

**TWO NEW AUSTRALIAN SPECIES OF *MACRUROHELEA*,  
WITH A DESCRIPTION OF THE MALE OF *M. COMMONI*  
(DIPTERA: CERATOPOGONIDAE)**

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*Abstract.* The hitherto unknown male of *Macrurohelea comuni*, reared from bracket fungus from New South Wales, Australia, is described and illustrated. Two new Australian species, *M. leei* and *M. dycei*, are described and figured.

The genus *Macrurohelea* Ingram & Macfie was previously known from 7 species, 6 of which are Neotropical (Ingram & Macfie 1931; Wirth 1965; Grogan & Wirth 1980). The 7th species, *M. comuni*, was described by Lee (1962) from New South Wales, Australia and until now was the only species known from outside the Neotropical Region. In this paper we describe and illustrate 2 additional new species from Australia and the hitherto unknown male of *M. comuni*.

Grogan & Wirth (1980) recently discussed the relationships of *Macrurohelea* within the tribe Ceratopogonini and its similarity to the northern Holarctic genus *Ceratopogon* Meigen. This similarity is based on the fact that both genera possess sensilla coeloconica on the 1st antennal flagellomere and deeply cordate 4th tarsomeres. This combination of characters is not found in any other genera within the Ceratopogonini. Both of these genera are probably plesiotypic, as their distributions are restricted to either the northern regions of the Northern Hemisphere (*Ceratopogon*) or the Southern Hemisphere (*Macrurohelea*).

For an explanation of general ceratopogonid terminology see Wirth (1952), Wirth et al. (1977), and Downes & Wirth (1981); terms dealing with the antennal sensilla follow Wirth & Navai (1978).

Holotypes and allotypes of the new species are deposited in the Australian National Insect Collection, CSIRO, Canberra (ANIC); paratypes are deposited in ANIC, the National Museum of Natural History, Washington, D.C. (USNM), and the Bernice P. Bishop Museum, Honolulu (BPBM).

KEY TO THE AUSTRALIAN SPECIES OF *MACRUROHELEA*

- |   |       |                      |
|---|-------|----------------------|
| 1. Female   | ..... | 2                    |
| Male  | ..... | 4                    |
| 2. Second radial cell of wing 2× as long as 1st; costal ratio 0.66 (Fig. 3)     | ..... | <b>dycei, n. sp.</b> |
| Second radial cell of wing 4-5× as long as 1st; costal ratio 0.76-0.80 (Fig. 1) | ..... | 3                    |

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3. Eyes separated; wing slender,  $3.2\times$  longer than broad; wing including veins pale . . . . . **leei, n. sp.**  
 Eyes contiguous; wing broader,  $2.3-2.4\times$  longer than broad; wing including veins  
 darkly infuscated . . . . . **communi**
4. Gonocoxite of genitalia with large pointed distomesal lobe (Fig. 11) . . . . . **leei, n. sp.**  
 Gonocoxite of genitalia without large pointed distomesal lobe (Fig. 17, 19) . . . . . 5
5. Aedeagus crescent-shaped; gonostylus greatly curved distally (Fig. 17) . . . . **dycei, n. sp.**  
 Aedeagus triangular; gonostylus nearly straight . . . . . **communi**

### **Macrurohelea comuni** Lee

Fig. 1-2, 18-19

*Macrurohelea comuni* Lee, 1962: 339 (♀; New South Wales; fig.).—Wirth, 1965: 48 (in key; notes).

*Diagnosis.* Distinguished from other Australian species of *Macrurohelea* by the following combination of characters: eyes contiguous; ♀ wing (Fig. 1) broad,  $2.3-2.4\times$  longer than broad, with 2nd radial cell long,  $4-5\times$  longer than 1st, costal ratio  $0.76-0.80$ ; wing surface and veins darkly infuscated; ♂ genitalia (Fig. 19) with triangular aedeagus, and gonostylus nearly straight.

