. a. uniformis, P. oceanica, P. vandeuseni, N. p. vicaria, N. alternata* — K. L. S. Harley 9.60, 9.61.
Herberton, Qld.: *Br. a. uniformis, P. vandeuseni, N. allotopa meridiana, N. p. vicaria* — J. Warham 6.59. — See also under Stanuary Hills.
Hill End, nr Bathurst, old gold mine, N. S. W.: *B. falcozi, P. oceanica, N. p. vicaria* — B. Dew 8.66.
Hobart, Town Hall, Tasm.: *B. multispinosa* — Miss Johnson 4.61.
Hodges Cave, Joanna, S.A.: *P. vandeuseni, N. p. vicaria* — E. Hamilton-Smith 11.61.
Holy Jump Cave, Bauer's Mt, Emuvale Qld.: *P. oceanica* — R. C. H. Shepard.
Hospital Creek, Ingham, Qld.: *C. albertisii* — J. L. McKean 8.64.
Humidicrib Cave, Wee Jasper, N. S. W.: *Br. verecunda* — J. L. McKean 2.64.

Ingham, Qld.: *Br. a. uniformis, C. albertisii, C. australis, P. oceanica, N. alternata* — K. L. S. Harley 1.60, 3.62; J. L. Harrison 5.59, R. Straatmann 2.61, K. Utech 3.62. — See also under Helen's Hill, Hospital Ck.
Inglewood, Vict.: See under Glenalbyn.
Inkerman, Qld.: *B. musgravei* — W. Tregram et al.
Innamincka, S. A.: *B. falcozi* — P. F. Lawson 8.58.
Innisfail, Qld.: *C. albertisii, B. brevicauda, P. oceanica, N. p. vicaria, N. alternata* — * Archbold Exped. 4.59, J. L. Harrison 1958-1960, J. L. McKean & K. Gill 4.67, Exped. Mertens-Felten 4.57. — See also under Bramston Beach, Daragee, Goondi, Mundoo, S. Johnstone.
Inverell, N. S. W.: See under Ashford Cave.
Iron Pot (Mt), 25 km from Rockhampton, Qld.: *B. musgravei* — B. Dew 1.66.
Iron Range, Qld.: *Br. verecunda, R.* sp., *B. halei, Ph. curvatum* — I. F. B. Common & Upton 4.64. — See also under Gordon Mine.
Isa (Mt), Qld.: *C. australis, B. techna* — R. Domrow 11.66, J. L. McKean 4.69.

Jenolan, N. S. W.: See under Nettle Arch Cave.
Joanna, S. A.: See under Hodges Cave.
Johanssen's Cave, 17 km N of Rockhampton, Qld.: *P. oceanica* — * G. H. H. Tate 2.48.
Junction Cave, Wombeyan, N. S. W.: *Ph. curvatum* — B. Dew 2.66.

Kalumburu, Kimberleys, W. A.: *Br. a. uniformis, P. oceanica, N. p. vicaria, N. alternata* — A. M. Douglas & Mees 6.60.
Karumba, at mouth of Norman R., Gulf of Carpentaria, Qld.: *B. falcozi* — Pawlowski.
Katanning, W. A.: *B. troughtoni* — G. M. Doak 11.64.
Katherine, N. T.: *C. albertisii, B. halei* — P. Spalding et al. 2.60, B. Wren 1960, (? collector) 9.52.
Kempsey, N. S. W.: *Br. a. uniformis, C. albertisii, P. oceanica, P. vandeuseni, Ph. curvatum, N. allotopa meridiana* — G. Allen 12.31, (? collector) 7.61. — See also under Carrai Cave, Temagog Cave, Willi-Willi Cave, Yessabah Cave.
Keppel Sands, Qld.: See under Sand Hills.
Kiata Lowan Sanctuary, Vict.: *B. troughtoni* — J. L. McKean 3.62.
Kimberleys, W. A.: See under Kalumburu.
Kincumber, N. S. W.: See under Endless Cave.
King George's Sound, W. A.: [*C. albertisii*] (?) — G. Masters.
Kingscliff, N. S. W.: *C. inflatipes euronoti* — J. Liddy 1.66.
Kingsgate, in mine shaft, N. S. W.: *P. oceanica, P. vandeuseni* — G. Gallasch 5.63.
Koiri R. S., Qld.: *C. albertisii* — R. Elder 11.64.
Koombaloomba Creek, S of Ravenshoe, Qld.: *B. longispinosa, N. p. vicaria* — *Archbold Exped. 5.59.
Kowanyama (formerly Mitchell R. Mission Station), Gulf of Carpentaria, Qld.: *C. albertisii, C. australis* — R. Domrow 10.66, H. A. Standfast & R. Domrow 11.67.
Kuranda, Qld.: *Br. a. uniformis, Br. mackeani, (?) As. archboldi, C. albertisii, B. hamsmithi, N. p. vicaria* — F. P. Dodd, P. D. Dwyer 5.67, P. Marcourtch & F. R. Allison 1.71.

