

Review of the Australian Signal Flies of the Genus *Microepicausta* (Diptera: Platystomatidae)

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ABSTRACT. Three Australian species of the platystomatid genus *Microepicausta* Hendel, 1914, are identified and keyed. Available information on their distribution and habitat is recorded. *Elassogaster terrae-reginae* Malloch, 1928, is a new junior synonym of *Microepicausta gracilis* Hendel, 1914. The following Australian species are described: *Microepicausta fenestra* sp. nov., *Microepicausta wirthi* sp. nov.

Introduction

In listing material, the following collectors' names are abbreviated to the initials: R. A. Barrett, A. Daniels, G. Daniels, R. Eastwood, G. F. Hill, Z. Liepa, D. K. McAlpine, R. Meier, K. R. Norris, J. Walsh, T. A. Weir.

The following abbreviations refer to institutions holding collections:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, CSIRO, Canberra
MNM	Hungarian Natural History Museum, Budapest
QM	Queensland Museum, Brisbane
SPHTM	School of Public Health and Tropical Medicine (platystomatid collection now transferred to AM)
USNM	National Museum of Natural History, Washington

Morphological terminology here used follows that of McAlpine (1973).

Systematics

Genus *Microepicausta* Hendel

Microepicausta Hendel, 1914a: 52–54. Type species (original designation) *M. gracilis* Hendel.

Description and delimitation. See Hendel (1914a) and further notes by McAlpine (2001: 152). The genus should be identifiable from the key to platystomatid genera in McAlpine (2001: 121–130). The species superficially resemble those of *Plagiostenopterina* Hendel and *Elassogaster* Bigot, but the males have a single hollow terminal filament on the aedeagus, while apparently all related genera have two (rarely three) terminal filaments, each with apical gonopore.

Evenhuis (1989:493) listed six Australasian species of *Microepicausta*. His two included Australian species, *M. gracilis* Hendel and *M. terraereginae* (Malloch) are now considered to be synonyms, and *M. evitta* (Malloch) from the Bismarck Archipelago is now placed in the genus *Par* McAlpine, 2001. The known Australian species, treated below, live on the northern and eastern Australian coasts as far south as Tasmania, with one record for coastal South Australia. Other species that I have seen range from West New Guinea to New Ireland and the Solomon Archipelago.

Keywords: *Microepicausta*; Platystomatidae; Diptera; taxonomy

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Habitat. In temperate eastern Australia, the two represented species, *Microepicausta gracilis* Hendel and *M. wirthi* sp. nov. are restricted to areas near the coast with a sandy substrate. *Microepicausta wirthi* is particularly restricted to the immediate vicinity of the shoreline on dunes and the

landward borders of beaches. The flies have commonly been found on the native grass *Spinifex sericeus*, which is one of the most conspicuous plants in this habitat. Though the larvae of *Microepicausta* spp. are not yet known, I suspect that those of *M. wirthi* may be associated with the rhizomes or root systems of this plant.

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Figures 1, 2. *Microepicausta gracilis* Hendel, male, Bronte, NSW. (1) Head and part of thorax. (2) Right wing.

Key to Australian species of *Microepicausta*

- 1 Prelabrum small and receding; mesoscutum extensively whitish-pruinose, with limited black markings or none (Figs 8, 9); major bristles of head and thorax pale yellowish *M. wirthi* sp. nov.
- Prelabrum well developed; mesoscutum largely black with median grey-pruinose stripe; major bristles of head and thorax black 2
- 2 Second basal cell and basal half of first basal cell largely bare; mesopleuron with small zone behind anterior spiracle smooth, without setulae; male: aedeagus with functional terminal filament not over 3× as long as glans and with secondary terminal process (Fig. 7, *tp*); female: aculeus of postabdomen narrowly rounded apically; northern Australia *M. fenestra* sp. nov.
- First and second basal cells almost entirely microtrichose; mesopleuron anterodorsally with extensive zone of numerous fine setulae reaching approximately to anterior spiracle; male: aedeagus with terminal filament more than 6× as long as glans, without secondary process (Fig. 3); female: aculeus tapering to narrow, sharp apex; eastern Australia *M. gracilis* Hendel

Microepicausta gracilis Hendel

Figs 1–3

Microepicausta gracilis Hendel, 1914a: 54, pl. 5, figs 101, 102 (no specific description); 1914b: 85–86 (description).
Elassogaster terrae-reginae Malloch, 1928: 352–353;
 Malloch, 1931: 22, **syn. nov.**

Type material. I made the following notes on type material of *M. gracilis* in MNM, Budapest, in April 1973: holotype ♀, i.e. specimen of which both head and wing were figured [Hendel, 1914a, pl. 5, figs 101, 102], Australia, L. Biró 1900, Sydney Botany B. Second specimen ♀, same data, is not a type, though labelled as such. Third specimen of series, also labelled “type” is a small ♀ of *Rhytidortalis rugifrons*. I have labelled it so, but the species is now provisionally given as *Duomyia rugifrons* (Thomson) according to McAlpine (2000).