♀. Wing length 1.21-1.48 mm; breadth 0.52-0.62 mm. *Head.* Brown. Eyes pubescent, contiguous, forming a V-shape where they contact. Antennal pedicel dark brown; flagellum brown, lengths of segments in proportion of 18-8-8-9-9-9-9-8-13-14-15-14-19; antennal ratio 0.96; segment 3 with 2-3 apical sensilla coeloconica. Palpus (Fig. 18) light brown; lengths of segments in proportion of 6-10-10-7-9; 3rd segment with large, well-defined pit; palpal ratio 1.67. Mandible with 7-10 large coarse teeth. *Thorax.* Brown; mesonotum with a few scattered setae and extremely fine pubescence. Legs including tarsi slightly lighter in color; femora and tibiae slender, with numerous long setae; palisade setae well developed on 1st tarsomere of fore and hind legs; 4th tarsomeres deeply cordate; claws moderately long, equal sized without basal inner teeth. Wing (Fig. 1) infuscated; broad,  $2.3-2.4\times$  longer than broad; surface covered with fine microtrichia only, a few macrotrichia on radial veins; 2 radial cells present, 2nd  $4-5\times$  longer than 1st; costal ratio  $0.76-0.80$ ; all veins dark brown, coarse, and well defined. Halter stem pale, knob darker. *Abdomen.* Brown. Tenth segment long and bent forward ventrally as typical in genus. Two spheroid, subequal spermathecae with slender, moderately long necks.

♂. Wing length 0.86 mm; breadth 0.31 mm. Smaller than ♀ and with the following differences: antenna with dense brown plume; distal 2 segments lost, lengths of segments 3-13 in proportion of 15-8-8-8-8-7-7-8-8-8-12. Femora and tibiae with shorter, coarser setae, wing (Fig. 2) more slender, 2nd radial cell  $1.25\times$  longer than 1st; costal ratio 0.60. *Genitalia* as in Fig. 19. Sternite 9  $2\times$  as broad as long, caudomedian margin extending nearly to basal arch of aedeagus; tergite 9 abruptly tapering distally to narrow truncated tip bearing 2 short setae. Gonocoxite moderately slender,  $1.8\times$  longer than broad; gonostylus 0.8 length of gonocoxite, slender, slightly tapering distally to pointed tip. Aedeagus triangular,  $1.2\times$  broader than long, basal arch 0.3 of total length; basal arm and margin heavily sclerotized, tip slightly recurved; distal portion more lightly sclerotized, tapering distally to hyaline, narrow, bifid tip. Parameres lightly sclerotized, separate; basal apodeme recurved  $90^\circ$ , winglike; distal portions nearly touching proximally, becoming curved and separated distally, with hyaline, slender, broadly divergent extensions on their tips.

*Distribution.* Australia (New South Wales; Queensland).

*Specimens examined.* AUSTRALIA. Holotype ♀, New South Wales: Clyde Mt, 2400 ft [735 m], 21.IX.1960, light trap (I.F.B. Common & M. Upton) (in Commonwealth Institute of Health, Sydney). *New records.* New