Lankelly Creek, Coen, Qld.: *Br. mackeani* — B. J. Marlow 6.60.
Launceston, Tasm.: *B. barbarae* — R. H. Green 9.63. — See also under Green's Beach.
Laura, Qld.: *C. australis* — (? collector) 8.58.
Lawn Hill, 2 km N, Qld.: *C. australis, B. techna* — P. Aitken 7.63, B. J. Marlow 10.63 — See also under Adels Grove, Lawn Hill Ck., Louie Ck.
Lawn Hill Creek, Qld.: *B. falcozi* — B. J. Marlow 10.63.
Lindeman I., Qld.: *Br. a. uniformis, P. oceanica* — G. P. Whitley.
Liverpool and Tonkinson Rivers, junction, N. T.: *C. albertisii* — J. H. Calaby 8.62.
Long I., Qld.: *Br. verecunda, N. p. vicaria, N. alternaa* — T. Brooks 5.62, 7.62.
Longreach, Qld.: See under Barcarolle.
Louie Creek, 13 km SW of Adels Grove, via Lawn Hill, Qld.: *B. techna* — B. J. Marlow 10.63.
Lucindale, S. A.: *B. troughtoni* — F. Secker.
Lyndhurst (Mt), 50 km E of Farina, S. A.: *B. falcozi* — E. Le G. Troughton 12.19.
Mabel Cave, E. Buchan, Vict.: *Ph. curvatum, N. p. vicaria* — E. Hamilton-Smith 6.65.
Major's Creek, N. S. W.: See under Waterfall Gold Mine.
Mallacoota, Vict.: *P. oceanica, N. p. vicaria* — D. Purchase 9.61.
Manilla, N. S. W.: See under Caermarthen.
Many Peaks Range, Tyville, Qld.: *B. techna* — P. D. Dwyer 5.67.
Mapoon Mission Station, mouth of Batavia R. -Wenlock R., Gulf of Carpentaria, Qld.: *C. albertisii* — C. Hedley.
Mareeba, Qld.: *Br. a. uniformis, P. vandeuseni, N. allotopa meridiana* — D. Fitzsimon 8.63.
Mary R., nr Darwin, N. T.: *C. albertisii, C. australis* — J. T. Tunney 11.02.
Maydena, Tasm.: *B. barbarae* — B. C. Mollison 1.61.
McIlwraith Range, Qld.: See under Rocky Scrub.
McPherson Range, 1000-1300 m, National Park, Qld.: *B. multispinosa* — P. J. Darlington, Jr. 6.32.
Melrose, S. A.: *P. oceanica* — F. W. Jones.
Mildura, Vict.: [*B. barbarae*] (?) — I. M. Mackerras.
Millaa Millaa, 850 m, Qld.: [*B. forcipata*] (mislabelling) — P. J. Darlington, Jr. 4.32.
Mill Stream Station, W.A: See under Palm Springs.
Milmerran, Qld.: *B. brevicauda* — (? collector) 11.26, 1.27.
Mingoola, Qld.: See under Viator Cave.
Mitchell, Qld.: *B. aitkeni* — J. L. McKean & L. S. Hall 2.67.
Mitchell R. Mission Station, Qld.: See Kowanyama.
Molloy (Mt), Qld.: *C. albertisii, C. australis* — G. Barrow 10.64, Little 10.63, 1.64.
Mooloolah, Qld.: *N. allotopa meridiana* — P. D. Dwyer 6.68.
Mornington I., Qld.: *C. australis, B. falcozi* — P. Aitken 5.60, 6.63.
Mossman, Qld.: [*As. australiense*], *C. albertisii, P. oceanica, N. p. vicaria, N. alternata* — F. Muir 6.10.
Mundoo, nr Innisfail, Qld.: *C. albertisii* — J. L. Harrison 6.59.
Mungana, nr Chillagoe, Qld.: *As. australiense* — *R. F. Peterson 7.59.
Munni, Williams R., N.S.W.: *B. troughtoni* — C. Cayley 7.21.
Murwillumbah, N.S.W.: *C. inflatipes euronoti* — R. Domrow 11.64, J. Nelson 11.61.
Myall Lakes, N.S.W.: [*Br. a. uniformis*], *B. brevicauda* — J. Tomlinson 12.63.
Myola, Qld.: *Br. verecunda* — W. W. Froggatt 5.09.
Nambour, Qld.: *P. vandeuseni, N. p. vicaria* — G. Gordon 9.64.
Nambung R., W. A. — See Brown Bone Cave.
Naracoorte, bat cave S of town, S.A.: *P. tectisentis, N. p. vicaria* — P. Aitken 1961-1964, G. F. Gross 10-11.58, E. Hamilton - Smith 8-10.56, 11.61. — See also under Tomato Stick Cave.
Narooma, N.S.W.: *B. brevicauda* — J. L. McKean 12.66.
Narrengullen, N.S.W.: *N. p. vicaria* — (? collector) 10.57.

