

THE GENUS *PARADASYHELEA* MACFIE, WITH
DESCRIPTIONS OF TWO NEW SPECIES FROM
EASTERN AUSTRALIA (DIPTERA:
CERATOPOGONIDAE)

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The only previously known species of *Paradasyhelea* was recognized by Macfie in 1940 from Patagonia. Recent collecting in Australia has revealed two additional species which are herein described as new. A search of the literature has added a fourth species to the list, namely, *Dasyhelea egregia* Macfie (1932) from New Zealand.

Macfie (1940, *Ann. Trop. Med. Parasit.*, **34**: 17) erected the genus *Paradasyhelea* with *Dasyhelea brevipalpis* Ingram and Macfie as type, differentiating the genus from *Dasyhelea* on the characters "antennal segments not sculptured, 12-14 in male not binodose". In the original description of *brevipalpis* from Patagonia, Ingram and Macfie (1931, *Diptera of Patagonia and South Chile*, part II, fasc. 4, p. 178) point out a number of characters by which this species differs from *Dasyhelea*, and some in which it closely resembles the genus *Forcipomyia*. In searching the literature we find one other species which must be included in *Paradasyhelea*; this is *Dasyhelea egregia* Macfie 1932 from New Zealand. Both species are known only from males. We take this opportunity to describe two additional species which we have collected in New South Wales, and to offer additional characters of the genus including those of the female and of the pupa.

Genus *Paradasyhelea* Macfie

Male, female. Eyes widely separated above, finely but densely hairy all over. Clypeus with numerous long hairs. Proboscis very short, about half as long as height of a compound eye, mouth parts vestigial. Palpus four-segmented, the antepenultimate segment without a true sensory pit but with a cluster of long modified sensory hairs on distal third. Antenna fifteen-segmented. Female with first segment well-developed, in head capsule, with a

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row of long hairs, second large and globular, third to fifteenth similar in shape and bristling, no great change between ten and eleven, each with basal whorl of verticils, five distal segments with scattered, long, peg-like sensoria, some of segments three to ten with very small, distal sensory pits surrounded by fine hairs. Male antenna with well-developed plume, segments neither binodose nor sculptured. Humeral pits on mesonotum well-developed; scutellum with numerous long hairs. Legs slender, without spines; hind tibia with oblique comb of four spines; hind basitarsus 1.3–1.9 times as long as second tarsal segment, fourth cylindrical, fifth without spines; claws small, equal, tips bifid in male; empodium minute, hair-like. Wing with costa short, not quite reaching middle of wing; both radial cells completely obliterated, radius appearing as a single straight vein in line with the oblique r-m cross vein; medial fork with long petiole; intercalary fork well-developed; anal angle very obtuse; microtrichia erect and minute, macrotrichia long and curved, abundant, and covering entire wing as in *Forcipomyia*; fringe well-developed, composed of a row of long straight hairs between two rows of shorter oblique hairs; alula with fringe. One sclerotized female spermatheca. Male genitalia with ninth sternum excavated posteriorly; ninth tergum well-developed with strong apicolateral processes; basistyles and dististyles of usual form; aedeagus with well-developed basal arch and slender median distal portion; parameres a narrow sclerotized band connecting ventral roots of basistyles, broken in mesal portion into a U-shaped or Y-shaped sclerite projecting cephalad.

Pupa. Elongate conical as in *Culicoides* and *Dasyhelea*, larval exuviae not attached, prothoracic respiratory organ a stalked, flattened horn about 5.5–7.5 times as long as broad, transversely wrinkled in mid-portion and bearing several dorsal papillae and a marginal row of papillae around apex. Metathorax almost completely divided in mid-dorsal line; anterodorsal, dorsolateral and dorsal tubercles (nomenclature of Carter, Ingram & Macfie, 1920, *Ann. Trop. Med. Parasit.*, **14**: 211–274; Lawson, 1951, *Trans. R. Ent. Soc. London*, **102**: 511–574) of cephalothorax large with well-developed spines; operculum with sparse granulations. Abdominal tubercles as in *Culicoides*, each with fine median hair; apicolateral processes of last abdominal segment directed at about 60 (*minuta*) to 90 (*albipunctata*) degrees to main body axis, short, and ending distally in a blade-like spine flattened perpendicularly to body axis; no bristle-bearing tubercle present on last segment as in *Dasyhelea*.