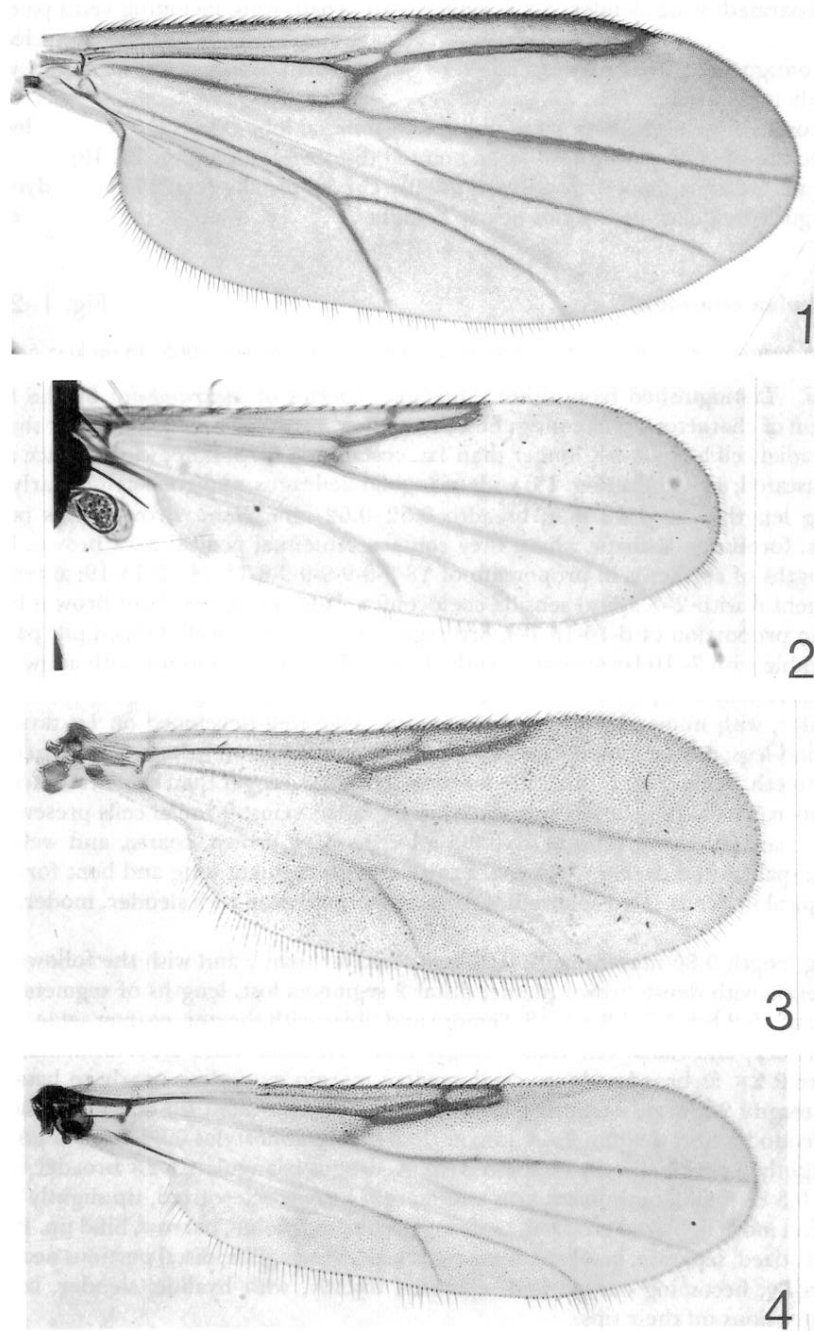


FIG. 1-4. Wings of *Macrurohelea* spp.: 1, ♀, and 2, ♂, of *M. commoni*; 3, ♀, and 4, ♂, of *M. dycei*.

South Wales: 1♂, Bruxner Park, Coff's Harbour, 1.XI.1965, light trap (Upton); 1♀, Monga (35°33'S, 149°56'E), 8.V.1968, bred from bracket fungus (D.H. Colless & Z. Liepa) (both ANIC). Queensland: 2♀, Bellenden Ker Range, TV station at summit, 17°13'S, 145°52'E, 1560 m, 17.X-5.XI.1981 (Qld. Mus. Earthwatch) (1 USNM, 1 ANIC).

*Discussion.* Lee (1962) in his original description of this species states, "Eyes rather widely spaced." However, all of the paratypes from his original series and all of the new records have contiguous eyes. Alan Dyce (in litt.) indicates that the holotype of *M. commoni* does in fact have contiguous eyes and that Lee's original description and figure are incorrect.

### **Macrurohelea leei** Grogan & Wirth, **new species**

Fig. 5-12

*Diagnosis.* Distinguished from all other Australian species of *Macrurohelea* by the following combination of characters. Eyes separated; ♀ wing (Fig. 9) slender, 3.2× longer than broad, 2nd radial cell long, 4-5× longer than 1st, costal ratio 0.78, wing surface and veins pale; ♂ genitalia (Fig. 11) with a large, pointed, distomesal lobe on the gonocoxite.