Nettle Arch Cave, Jenolan, N.S.W.: *B. multispinosa* — B. Dew 7.63, 7.64.
Nimbin, N.S.W.: *B. hamsmithi, B. longispinosa* — J. L. McKean 4.65.
Noohona, N.S.W.: *B. falcozi* — P. Strong 4.64.
Norman R., Qld.: See under Karumba.
North Barnard Is., nr Cairns, Qld.: *C. albertisii* — W.E.J. Paradice.
North Sydney Railway Tunnel, N.S.W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — B. Dew 1960-62.
Nourlangie Camp, N.T.: *B. falcozi* — J. H. Calaby 8.62.

Olive R., Cape York Penin., Qld.: [*C. albertisii*] — G. H. Wilkins (W.A.I. Exped.) 8.23.
Olsens Cave, Rockhampton, Qld.: *B. techna* — J. L. McKean 8.64.
Orchard Hills, N.S.W.: *B. troughtoni* — B. Dew 4.67.

Palm Springs, Mill Stream Station, W.A.: *C. albertisii* — A. M. Douglas 7.58.
Parramatta, N.S.W.: [*B. falcozi, B. troughtoni*] — Challenger Exped., P. Schrader 4.04.
Peacock Creek, nr Bonalbo, N.S.W.: *B. longispinosa, B. musgravei* — J. H. Calaby 3.61.
Pentland, Qld.: *B. falcozi.*
Penrith, N.S.W.: See under Warragamba Dam.
Perth, W.A.: *B. troughtoni* — *E. H. Giglioli 7.07.
Phoenician Mine, Mt Amos, nr Cooktown, Qld.: *Br. a. uniformis, As. australiense, P. setosala, N. p. vicaria, N. alternata* — *Archbold Exped. 8.49.
Piano Cave, N.S.W.: See under Colong Caves.
Pierce's Creek, A.C.T.: *B. halei* — J. L. McKean 12.67.
Pilkington Cave, 16 km N of Rockhampton, Qld.: *N. p. vicaria* — *Archbold Exped. 2.49.
Pink's Cave, Chillagoe, Qld.: *B. musgravei, N. allotopa meridiana, N. p. vicaria, N. alternata* — *Archbold Exped. 3.49.
Pirie (Port), S. A.: *B. falcozi* — J. McPherson 7.64.
Possession I., Torres Strait, old mine shaft, Qld.: *Br. a. uniformis, P. oceanica, P. vandeuseni, N. p. vicaria, N. alternata* — M. Ward 8.25.
Prospect Tunnel, Prospect Reservoir, N. S. W.: *Br. a. uniformis, P. oceanica, N. p. vicaria* — C. Anderson et al. 7.25, A. Musgrave 7.27.
Punchbowl Cave, Wee Jasper, N. S. W.: *P. oceanica, N. p. vicaria* — A. Goede 7.63, D. Purchase 1960-1961.
Punyelroo Cave, Swan Reach, S. A.: *B. burrelli* — P. Aitken 9.63.