Discussion. All the known species are small brown midges well clothed with light and dark brown hairs, in one species with a

distinct marking of white hairs forming a spot over the end of the costa on the anterior wing margin. Specific characters are found in the color and pruinosity of the thorax, presence of wing marking, relative length of the first and second hind tarsal segments, relative length of the antennal segments, size and shape of the female spermatheca, details of the male genitalia and coloration of the pupal respiratory organ.

Paradasyhelea resembles: (a) *Forcipomyia* in the vestiture of the wings, oblique r-m cross vein, hairy scutellum, broadly separated eyes, tarsal ratio (hind T_1/T_2) less than 2, presence of scattered, slender, hyaline sensory pegs on antenna, and structure of male gonostyles and parameres; (b) *Dasyhelea* in the four-segmented palpus, hairy eyes, short proboscis with rudimentary mouth parts, basal verticils present on all of segments three to fifteen, male antenna with last four segments elongated, vestigial empodium, and the shape of apicolateral processes of male genitalia; (c) *Culicoides* in the presence of well-developed humeral pits, presence of distal, minute sensory pits bordered by fine setae on certain antennal segments, distal antennal segment without terminal nipple, and Y-shaped aedeagus.

Paradasyhelea is unique in having both radial cells obliterated with costa extending less than half way to wing tip.

***Paradasyhelea albipunctata* Wirth and Lee, n. sp.**
(Plate I)

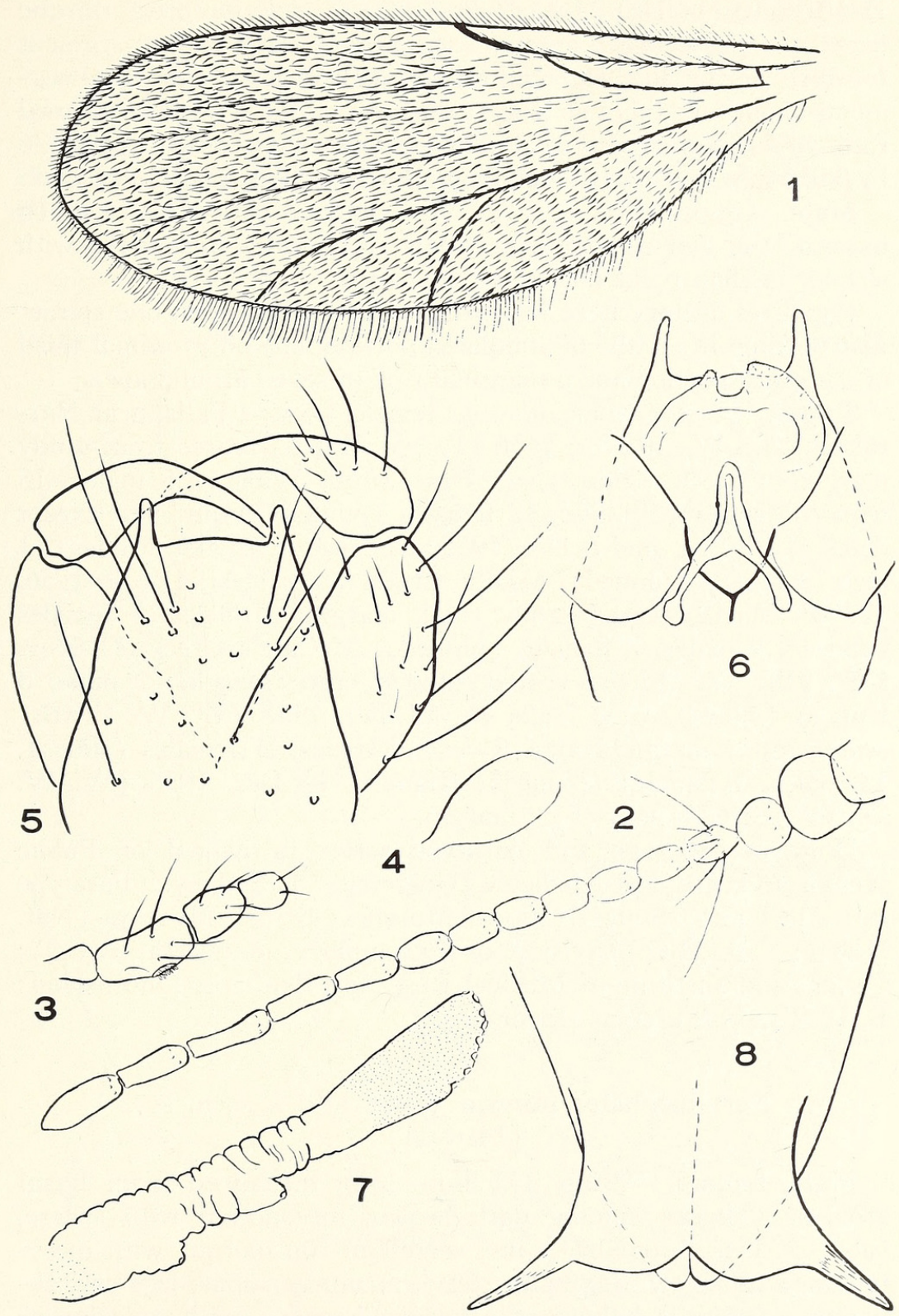
Male, female. Wing 0.98 mm. long, measured from basal arculus. Thorax dull brownish black. Mesonotal integument with dense, dull, bluish green pruinosity, with vestiture of numerous semi-erect, short, yellowish hairs and a few erect, long, blackish hairs. Scutellum pruinose brownish with about eight long black hairs on margin. Postscutellum and pleuron brownish black. Abdomen blackish. Head, antenna, palpus and legs brownish. Halter yellowish brown. Wing with vestiture of dark greyish hairs, a small costal spot over end of radius whitish.