*Allotype* ♀. Wing length 1.40 mm; breadth 0.44 mm. *Head.* Brown. Eyes pubescent, separated by the diameter of 1.5 ommatidial facets, a distance of 0.015 mm. Antennal pedicel dark brown; flagellum (Fig. 5) lighter brown; lengths of flagellar segments in proportion of 15-8-8-8-8-7-11-12-13-14-19; antennal ratio 0.99; 3rd segment with 4-5 apical sensilla coeloconica. Palpus (Fig. 7) light brown; lengths of segments in proportion of 5-12-12-6-11; 3rd segment slender, without sensory pit but bearing 2 capitate sensilla that arise from a shallow depression; palpal ratio 2.00. Mandible with 8-10 small, coarse teeth. *Thorax.* Dark brown; mesonotum with numerous long setae and sparse fine pubescence. Legs pale brown except for mid and hind femora which are darker brown; femora and tibiae with long bristly setae; tarsi pale on proximal 3 tarsomeres, distal 2 brownish; 4th tarsomeres deeply cordate; claws small, equal sized, without basal inner teeth, and about as strong as those of *M. commoni*. Wing (Fig. 9) hyaline, covered with fine microtrichia, macrotrichia absent except for a few on proximal portion of radial vein; 2 radial cells present, 2nd 4-5× longer than 1st; costal ratio 0.78; all veins pale but well defined. Halter pale. *Abdomen.* Yellowish, but darker in both paratypes. Genitalia as in Fig. 12. Sternite 8 hyaline, convex posteriorly; sternite 9 difficult to observe but with slender pale halves; segment 10 long and bent forward ventrally as typical in the genus. Two spheroid, subequal spermathecae with short conical necks.

*Holotype* ♂. Wing length 0.99 mm; breadth 0.35 mm. Similar to allotype ♀ but smaller. *Head.* Brown. Eyes pubescent, separated by a distance of 0.03 mm, about equal to 2 ommatidial facets. Antennal pedicel dark brown; flagellum (Fig. 6) dark brown, plume extending to middle of 12th segment; 1st flagellar segment with 2 sensilla coeloconica, lengths of flagellar segments in proportion of 29-13-13-13-13-13-13-14-16-24-20-24; antennal ratio (13-15/3-12) 0.45. Palpus (Fig. 8) with lengths of segments in proportion of 6-9-14-7-14; palpal ratio 2.80. *Thorax.* Dark brown; mesonotum covered with scattered long setae and extremely fine, sparse pubescence; scutellum with 4 large setae and 5 smaller setae interspersed between the larger ones. Legs including tarsi light brown; femora and tibiae with moderately long setae; palisade setae well developed on 1st tarsomere of mid and hind legs; 4th tarsomeres deeply cordate; claws small, simple with bent tips. Wing (Fig. 10) lightly infuscated, veins light brown; venation as figured, 2 radial cells present, 2nd 2× as long as 1st; costal ratio 0.67. Halter pale. *Abdomen.* Dark brown. Genitalia as in Fig. 11. Sternite 9 pubescent, 2× as broad as long, posterior margin rounded, extending nearly to aedeagus; tergite 9 gradually tapering distally to narrow, nearly truncate tip bearing 2 small setae, 2 small apicolateral processes arising subapically to