Randall Dam, W. A.: *B. falcozi* — W. H. Butler 5.62.
Ravenshoe, Qld.: See under Dinner Ck., Koombaloomba Ck.
Razor Back Ridge, Stephens Ck., N. S. W.: *B. falcozi* — K. Dansie 3.63.
Red Bank Mine, 20 km W of Wollogorang, N. T.: *B. techna* — * Archbold Exped. 6.59.
Richmond R., N. S. W.: [*B. longispinosa*] — (? collector).
Rise and Shine Mine, Tooloom Ck., N. S. W.: *Br. a. uniformis, P. oceanica, P. vandeuseni, Ph. curvatum, N. p. vicaria, N. alternata* — J. H. Calaby 2.62, B. J. Marlow 12.62.
Rivertree, N. S. W.: *Br. verecunda, B. musgravei, B. troughtoni* — J. H. Calaby 2.62.
Rockhampton, Qld.: *Br. a. uniformis, Br. verecunda, As. australiense, P. tectisentis, P. vandeuseni, Ph. curvatum, N. allotopa meridiana, N. p. vicaria, N. alternata* — P. D. Dwyer 5.62, 7.66, 8.68, 11.68, A. Musgrave 10.24, O. Kemp 4.69, K. E. Stager 8.54, (? collector) 7.60 — See also under Cityan, Fitzroy Vale, Gracemere, Iron Pot, Olsens Caves, Pilkington Cave.
Rocklands Dam, N of Cavendish, Vict.: *B. barbarae* — J. L. McKean 3.68.
Rocky Range, nr Coen, Qld.: *C. albertisii* — B. J. Marlow 6.60.
Rocky Scrub, McIlwraith Range, nr Coen, Qld.: *C. australis, P. vandeuseni, Ph. curvatum, N. allotopa meridiana, N. alternata* — J. P. Darlington, Jr. 6.32.
Ropes Creek, N. S. W.: [*B. longispinosa*] — (? collector).
Royal Arch Cave, Chillagoe, Qld.: *P. vandeuseni* — E. Hamilton-Smith 4.64.