EXPLANATION OF PLATE I

Paradasyhelea albipunctata, n. sp. Fig. 1. Wing (female). Fig. 2. Antenna (female). Fig. 3. Palpus (female). Fig. 4. Spermatheca. Fig. 5. Male genitalia (dorsal). Fig. 6. Male genitalia (ventral). Fig. 7. Pupal respiratory horn. Fig. 8. Terminal segment of pupa.

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PLATE I



Female. Antenna with flagellar segments in proportion of 15-10-10-10-11-11-11-11-13-16-20-18-20, a definite break in the flagellar series between antennal segments ten and eleven, segment fourteen shorter than the ones on each side; verticils on distal segments about four times as long as diameter of the segments. Tarsal ratio 1.8. Spermatheca small, elongate, pyriform, measuring 0.026 by 0.013 mm., the length including a long, slender, sclerotized neck.

Male. Genitalia as figured. Apicolateral processes of ninth tergum long and slender and widely separated. Parameres with slender median point projecting cephalad.

Pupal respiratory horn blackish on distal third, with one spiracular opening in middle of annulated portion, one on proximal third of darkened portion and a marginal row of seven around apex.

Types. *holotype* male, *allotype* female, Oxford Falls, near Narrabeen, N.S.W., 10 Nov. 1956 (W. W. Wirth) reared from sandy margin of creek. *Paratypes*: New South Wales: 25 males, 15 females (slides), 9 males, 18 females (pinned), same data except dates 1, 10 Nov. and 6 Dec. 1956; 6 males, 4 females (slides), 1 male, 1 female (pinned), Middle Creek, Narrabeen, 4 Nov. 1956, W. W. Wirth, reared sandy creek margin; 7 males, 7 females (slides), 9 males, 7 females (pinned), McCarr's Creek, 11 Nov. 1956 (W. W. Wirth) reared, muddy creek margin; 1 male, 3 females (slides), Colo Vale, 16, 17 Jan. 1957 (W. W. Wirth) reared sandy margin Nattai River; 35 males, 17 females (slides), 13 males, 5 females (pinned), Kiandra, 19 Dec. 1956 (W. W. Wirth) reared mucky creek margin.

Holotype, allotype and paratype series in School of Public Health and Tropical Medicine, University of Sydney. Paratype series in United States National Museum; British Museum (Nat. Hist.); C.S.I.R.O. Division of Entomology, Canberra, A.C.T.; Queensland Institute of Medical Research, Brisbane, Queensland; B. P. Bishop Museum, Honolulu.