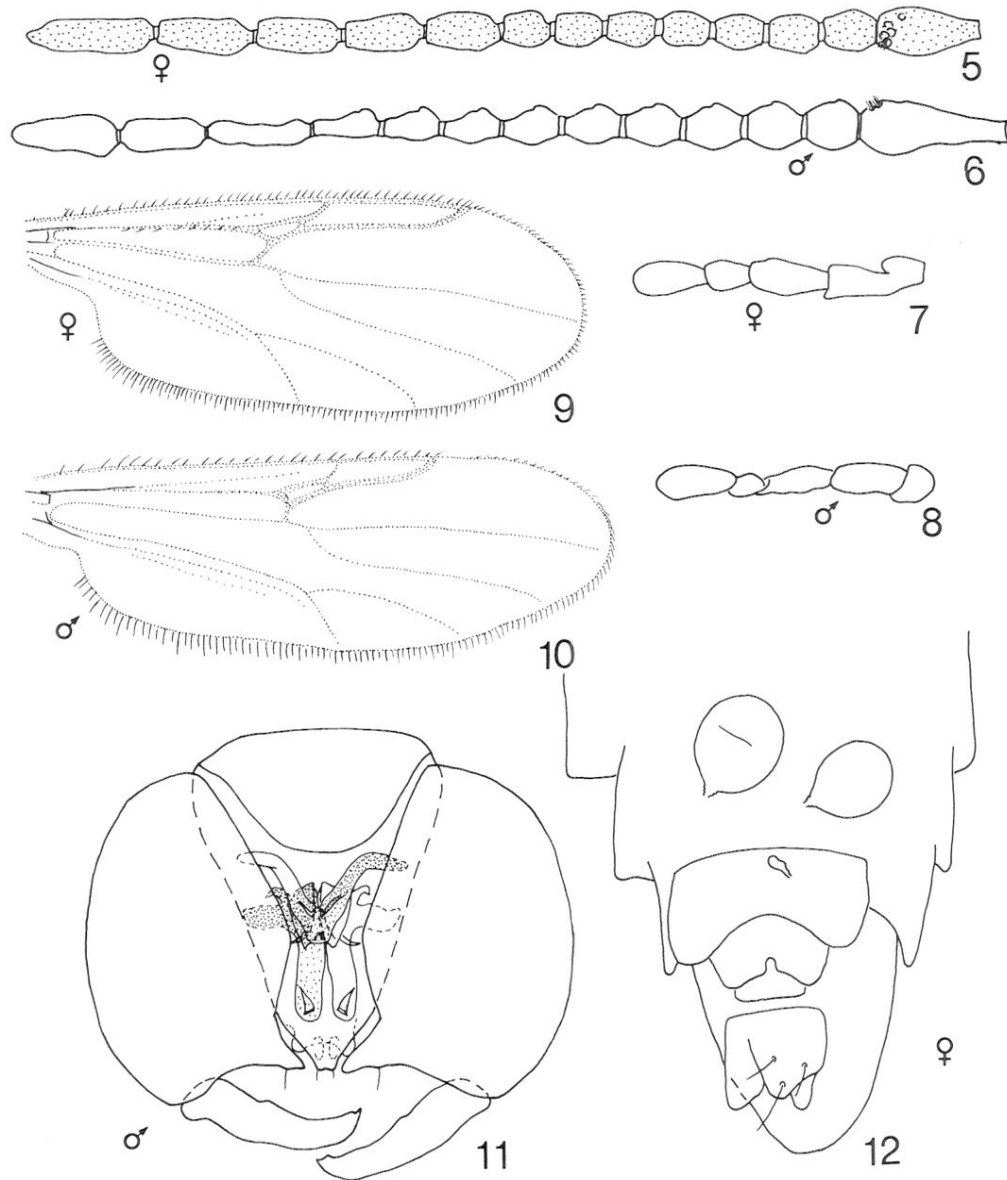


FIG. 5-12. *Macrurohelea leei*: 5-6, antenna; 7-8, palpus; 9-10, wing; 11, genitalia; 12, terminal segments and spermathecae, ventral view.

tip. Gonocoxite large and bulbous,  $1.45 \times$  longer than broad, with a large, pointed, distomesal lobe; gonostylus 0.58 the length of gonocoxite. Aedeagus heavily sclerotized; basal arms recurved about  $60^\circ$ ; distal portion with narrow truncate tip. Parameres divided; basal portion with 3 lateral extensions; distal portion lightly sclerotized, slender, with very lightly sclerotized,

slender, pointed processes extending from tips, which are depressed but extended in the paratype from Tully Falls.

