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Generic Positions of Australian Psocoptera Currently Placed in *Paracaecilius* Badonnel and *Enderleinella* Badonnel (Insecta: Psocoptera: Caeciliidae)

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ABSTRACT. *Paracaecilius lemuris* n.sp. is described from New South Wales and the generic position of *P. globiclypeus* (Enderlein) n.comb., *P. hilli* (Smithers) n.comb., *P. zelandicus* (Tillyard) n.comb. and *Enderleinella hylobius* (Smithers) n.comb. discussed.

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The psocopteran family Caeciliidae is worldwide in distribution, with over 200 described species in about 16 genera. There are at present 16 recognisable Australian species placed in seven genera. This paper deals with the Australian species of *Paracaecilius* Badonnel and *Enderleinella* Badonnel. Large populations of species in these genera sometimes occur and they are important elements of arboreal ecosystems. They are found on the foliage of broad leaved plants, especially of rainforest trees, and are mainly yellowish, creamy or white with little in the way of conspicuous or characteristic patterns. As a group they are very similar to one another in general morphology. Some of the taxonomically useful features, such as female genitalia, are very lightly sclerotised, requiring careful dissection and staining if they are to be used reliably for identification. With the current increase in surveys being undertaken in Australian rainforests it is important that taxonomic studies and determination of the generic position of these frequently encountered species be carried out.

Mockford (1965b, 1966, 1969, 1989) has made an important study of the genera of the Caeciliidae, based mainly on American species, which has resulted in recognition of several species groups in the large genus *Caecilius* Curtis. The study is still incomplete and authors have continued to describe species from many parts of the world, including Australia, in *Caecilius*. It is clear that most, if not all, of the Australian species will eventually have to be moved to other genera. When Mockford established the genus *Xanthocaecilius* (Mockford, 1989: 268) for a western hemisphere group he provided information on characters which distinguish it from *Paracaecilius* and *Enderleinella* and hence, incidentally, also gave features which redefined and distinguished these two genera from each other. This provides an opportunity to allocate species to these two very similar genera with greater confidence than was possible before. Broadhead & Richards (1982), when dealing with African species, also provided additional information on morphological details of *Paracaecilius*. Mockford (1989:292) defined subfamilies and tribes

within the Caeciliidae. In his scheme *Paracaecilius* and *Enderleinella* are placed in his Paracaeciliinae on the basis of possession of the following combination of features: ocelli present; abdomen with three ventral vesicles; male aedeagus blunt-tipped and endophallus 2-lobed or not divided; female gonapophyses short and broad, with one or two setae on the remnant of the external valve. He placed them in the tribe Paracaeciliini (as opposed to the Aphyopsocini, the only other tribe of the Paracaeciliinae) on the following features: labral stylets absent; seven posterodistal labral sensilla present; wings not exceptionally long and narrow; cell R5 of the forewing not constricted in the middle; spermathecal sac separated from the sheath by a broad neck or narrowly separated from sheath by a short neck abutting on sheath or sheath absent; epiproct not elongated. Within this tribe *Paracaecilius* can be distinguished from *Enderleinella* by its having a very long, shallow, almost parallel-sided pterostigma with hardly any suggestion of a broadening in the distal third; the stem of Rs is almost straight basad of the separation of R2+3 and R4+5; the lacinia ends in two small cusps without either being particularly extended into a point; ventral and dorsal valves of the female gonapophyses with rounded apex; spermatheca with at most a short neck; phallosome transverse anteriorly, sclerotised frame thin and sometimes broken. In *Enderleinella*, although the pterostigma is shallow, there is at least slight suggestion of a broadening in the distal third; the stem of Rs is very slightly sinuous basad of the radial fork; there is at least one pointed extension at the distal end of the lacinia; the ventral valve of the female gonapophyses is pointed; the spermatheca has an obvious neck; anterior part of frame of phallosome strongly developed, not broken.

Three of the four species currently placed in *Enderleinella* have been recorded from Australia, namely *E. globiclypeus* (Enderlein), *E. zelandicus* (Tillyard) (both originally in *Caecilius*) and *E. hilli* Smithers. The fourth, *E. obsoleta* (Stephens), is a European species. A survey of the Psocoptera of Tuglo Wildlife Refuge, near Mount Royal, north of Singleton in the Hunter Valley, New South Wales, has revealed the presence there of *P. hylobius* Smithers and a new species of *Paracaecilius* (*P. lemuris* n.sp. described below). Study of this material has necessitated a reappraisal of the generic placing of all Australian species of *Enderleinella* and *Paracaecilius* taking into account Mockford's redefinitions.