Samford, Qld.: *Br. a. uniformis. B. hamsmithi, P. setosala* — R. G. Rees 5.64.
Sand Hills (? = Keppel Sands), Qld.: *C australis* — F. N. Ratcliffe 10.29.
Sans Souci, N. S. W.: See under Botany Bay.
Scone, N. S. W.: See under Belfery Cave.
Seven Hills, Sydney, N. S. W.: *B. aitkeni, B. troughtoni* — B. Dew 10.62.
Shipton's Flat, 50 km S of Cooktown, Qld.: *B. brevicauda.* — *Archbold Exped. 8.49.
Signature Cave, Wee Jasper, N. S. W.: *N. p. vicaria* — E. Hamilton-Smith 6.62.
Smithfield, N. S. W.: *B. troughtoni* — R. Stein 2.25; ♀ recorded by Speiser (1901) as *Nycteribia oceanica* not seen.
Smith Point, Coburg Penin., N. T.: *C. albertisii* — J. L. McKean 8.65.
Somerset, Qld.: *B. brevicauda, B. musgravei* — *L. M. D'Albertis 1875; *G. H. H. Tate & H. M. Van Deusen 3-5.48.
South Johnstone, Agric. Exp. Station, 8 km S of Innisfail, Qld.: *Br. a. uniformis, B. verecunda, C. albertisii, P. oceanica, Ph. curvatum, N. p. vicaria* — M. E. Emanuel 4-5.58, J. L. Harrison 5.59.
Spring Creek Cave, Buchan, Vict.: *P. oceanica, N. p. vicaria* — E. Hamilton-Smith 6.62, W. B. Hitchcock 9.61.
Springwood, N. S. W.: *B. brevicauda* — J. L. McKean 7.67.
Spurgeon Mt, 80 km NW of Cairns, Qld.: *P. oceanica, N. p. vicaria, N. alternata* — P. J. Darlington, Jr. 6.32.
Stanthorpe, Qld.: *C. albertisii* — K. Korboot 1.60.
Stanuary Hills, nr Herberton, Qld.: *N. allotopa meridiana, N. p. vicaria* — J. L. Harrison 6.60.
Stephens Creek, N. S. W.: See under Razor Back Ridge.
Stephens (Port), N.S.W.: See under Anna Bay.
Swallow Cave, N.S.W.: See under Cowie Bay Cave.
Swan Reach, S.A.: See under Punyelroo Cave.
Sydney, N.S.W.: *C. albertisii, C. australis, P. oceanica, B. longispinosa* — *A. M. D'Albertis 1873, F. W. Elphick 1.52, A. Musgrave 1919-1927. — See also under Bannockburn Oval, Botany Bay, Elizabeth Bay House, N Sydney Railway Tunnel, Seven Hills.
Tamar R., Tasm.: See under Green's Beach.
Tambourine Mt, Qld.: *C. albertisii, C. australis* — A. Musgrave 12.26, F. N. Ratcliffe 10.29.
Tanja Gold Mine, nr Bega, N.S.W.: *Br. verecunda, Ph. curvatum* — D. Purchase 9.61.
Temagog Cave, Kempsey, N.S.W.: *Br. verecunda, Ph. curvatum* — P. Aitken 12.62.
Thursday I., Torres Strait, Qld.: *Br. a. uniformis, P. oceanica, P. setosala, N. alternata* — *Archbold Exped. 5.48.
Timor Caves, N of Scone, N.S.W.: *Br. verecunda, Ph. curvatum, P. oceanica, N. p. vicaria* — B. Dew 3.60, 7.60, G. Hunt 5.64. — See also under Belfery Cave.
Tinderry (Mt), N.S.W.: *B. barbarae, B. multispinosa, B. troughtoni* — J. L. McKean 2-4. 68.
Tomato Stick Cave, Naracoorte, S.A.: *P. tectisentis, N, p. vicaria* — E. Hamilton-Smith 8.65.
Tonkinson R., N.T.: See under Liverpool R.
Tooloom, S of McPherson Range, N.S.W.: *C. australis, P. oceanica, N. alternata* — J. H. Calaby 3.61, 12.61. — See also under Rise and Shine Mine, Wallaby Ck., Wallaby Nob.
Townsville, Qld.: *C. albertisii, C. australis, P. oceanica* — G. Dennes 1927, D. J. Lee 2.55, W. E. J. Paradice.
Tumut, N.T.: See under Grahamstown.
Turramurra, N.S.W.: See under Bannockburn Oval.
Tweed R., N.S.W.: *B. brevicauda, N. allotopa meridiana* — T. Steel 2.1892 — See also under Fingal Point Cave.
Tyville, Qld.: See under Many Peaks Ra.
Uriarra, via Canberra, A.C.T.: *B. barbarae* — E. O'Sullivan 11.54.
Utingu, Cape York Penin., Qld.: [*N. alternata*] — R. Kemp 5.12.

Viator Cave, Mingoola, Qld.: *Br. a. uniformis, B. musgravei* — P. D. Dwyer 11.61.