*Distribution.* Australia (Queensland).

*Types.* Holotype ♂, allotype ♀, AUSTRALIA: N Queensland, Bellenden Ker Range, Cable Tower, 1054 m, 17.X–5.XI.1981, malaise trap (Qld. Mus. Earthwatch) (ANIC). Paratypes, 3♂, 2♀, as follows: 1♀, same data as types; 2♂, 1♀, same data except at TV station at summit, 1560 m (1♂, 1♀ USNM; rest in ANIC); 1♂, Tully Falls, 10.III.1956, light trap (J.L. Gressitt) (BPBM).

*Discussion.* This species is named for David J. Lee, who described the 1st known Australian species of *Macrurohelea*, in recognition of his contributions to our knowledge of the Australasian Ceratopogonidae.

Based on the similar female wings and male genitalia, *Macrurohelea leei* is apparently more closely related to *M. comuni* than to *M. dycei*, n. sp. *Macrurohelea comuni* is easily distinguished from *M. leei* because it has contiguous eyes, while those of *M. leei* are separated.

### **Macrurohelea dycei** Grogan & Wirth, new species

Fig. 3–4, 13–17, 20

*Diagnosis.* Distinguished from other Australian species of *Macrurohelea* by the following combination of characters: ♀ wing (Fig. 3) with 2nd radial cell 2× as long as 1st, costa extending 0.66 of wing length; ♂ genitalia (Fig. 17) with crescent-shaped aedeagus bearing apicolateral extensions, and gonostylus greatly curved distally.

*Holotype* ♀. Wing length 0.90 mm; breadth 0.38 mm. *Head.* Eyes pubescent, separated by a distance of 0.014 mm, about equal to 1.5 ommatidial facets. Antennal pedicel dark brown; flagellum (Fig. 13) pale on 1st flagellomere and proximal ¾ of flagellomeres 2–8, light brown on distal ¼ of 2–8 and all of 9–13; 1st flagellomere with 3–4 apical sensilla coeloconica in a row; flagellomeres with lengths in proportion of 13-8-8-9-8-8-8-8-10-11-10-11-16; antennal ratio 0.83; 1st flagellomere with 4–5 apical sensilla coeloconica. Palpus (Fig. 15) pale; lengths of segments in proportion of 3-6-6-5-6; 3rd segment with small shallow pit bearing a few capitate sensilla; palpal ratio 1.50. Mandible with 8–9 rather small teeth. *Thorax.* Dark brown; mesonotum with a few scattered coarse setae and dense, long pubescence. Legs with femora light brown, tibiae and tarsi pale; femora and tibiae with scattered, sparse, weak setae; palisade setae well developed on 1st tarsomeres of fore and mid legs; 4th tarsomeres deeply cordate; claws small, equal sized, without basal inner teeth, and much smaller and weaker than those of *M. comuni*. Wing (Fig. 3) lightly infuscated, covered with rather coarse microtrichia, macrotrichia absent; 2 radial cells present, 2nd 2× as long as 1st; costal ratio 0.66; all veins brown, well defined but not so strong as in *M. comuni* (Fig. 1). Halter pale. *Abdomen.* Dark brown, intersegmental areas pale; interior with well-developed eggs, a typical egg measuring 0.20 by 0.03 mm. Fig. 20 presents a lateral view of genitalia and spermathecae, illustrating 10th segment bent forward and ventrally as is typical for the genus. Spermathecae pyriform, equal sized, with moderately long, abruptly tapering necks; spermatheca not partially collapsed, measuring 0.070 by 0.040 mm.