Such a reappraisal reveals that *E. globiclypeus*, *E. zelandicus*, *E. hilli* and *P. lemuris* have the combination of features which place them in *Paracaecilius*. *Paracaecilius hylobius*, on the other hand, has those features which confirm that it should be placed in *Enderleinella*. Although Broadhead & Richards (1982) suggested this they did not formally move the species to *Enderleinella*.

It is possible that *P. globiclypeus* and *P. zelandicus* are the same species but it would be necessary to

examine the type of the former species before a definite decision could be made. It is likely, however, that the type was lost when the Psocoptera collections of the Hungarian Museum were destroyed.

As a result of this study the following generic placement is proposed for Australian species.

Enderleinella hylobius (Smithers) n.comb.

Paracaecilius hylobius Smithers, 1977: 261, figs 24-30.
Enderleinella hylobius.—Broadhead & Richards, 1982: 161. (Placement in *Enderleinella* suggested but not formally established).

Paracaecilius globiclypeus (Enderlein) n.comb.

Caecilius globiclypeus Enderlein, 1903: 275.
Enderleinella globiclypeus.—Smithers, 1977: 262.

Paracaecilius hilli (Smithers) n.comb.

Enderleinella hilli Smithers, 1979: 62, figs 10-12.

Paracaecilius zelandicus (Tillyard) n.comb.

Caecilius zelandicus Tillyard, 1923: 188, fig. 12, pl. 18 fig.7.
Enderleinella zelandicus.—Smithers, 1969: 277, figs 41-43.

Paracaecilius lemuris n.sp.

Pl. 1 figs 1-9

Type material. HOLOTYPE, female, ALLOTYPE, male, PARATYPES, 4 females, 7 males, Tuglo Wildlife Refuge, 48 km, north of Singleton, NSW, 14 June 1992, A.S. Smithers. ADDITIONAL PARATYPES, all from type locality, 2 males, 3 females, 7-13 May 1974; 4 males, 10 May 1992; 2 males, 20 May 1992; 1 male, 30 May 1992; 4 males, 2 females, 14 Oct. 1978; 2 males, 10 Dec. 1978; 1 female, 17 Dec. 1978; 2 males, 1 female, 30 May 1992; 1 female, 12 Aug. 1978; 1 male, 1 female, 21 Oct. 1978 (A.S. Smithers); 6 males, 12 June 1988 (M.S. Moulds); 1 female, 17 July 1988; 1 male, 29 May 1989; 4 males, 11 July 1988; 1 male, 11 Sept. 1988; 2 males, 23 June 1989; 1 female, 20 Aug. 1988; 1 female, 26 June 1988; 2 males, 22 Oct. 1988; 1 male, 3 July 1988; 1 female, 14 Aug. 1988; 2 males, 1 female, 25 Sept. 1988; 1 male, 18 Aug. 1988; 1 male, 1 female, 2 Oct. 1988; 1 male, 3 Sept. 1988; 1 female, 12 June 1988; 9 males, 3 females, 18 Sept. 1988 (Malaise trap). Holotype, allotype and paratypes in the Australian Museum.

Description. FEMALE. *Colouration* (in alcohol). Head, body and legs pale creamy white with suggestion of a greyish area on either side of median epicranial suture and V-shaped mark of similar colour on frons; 2 narrow, pale brown, longitudinal bands on dorsum of thorax. Fore wings (Fig. 1) hyaline, almost colourless but with very pale brown anal cell. Hind wings hyaline. To the naked eye in life the insect appears almost white with conspicuous, dark eyes and a pair of longitudinal pale brown bands on the dorsum of the thorax.