Types of *E. terrae-reginae*: holotype ♂, Queensland: Townsville, 1.iv.1922 (in cop), G.F.H. (AM K.90460, formerly in SPHTM); allotype ♀, same data, “fragmentary”, only wings remaining (AM K.90461).

Other material (localities only given). New South Wales: Iluka (AM); Angourie (AM); Red Rock, near Woolgoolga (AM); Tucker’s Rock, near Repton (AM); Bundagen, near Repton (AM); Harrington (AM); Manning Point, near Taree (AM); Black Head, near Halliday’s Point (AM); Shoal Bay, near Port Stephens (AM); Toukley (ANIC); Woy Woy (ANIC); Narrabeen (AM); Dee Why, near Sydney (Fig. 13, AM); Bronte, near Sydney (AM); Cook’s River, near Sydney (AM); Kurnell (AM); North Cronulla (AM); Grey’s Point, near Cronulla (AM); Durras (ANIC); Ulladulla (ANIC); Bendalong (AM); Broulee (ANIC); Narooma (AM, ANIC); Wallagoot Lake (ANIC); Merimbula (AM); Nadgee, near Eden (AM). Queensland: Cliff Island, Princess Charlotte Bay (ANIC); Palm Islands, near Ingham (QM); Deepwater National Park, S of Agnes Water (AM); Mooloolaba, near Maroochydore (ANIC); Caloundra (QM); Bribie Island (QM); Nerang river, near Surfers Paradise (ANIC).

Description (♂, ♀). Resembling *M. fenestra* in most characters, except as indicated below.

Coloration mostly as for *M. fenestra*. Postfrons often partly

tawny-brown. Palpus dark brown to black. Mesoscutum with median whitish pruinose stripe, but no pale pruinose lateral zone; mesopleuron with separate anterior and posterior whitish-pruinose zones, latter zone extending on to sternopleuron. Fore coxa yellow; other coxae largely brownish; femora usually brown, often becoming yellowish towards bases; fore tarsus black; other tarsi brown to yellowish. Wing markings and halter approximately as in *M. fenestra*. Abdomen black.

Head with postfrons generally slightly longer than face. Antenna approximately as in *M. fenestra*; segment 3 tapered apically.

Thorax. Humeral callus with only moderately developed hairs. Legs with armature resembling that of *M. fenestra*. Wing venation very like that of *M. fenestra* but showing considerable variation in details of proportion and contour; much or all of second costal cell, first and second basal cells, anal cell and alula almost uniformly microtrichose.

Male postabdomen: stipe very long, with small, compact glans, without secondary elongate process, but bearing single very long, distally tapered, simple terminal filament with terminal gonopore.

Female postabdomen: aculeus tapering to finely acuminate apex.

Dimensions. Total length, ♂ 3.1–5.7 mm, ♀ 4.1–5.7 mm; length of thorax, ♂ 1.1–2.3 mm, ♀ 1.4–2.1 mm; length of wing, ♂ 2.7–4.9 mm, ♀ 3.5–4.7 mm.

Distribution. Queensland: coastal districts from Princess Charlotte Bay southwards. New South Wales: coastal districts generally.

Notes. It was initially difficult to evaluate variation in the collections belonging to this species or apparent complex, because of variation in pigmentation of the legs (particularly of the femora) and the apparent form of the elongate hypandrial tube. Study of numerous specimens of both sexes shows that the variation in leg coloration is unlikely to have taxonomic significance. Careful preparation of the male postabdomen seems to indicate that the apparent differences are not due to structure, but to the position in which the hypandrial tube became lodged when the insect died.