***Paradasyhelea minuta* Wirth and Lee, n. sp.**

(Plate II)

Male, female. Wing 0.75 mm. long measured from basal arculus. Thorax shining dark brown, mesonotum with sparse, suberect, long, brownish hairs; scutellum concolorous with mesonotum, with a few long hairs; head, antenna, palpus, legs and abdomen brownish; haltere pale brownish; wing with unicolorous vestiture of dark greyish hairs.

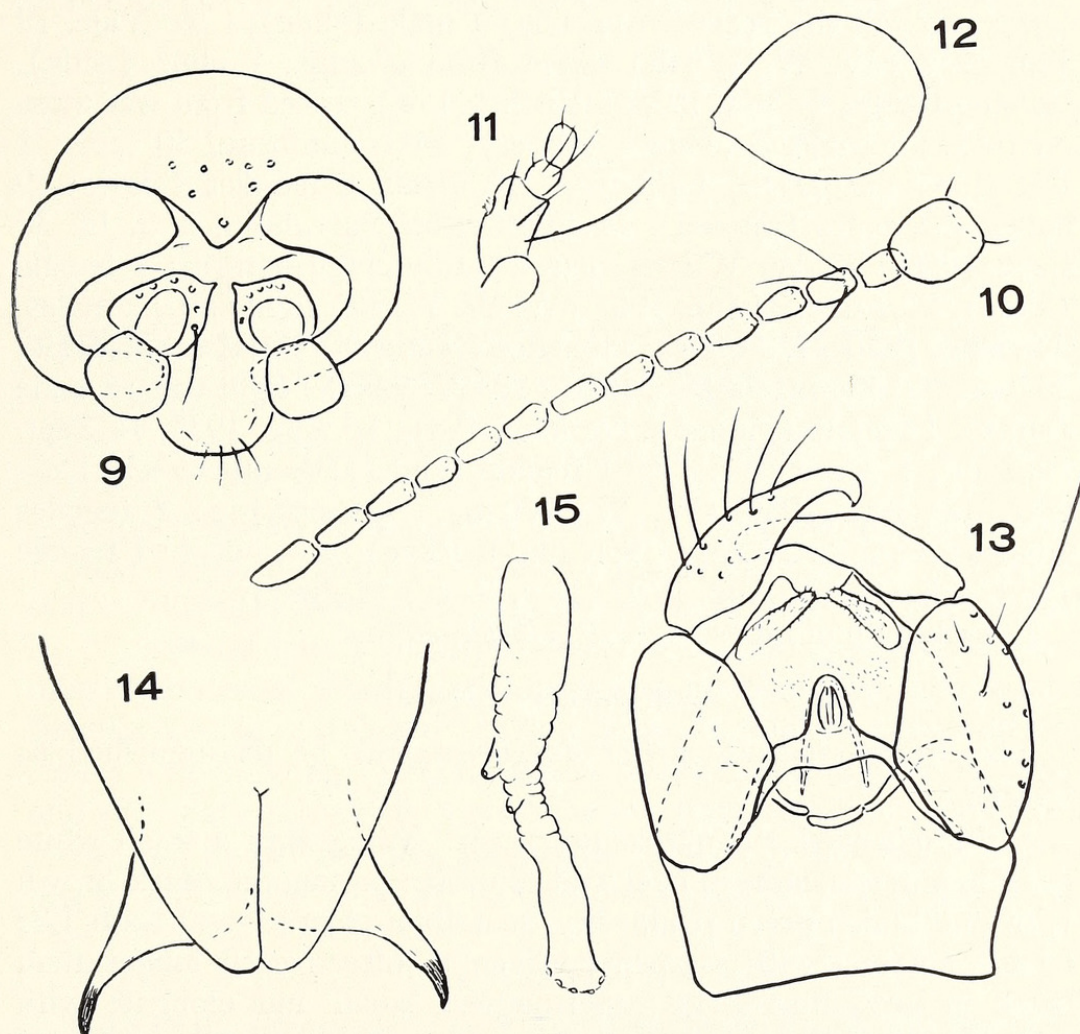
Female antenna with flagellar segments in proportion of 10-10-

10-10-10-10-10-10-10-10-10-16, no break in relative lengths between antennal segments ten and eleven, verticils on distal segments about twice as long as diameter of segment; spermatheca large and slightly ovoid, measuring 0.026 by 0.021 mm., without sclerotized neck.