Wagga Wagga (as Wagga in Musgr. 1927: 265), N.S.W.: *B. falcozi* — V. H. Braun 1.25.

Walcha. N.S.W.: *C. australis* — (? collector) 2.58.

Wallaby Creek, Tooloom, N.S.W.: *P. oceanica, Ph. curvatum, N. p. vicaria* — E. J. Hayes 4.61, Australian Naval Exped. 12.62.

Wallaby Nob, Tooloom, N.S.W.: *B. troughtoni* — J. H. Calaby 2.61.

Warnambool, Vict.: See under Grassmere Cave.

Warragamba Dam, nr Penrith, N.S.W.: *Br. a. uniformis, B. hamsmithi, P. oceanica, N. p. vicaria* — B. Dew 3.66.

Warren, N.S.W.: *B. aitkeni* — R. Warnock 5.62.

Waterfall Gold Mine, Major's Ck., N.S.W.: *P. oceanica, N. p. vicaria* — D. Purchase 9.61.

Waterfall Gully, S.A.: *B. troughtoni* — (? collector) 5.54.

Wee Jasper Caves, N.S.W.: *Br. verecunda, P. oceanica, N. p. vicaria* — L. Hall 10.63, (? collector) 8.57. — See also under Humidicrib Cave, Punchbowl Cave, Signature Cave.

Wenlock R., Qld.: See under Mapoon Mission Stn.

Wheogo, N.S.W.: See under Dunedoo.

Whitsunday I., Qld.: *Br. a. uniformis, N. allotopa meridiana, N. p. vicaria, N. alternata* — A. J. Marshall 8.35.

Wialki, W. A.: *B. falcozi* — (? collector) 2.58.

Wilgie Mia, nr Cue, W. A.: *B. halei* — M. J. Cornish 9.61.

Willi Willi Cave, Kempsey, N. S. W.: *Br. a. uniformis, Br. verecunda, P. oceanica, P. setosala, P. tectisentis, P. vandeuseni, Ph. curvatum, N. allotopa meridiana, N. p. vicaria, N. alternata* — P. Aitken 12.62, P. D. Dwyer 7.60, 1.61.

Williams R., N. S. W.: See under Munni.

Wilton R., Arnhem Land, N. T.: *C. australis* — P. Aitken.

Winnecke Creek, N. T.: *B. halei* — J. L. McKean 3.67.

Wollogorang, N. T.: See under Red Bank Mine.

Wombeyan Caves, 65 km N of Bungonia, N. S. W.: *P. oceanica, N. p. vicaria* — B. Dew 1959-1964. — See also under Bullio Cave, Fig Tree Cave, Junction Cave.

Woolooga, Qld.: *Br. verecunda, Ph. curvatum* — J. W. Turner 11.61, 11.62.

Worbuh, Qld.: *B. musgravei* — P. D. Dwyer 11.68.

Wotjulum, W. A.: *C. albertisii, C. australis* — A. M. Douglas 9.55.

Wyan, cave, nr Casino, N. S. W.: *B. musgravei* — D. V. R. 12.57.

Yabbra State Forest, N. S. W.: *B. longispinosa* — J. H. Calaby 2.62.

Yeppoon, Qld.: See under Byfield.

Yerranderie, N. S. W.: See under Colong Caves.

Yessabah Cave, Kempsey, N. S. W.: *Br. a. uniformis, P. oceanica, N. allotopa meridiana, N. p. vicaria* — P. Aitken 12.62.

Appendix B. Host-Parasite List

The numeral following the name of a parasite denotes the number of available records for that particular parasite from the host in question. Doubtful or apparently unreliable records are each prefixed by an asterisk (*).

Pteropodidae

Pteropus poliocephalus Temminck
Cyclopodia albertisii 6, *C. australis* 2.

Pteropus scapulatus Peters
Cyclopodia albertisii 3, *C. australis* 17.

Pteropus alecto gouldi Peters
Cyclopodia albertisii 12, *C. australis* 5.