Morphology. Length of body: 2.8 mm. Median epicranial suture distinct. Postclypeus strongly bulbous. Epicranium broadly rounded. Antennae shorter than wings. Length of flagellar segments: f1: 0.73 mm; f2: 0.62 mm. Eyes fairly large, level with vertex when viewed from side. IO/D (Badonnel): 1.0; PO: 0.72; IO/D (Pearman): 1.25. Ocelli small. Lacinia (Fig. 6). Measurements of hind leg: F: 0.67 mm; T: 1.3 mm; t1: 0.38 mm; t2: 0.11 mm; rt: 3.5:1; ct: 26,0. Each trochanter has what appears to be a group of placoid sensilla in the distal half. Fore wing length: 3.7 mm;

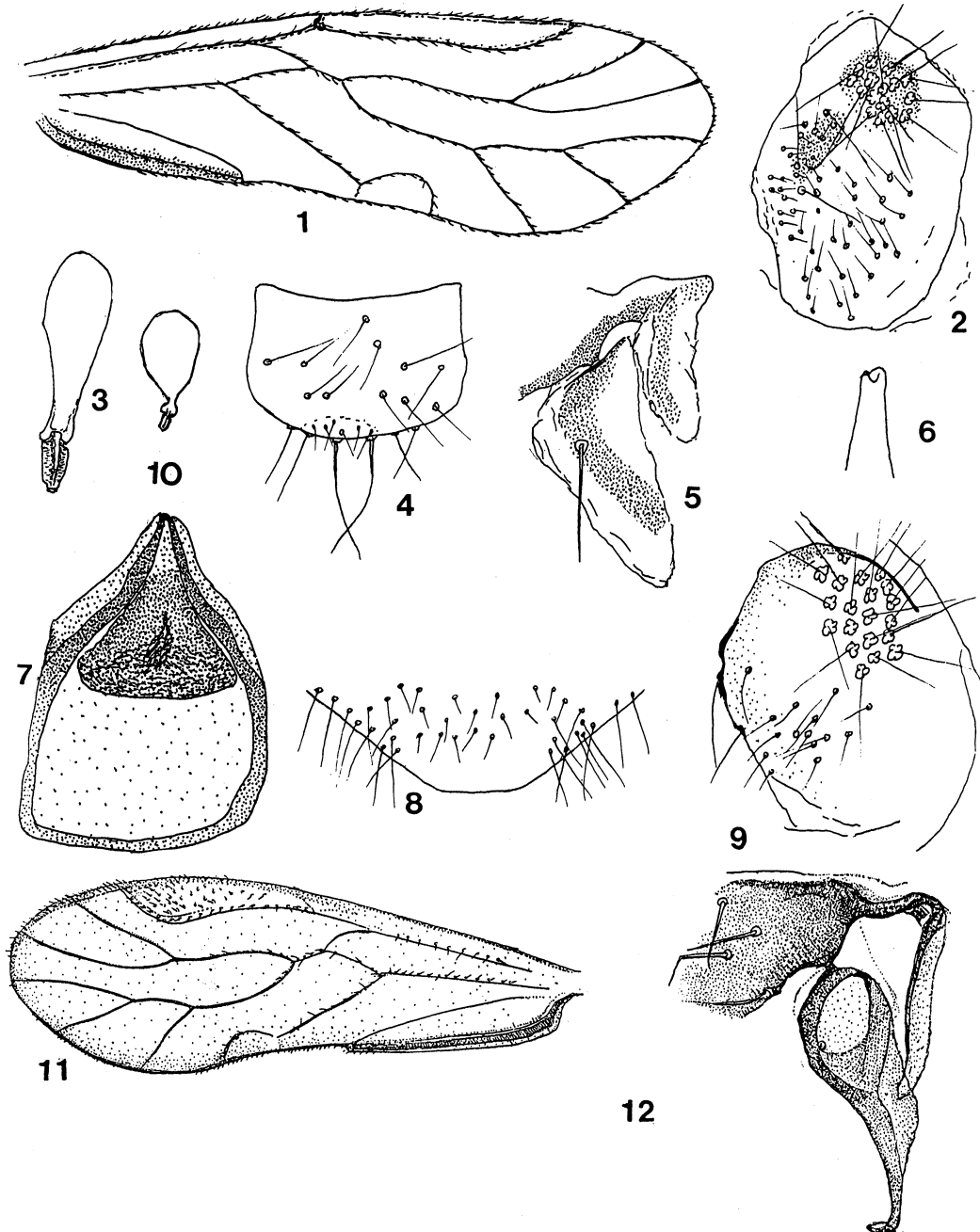


Plate 1. Figs 1-9 = *Paracaecilius lemuris* n.sp. 1 - female forewing; 2 - female paraproct; 3 - female spermatheca; 4 - female epiproct; 5 - female gonapophyses; 6 - female lacinia; 7 - male phallosome; 8 - male hypandrium; 9 - male paraproct. Figs 10-12 = *Enderleinella hylobius*. 10 - female spermatheca; 11 - female forewing; 12 - female gonapophyses.