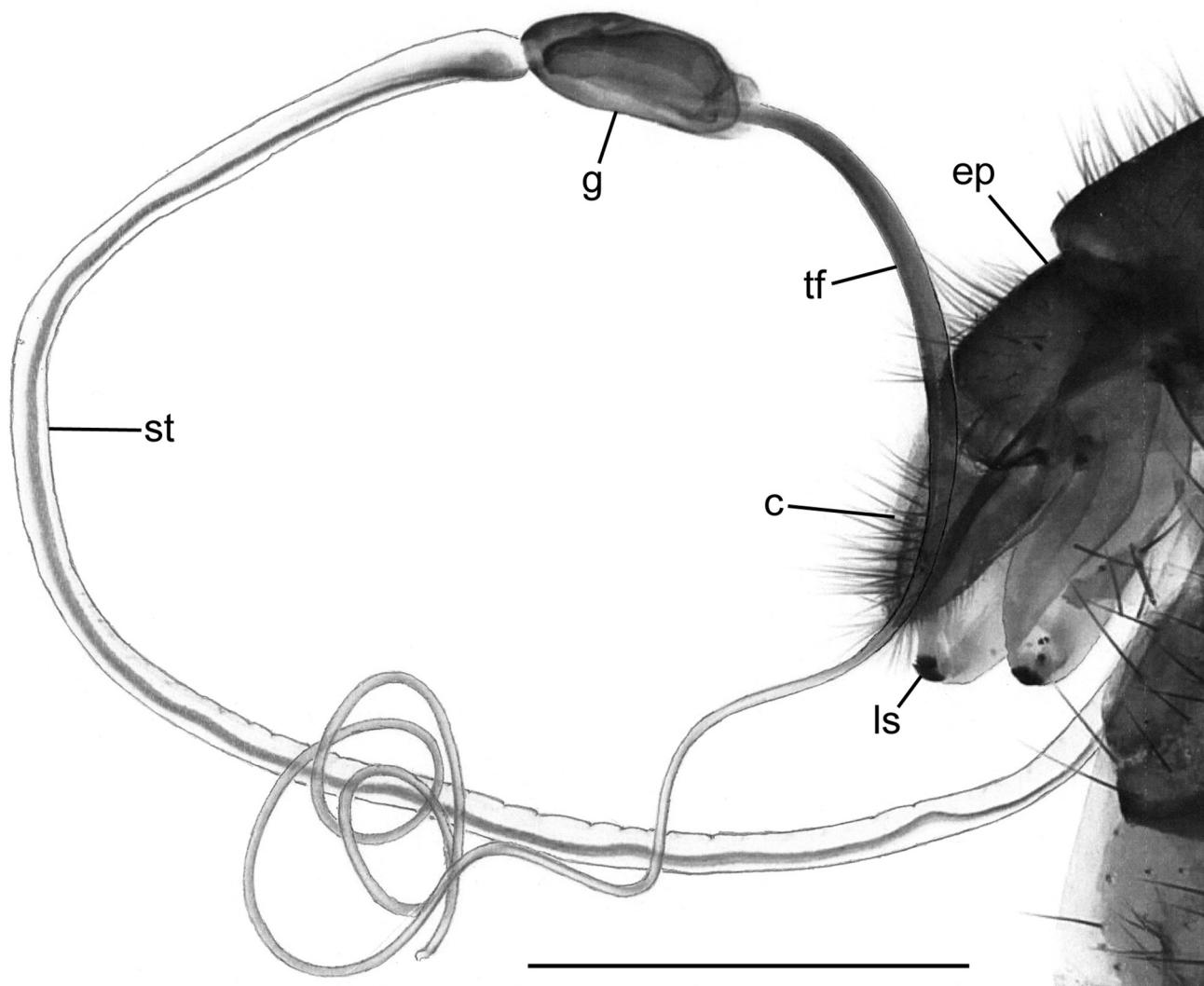


Figure 3. *Microepicausta gracilis* Hendel, Bronte, NSW. Details of male postabdomen, from retouched photograph. Scale = 0.5 mm. c, cercus; e, epandrium; g, glans; is, inner surstylus; st, stipe; tf, terminal filament.

Microepicausta fenestra sp. nov.

<http://zoobank.org/NomenclaturalActs/2AB7C9FE-2818-4717-94BD-29DF293A384F>

Figs 4–7

Holotype ♂. Queensland: 13 km W of Musgrave [14°48'S 143°23'E, 220 m], 14.i.1994, G.D., A.D., R.E., mercury vapour lamp (AM K.504392). Double-mounted on micro-pin through polyporus. **Paratypes**. Queensland: same data as holotype 1♂, 2♀♀ (AM).

Other material. Northern Territory: Rimbija I., Wessel Islands, [11°01'S 136°45'E], Feb. 1977, T.A.W., R.A.B., 1♂ (AM), 3♂♂, 1♀ (ANIC).

Description (♂, ♀). Somewhat elongate black, largely shining fly.