Pteropus conspicillatus Gould
Cyclopodia albertisii 14, ***C. australis*** 3.
****Penicillidia oceanica*** 1.

Dobsonia moluccensis magna Thomas
****Cyclopodia albertisii*** 1.
Archinycteribia actena 1.

Syconycteris australis (Peters)
Cyclopodia sycophanta euronoti 2.

Emballonuridae

Taphozous australis Gould
****Nycteribia allotopa meridiana*** 1.

Taphozous georgianus Thomas
Basilia techna 5.

Taphozous troughtoni Tate
Basilia techna 3.

Taphozous flaviventris Peters
****Basilia falcozi*** 1.

Taphozous sp.
Basilia techna 2.

Megadermatidae

Macroderma gigas Dobson
****Penicillidia oceanica*** 1.

Rhinolophidae

Rhinolophus megaphyllus Gray
Brachytarsina verecunda 18, ****Br. amboinensis uniformis*** 1.
Raymondia sp. 1.
****Basilia troughtoni*** 1.
****Penicillidia oceanica*** 3, ****P. tectisentis*** 1.
Phthiridium curvatum 20.
****Nycteribia parilis vicaria*** 1, ****N. alternata*** 1.

Rhinolophus philippinensis Waterhouse
Phthiridium curvatum 1.

Hipposideros galeritus Cantor
Phthiridium torresi 1.

Hipposideros diadema (E. Geoffroy)
Brachytarsina mackeani 2.
Ascodipteron archboldi 2.

Hipposideros semoni Matschie
****Phthiridium curvatum*** 1.

Vespertilionidae: Vespertilioninae

Pipistrellus tasmaniensis (Gould)
Basilia multispinosa 5.

Myotis adversus Horsfield
Basilia hamsmithi 4.

Chalinolobus gouldi (Gray)
****Basilia barbarae*** 1, ***B. falcozi*** 9, ***B. troughtoni*** 17.
****Phthiridium curvatum*** 1.

Chalinolobus picatus (Gould)
Basilia falcozi 2.

Chalinolobus dwyeri Ryan
Basilia falcozi 1.

Chalinolobus morio (Gray)
Basilia burrelli 2, ****B. falcozi*** 1, ***B. halei*** 2.

Vespadelus pumilus (Gray)
****Brachytarsina amboinensis uniformis*** 1.
Basilia barbarae 13, ****B. falcozi*** 2, ***B. halei*** 6, ***B. musgravei*** 8, ***B. transversa*** 1.
****Penicillidia vandeuseni*** 1.
****Nycteribia allotopa meridiana*** 1.

Nycticeius rueppellii (Peters)
Basilia aitkeni 2, ***B. longispinosa*** 6, ****B. multispinosa*** 2, ****B. musgravei*** 1.

Nycticeius influatus (Thomas)
Basilia aitkeni 1.

Nycticeius orion (Troughton)
Basilia aitkeni 1.

Nycticeius balstoni (Thomas)
Basilia aitkeni 1, ****B. falcozi*** 1, ****B. hamsmithi*** 1.

Nycticeius greyii (Gould)
Basilia aitkeni 1, ***B. falcozi*** 2.

Vespertilionidae: Miniopterinae

Miniopterus schreibersii (Kuhl) plus *Miniopterus australis* Tomes
Brachytarsina amboinensis uniformis 49.
Ascodipteron australiense 10.
****Basilia burrelli*** 1. ****B. multispinosa*** 1.
Penicillidia oceanica 61, ***P. setosala*** 3, ***P. tectisentis*** 6, ***P. vandeuseni*** 15.
Nycteribia allotopa meridiana, 10, [***N. bakeri*** 1], ***N. parilis vicaria*** 67, ***N. alternata*** 25.

Vespertilionidae: Nyctophilinae

Nyctophilus geoffroyi pacificus (Gray)
Basilia brevicauda 9.

Nyctophilus timoriensis gouldi Tomes
Basilia brevicauda 8, ****B. halei*** 1.

Nyctophilus walkeri Thomas
****Basilia halei*** 1.

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