Male genitalia as figured, apicolateral processes of ninth tergum short, blunt and closely approximated, median sclerite of parameres on arcuate transverse bar.

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PLATE II



EXPLANATION OF PLATE II

Paradasyhelea minuta, n. sp. Fig. 9. Head (female). Fig. 10. Antenna (female). Fig. 11. Palpus (female). Fig. 12. Spermatheca. Fig. 13. Male genitalia. Fig. 14. Terminal segment of pupa. Fig. 15. Pupal respiratory horn.

Pupal respiratory horn yellowish to apex, with two widely separated spiracular openings, each situated on a prominence on dorsal margin basal to annulate portion, and a marginal row of about six around apex.

Types. *holotype* male, *allotype* female, Hornsby, N.S.W., 31 Oct. 1956, D. J. Lee, light trap. *Paratypes*: New South Wales: 22 males, 5 females (slides), 8 males, 5 females (pinned), same data as type except dates, 10 Apr., 18 Sept., 25, 26, 31 Oct. 1956, 8 Jan. 1957; 2 males, 2 females (slides), 25 females (pinned), Careel Bay, 20, 27 Sept., 25 Oct., 3 Nov. 1956 (W. W. Wirth) light trap; 1 male, 1 female (slides) Colo Vale, 17 Oct. 1956 (A. Dyce) reared, loamy creek margin; 1 male (slide), Colo Vale, 16 Oct. 1956 (Lee, Dyce, and Wirth) reared from bog; 1 male (slide), Colo Vale, 19 Jan. 1957 (W. W. Wirth) swept from swamp; 1 male (slide), Galston Gorge, 6 Sept. 1956 (Wirth & Lee) reared from wet moss on rocks; 1 male, 3 females (slides), Merricumbene, 30 Nov., 1 Dec. 1954 (A. Dyce) light trap; 10 males, 6 females (slides), 9 males, 7 females (pinned), Middle Creek, Narrabeen, 8, 9, 12, 30 Sept. 1956 (W. W. Wirth) reared sandy creek margin; 1 female (slide), Mosman, 24 Jan. 1957 (W. W. Wirth) light trap; 2 males, 5 females (slides), 2 males, 5 females (pinned), Narrabeen, 6 Sept., 26 Oct., 9, 10 Nov., 13 Dec. 1956 (W. W. Wirth) light trap; 1 male (slide), 1 female (pinned), National Park, 16 Aug. 1953, 14 Sept. 1952 (E. J. Reye) 3 males, 1 female (slides), South Creek, Dee-why, 15 Sept. 1956 (W. W. Wirth). Queensland: 2 females (slides), Gingin, 23 Aug. 1956 (E. J. Reye) on window; 1 female (slide), Noosa, 21 Aug. 1956 (E. J. Reye) at window.

Distribution of types as for *P. albipunctata*.

Comparative Notes

The known species of *Paradasyhelea* may be distinguished as follows:

1. *Paradasyhelea albipunctata*, n. sp. Wing with a small white spot on anterior margin over end of costa; mesonotum dark brown with dull bluish green pruinosity, scutellum paler; tarsal ratio 1.8; female antenna with segments eleven to fifteen each longer than those in preceding series; spermatheca small and elongate with sclerotized neck, male genitalia with long, slender apicolateral processes, median sclerite of parameres Y-shaped; pupa with apex of respiratory horn blackish.

2. *Paradasyhelea minuta*, n. sp. Wing unmarked; mesonotum and scutellum shining dark brown; tarsal ratio 1.7–2.0; female antennal segments in continuous series from three to fourteen;



Wirth, Willis Wagner and Lee, David J. 1959. "The genus *Paradasyhelea* Macfie, with descriptions of two new species from eastern Australia (Diptera: Ceratopogonidae)." *Bulletin of the Brooklyn Entomological Society* 54, 114–321.

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