Coloration. Head with largely black to brown-black ground-colour, with major bristles black, most minor setulae or hairs whitish; postfrons with silvery-grey pruinescent orbital margins; parafacial broadly silvery-grey pruinescent on tawny-brown cuticle, pruinescent zone extending over cheek region and on to lower postocular zone, but not on to extensively shining black occipital region; face shining black,

its approximate upper half with zone of fine silvery-grey pruinescence narrowly or indistinctly divided on median line, occiput with small whitish-pruinescent zone above cervical foramen. Antenna tawny-brown; segment 3 becoming darker distally; arista brown to blackish. Prelabrum shining black; palpus brown, often with narrowly yellowish apex. Thorax largely shining to subshining black with blue to green reflections, with major bristles black and most fine hairs or setulae white; mesoscutum with median whitish-pruinescent stripe on whole length and lateral pruinescent zone on notopleural region; mesopleuron with extensive posterodorsal whitish-pruinescent zone; propleuron and substantial zone below mid coxa on sternopleuron whitish-pruinescent; posterior parts of pleura with pruinescence of varying density; scutellum black, almost without pruinescence. Coxae brown with grey pruinescence, palest on fore coxa; femora and tibiae brown-black; fore tarsus dark brown; other tarsi dull yellow with brown apices. Wing with nebulous brown anterodistal zone covering region from distinctly beyond end of vein 1 to apex of vein 4; anterior crossvein and discal crossvein each surrounded by compact brown suffusion; veins brown. Halter pale brown basally, with pale yellow capitellum. Abdominal tergites and sternites shining black.

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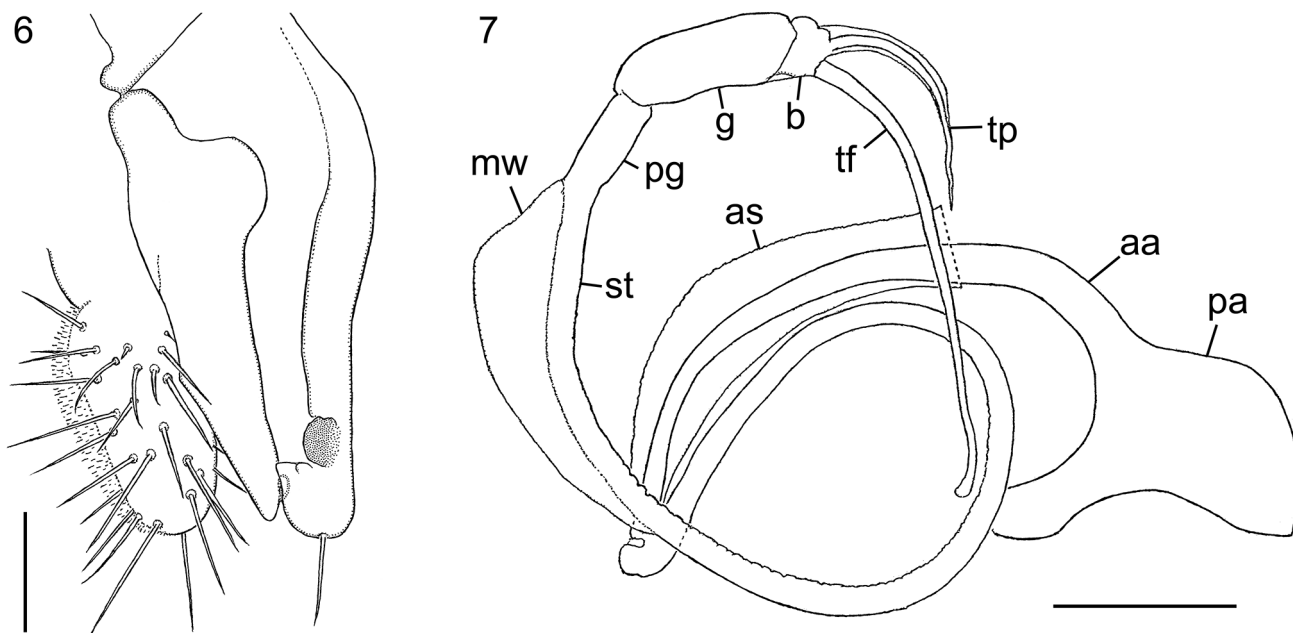
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Figures 4, 5. *Microepicausta fenestra* sp. nov., holotype male. (4) head and part of thorax. (5) right wing.

Head in profile higher than long, with postfrons much longer than face; face rather short and broad, with only slightly raised median elevation, thus concave in profile; height of cheek c. 0.15–0.22 of height of eye. Antennal segment 3 tapered to subacute apex; arista almost bare, except for trace of minute pubescence near base. Prelabrum moderately large and deep, slightly receding below; palpus moderately large, setulose, broadly rounded apically.