*Allotype* ♂. Wing length 0.88 mm; breadth 0.29 mm. Similar to ♀ holotype with the following differences: antenna with dense brownish plume; flagellum (Fig. 14) brown; lengths of segments in proportion of 22-9-9-9-9-9-9-9-10-11-12-14-17; antennal ratio 0.43. Palpus (Fig. 16) with slightly more slender 3rd segment; palpal ratio 1.71. Legs slightly more slender, but coloration,

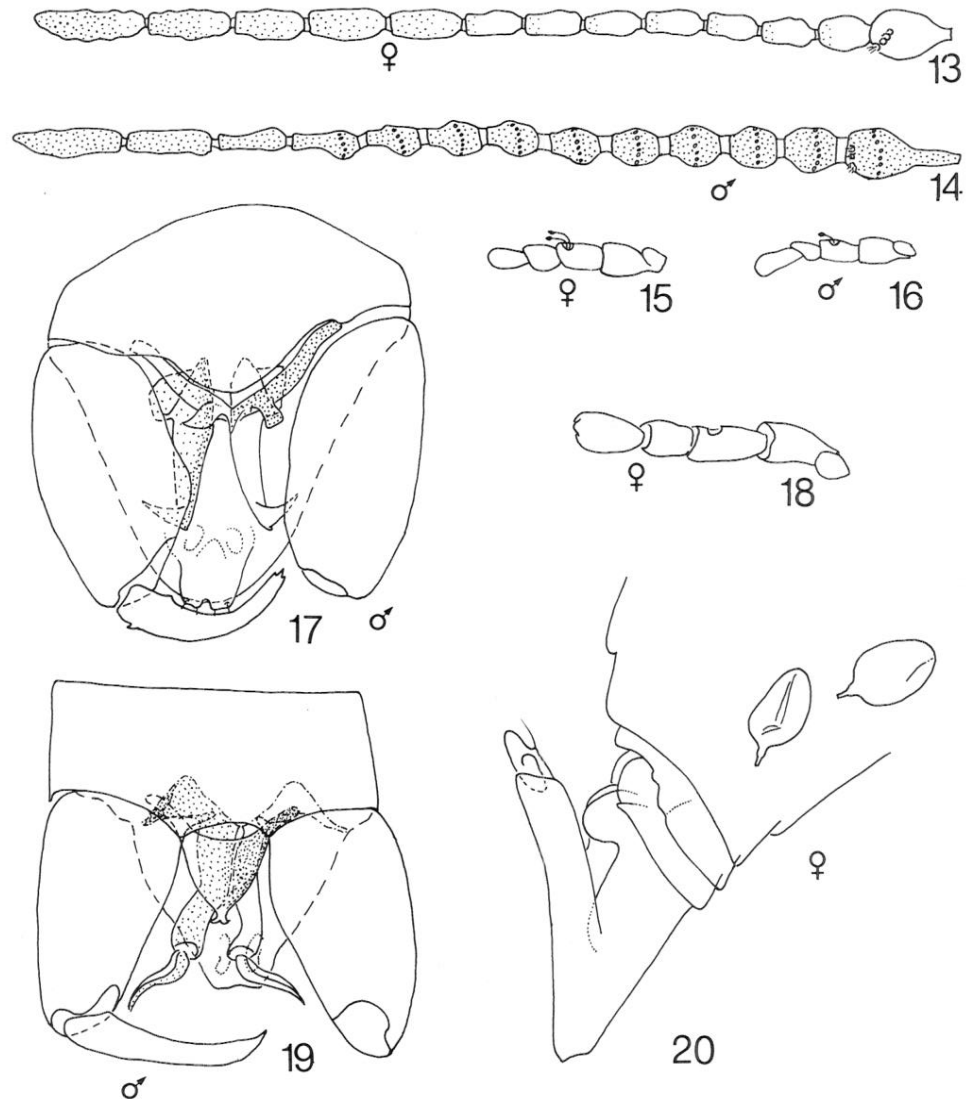


FIG. 13-20. *Macrurohelea* spp.: 13-17, 20, *M. dycei*; 18-19, *M. commoni*. 13-14, antenna; 15-16, 18, palpus; 17, 19, genitalia; 20, terminal abdominal segments and spermathecae, lateral view.