width: 1.2 mm. Fore wings (Fig. 1) long and narrow, length:width = 3:1. Costa slightly broadened in pterostigma. Pterostigma long and narrow, with merest suggestion of widening at about distal three quarters. Rs and M fused for a length. Stem of Rs straight basad of radial fork beyond separation from M. R2+3 slightly sinuous, R4+5 running forward slightly to wing margin. Areola postica small. Veins sparsely setose, Cu2 glabrous. Hind wing long, narrow. Veins glabrous, margin setose from distal to R1 to anal area. Epiproct (Fig. 4) simple, rounded behind, setose, with 2 setae thicker than others near hind margin. Paraproct (Fig. 2). Subgenital plate rounded behind, evenly setose, without lateral styli. Spermatheca (Fig. 3) long, broadened anteriorly, with narrow neck and short glandular sheath, apparently no villiform projections in neck. Gonapophyses (Fig. 5) with ventral and dorsal valves rounded apically, membranous but with lightly sclerotised, longitudinal band, curved in case of dorsal valve. External valve represented only by a long seta arising from dorsal valve.

MALE. *Colouration* (in alcohol). As female but greyish area on top of head less obvious.

Morphology. Length of body: 2.2 mm. Median epicranial suture more distinct than in female. Vertex narrowed because of much greater eye size. Eyes very large, reaching well above vertex when viewed from side. IO/D (Badonnel): 0.31; PO : 0.84; IO/D (Pearman) : 0.36. Ocelli larger than in female. Antennae much thicker than in female, almost as long as fore wing. Length of flagellar segments: f1 : 0.70 mm; f2 : 0.72 mm. Lacinia as in female. Measurements of hind leg: F : 0.65 mm; T : 1.19 mm; t1 : 0.40 mm; t2 : 0.11 mm; rt : 3.6:1; ct : 28,0. Sensilla on trochanter as in female. Fore wing length: 4.0 mm; width: 1.5 mm. Length:width = 2.6 : 1. Venation and setae as in female. Hind wing length: 2.9 mm; width: 1.0 mm. Epiproct simple, rounded behind, sparsely setose. Paraproct (Fig. 9). Hypandrium (Fig. 8) simple, setose, longer setae near hind margin grouped towards lateral area leaving middle area almost glabrous. Phallosome (Fig. 7).

Key to Australian Species of *Enderleinella* and *Paracaecilius*

(The males of *P. hilli* and *P. globiclypeus* have not been described)

1. Lacinia with at least one side extended into pointed tooth. Slight widening of pterostigma (Fig. 11). Rs stem slightly sinuous (Fig. 11). Ventral valve of gonapophyses pointed (Fig. 12) *E. hylobius*
- Lacinia without a pointed extension at apex. Pterostigma elongated, almost parallel sided (Fig. 1). Rs stem almost straight (Fig. 1). Ventral valve of gonapophyses, broad, rounded (Fig. 5) (*Paracaecilius*) 2
2. Very pale species, almost white when alive 3
- Creamy yellow species 4
3. Ventral valve of gonapophyses hardly longer than wide. Dorsal valve short, broad (male not described) *P. hilli*
- Ventral valve elongated, parallel sided, with round end. Dorsal valve long, broad, tapering, round ended *P. lemuris*
4. Ventral valve of gonapophyses long, parallel sided, broadly rounded at end. Dorsal valve long, broad, tapering, round ended (male not described) *P. globiclypeus**
- Ventral valve long, parallel sided, rounded at end. Dorsal valve tapering to narrow end *P. zelandicus**

*(As discussed above in the introduction to this paper it is possible that *P. globiclypeus* and *P. zelandicus* are the same species and that the matter can only be resolved by examination of the type of *P. globiclypeus*).

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