setation and other characters very similar to ♀; claws with bifid tips. Wing (Fig. 4) more slender than in ♀; 2nd radial cell slightly shorter than 1st; costal ratio 0.59. Genitalia as in Fig. 17. Sternite 9 2 × as broad as long, caudomedian portion extending nearly to basal arch of aedeagus; tergite 9 gradually tapering distally to broadly rounded tip, 2 slender apicolateral processes extending just beyond margin of tergite, each bearing 2 very small setae. Gonocoxite 2 × as long as broad; gonostylus 0.65 length of gonocoxite, greatly curved and gradually tapering distally to broad trifid tip. Aedeagus heavily sclerotized, crescent-shaped; basal arm only slightly recurved; distal portion with apicolateral extensions and pointed tip. Parameres separated,

each heavily sclerotized mesally, more lightly sclerotized laterally; basal apodeme broad, truncate; distal portion slender, tapering distally with divergent subapical ventral extensions.

*Distribution.* Australia (New South Wales, Queensland).

*Types.* Holotype ♀, allotype ♂, 1♀ paratype, AUSTRALIA: New South Wales, Bruxner Park, Coff's Harbour, 11.I.1965, light trap (M. Upton) (holotype and allotype ANIC; paratype USNM). Additional paratypes, Queensland: 2♂, 3♀, Bellenden Ker Range, Cable Tower, 1054 m, 17.X-5.XI.1981, malaise trap (Qld. Mus. Earthwatch) (1♂, 1♀ USNM; rest ANIC).

*Discussion.* This species is named in honor of Alan L. Dyce of McMaster Laboratory, CSIRO, Sydney, in recognition of his contributions to the study of Australasian Ceratopogonidae.

*Macrurohelea commoni* is closely related to *M. dycei*, but in females of the former the 2nd radial cell is 4–5× longer than the 1st, the costal ratio is 0.76–0.80, and in the male the aedeagus is triangular and the gonostylus is nearly straight.

*Acknowledgments.* We are very much indebted to Ethel L. Grogan for preparing the drawings. We also wish to thank Alan L. Dyce, McMaster Laboratory, CSIRO, Sydney, Australia, for making available to us the specimens from the Australian National Insect Collection, for examining the holotype of *M. commoni* for us, and for the wing photographs prepared by Ian Roper of the same laboratory.

#### LITERATURE CITED

- Downes, J.A. & W.W. Wirth. 1981. Chapter 28. Ceratopogonidae, p. 393–421. In: McAlpine, J.F. et al., eds., Manual of Nearctic Diptera. Vol. 1, *Agric. Can. Monogr.* **27**: 674 p.
- Grogan, W.L., Jr & W.W. Wirth. 1980. Two new species of *Macrurohelea* from Chile with a key to the Neotropical species (Diptera: Ceratopogonidae). *Pan-Pac. Entomol.* **56**: 137–43.
- Ingram, A. & J.W.S. Macfie. 1931. Ceratopogonidae, p. 155–232. *Diptera of Patagonia and South Chile, Part II, Fasc. 4*.
- Lee, D.J. 1962. Australasian Ceratopogonidae (Diptera, Nematocera). Part IX. The genus *Macrurohelea*. *Proc. Linn. Soc. N.S.W.* **87**: 339–40.
- Wirth, W.W. 1952. The Heleidae of California. *Univ. Calif. Publ. Entomol.* **9**: 95–266.
1965. Two new species of *Macrurohelea* from Chile (Diptera: Ceratopogonidae). *Pan-Pac. Entomol.* **41**: 46–50.
- Wirth, W.W. & S. Navai. 1978. Terminology of some antennal sensory organs of *Culicoides* biting midges (Diptera: Ceratopogonidae). *J. Med. Entomol.* **15**: 43–49.
- Wirth, W.W., N.C. Ratanaworabhan & D.H. Messersmith. 1977. Natural history of Plummers Island, Maryland. XXII. Biting midges (Diptera: Ceratopogonidae). 1. Introduction and key to genera. *Proc. Biol. Soc. Wash.* **90**: 615–47.