Thorax elongate; humeral callus and mesoscutum very extensively haired; in female only, humeral callus with tuft of slightly longer black setulae behind humeral bristle, these undifferentiated in male; scutellum shorter than semicircle in dorsal view, with hairs rather long and generally distributed, but not dense; mesopleuron with numerous long hairs, mainly on posterior part; sternopleuron extensively haired. Fore femur with a series of long, fine posteroventral bristles,



Figures 6, 7. *Microepicausta fenestra* sp. nov., Musgrave, Qld. Details of male postabdomen. (6) Right cercus and surstyli. Scale = 0.1 mm. (7) Aedeagus and associated structures. Scale = 0.3 mm. *aa*, aedeagal apodeme; *as*, aedeagal sheath; *b*, bulb of aedeagus; *g*, glans; *mw*, membranous wing of stipe; *pa*, process of aedeagal apodeme (paired); *pg*, preglans; *st*, stipe; *tf*, terminal filament; *tp*, terminal process of bulb.

without differentiated dorsal bristles; other femora without distinct bristles; mid tibia with single large terminal ventral spur and several much smaller ones; legs otherwise without well developed armature. Wing as in Fig. 5; first costal cell, much of second costal cell, basal part of first basal cell, almost entire second basal and anal cells bare; alula bare; most of rest of wing membrane almost uniformly microtrichose.

Abdomen. Preabdomen and female postabdomen with the general characters of the genus. **Male postabdomen:** anterior and posterior surstyli and cercus of similar length and prominence; outer (anterior) surstylus with single long terminal setula, its concave posterolateral surface with fine, dense, plush-like pubescence; inner surstylus without apparent surface armature, with attenuated basal articulation; cercus with numerous long setulae, on posterior surface with long, dense, erect pubescence; membranous aedeagal sheath (containing aedeagal apodeme) elongate, but not prominently projecting (at least in type material); stipe of aedeagus distally with transparent membranous wing, which does not extend on to the otherwise slightly differentiated preglans; terminal bulb of glans compact and sclerotized, bearing an elongate, tapering process; terminal filament c. 2.4× as long as glans, simple, not much tapering distally.

Female postabdomen: aculeus broader than in *M. gracilis* and *M. wirthi*, not tapering distally, rounded at apex.

Dimensions. Total length, ♂ 5.0–6.5 mm, ♀ 5.0–5.6 mm; length of thorax, ♂ 2.1–2.2 mm, ♀ 2.0–2.1 mm; length of wing, ♂ 4.4–4.5 mm, ♀ 4.1–4.2 mm; length of glans of aedeagus 0.3 mm.

Distribution. Queensland: Cape York Peninsula. Northern Territory: Wessel Islands.

Notes. This species is readily distinguished from the other known Australian species of *Microepicausta* by the

characters given in the key to species. The dark brown palpus, the whitish pruinescence on the upper part of the otherwise black prelabrum, and the largely bare anal cell help to differentiate *M. fenestra* from some non-Australian species, several of which are undescribed.

The specific epithet is a Latin noun meaning window, in reference to the clear zones lacking microtrichia in the anal cell and first and second basal cells of the wing.

Microepicausta wirthi sp. nov.

<http://zoobank.org/NomenclaturalActs/CF393AE4-A085-4984-855E-119CE53976BC>

Figs 8–12

Holotype ♂. New South Wales: Nullica Beach, near Eden [37°06'S 149°53'E], 17.xi.1997, R.M., D.K.M., on *Spinifex* [presumably *S. sericeus*] (AM K.504393). Glued to card mount. **Paratypes.** New South Wales: same data as holotype, 20♂♂, 14♀♀ (AM), 4♂♂, 5♀♀ (USNM); Nadgee [37°28'S 149°58'E], Jan. 1967, J.W. 2♂♂, 1♀ (AM); Merimbula, Jan. 1960–1966, K.R.N., 2♂♂, 2♀♀ (ANIC); Narooma, Jan. 1963, Z.L. 1♂, 1♀, (AM), 2♂♂ (ANIC).

Other material examined (localities only given). New South Wales: Red Rock, near Woolgoolga (AM); North Beach, Bellinger River (AM); Nambucca Heads (ANIC); Camden Head, near Harrington (AM); Toukley (ANIC); Terrigal (ANIC); Turimetta Beach, near Sydney (AM); Dee Why, near Sydney (Fig. 13, AM, USNM); Durras, near Bateman's Bay (ANIC); Broulee (ANIC). Queensland: Queen's Bay, Bowen (ANIC); Yeppoon (ANIC); Broadbeach, Gold Coast (ANIC). Tasmania: Stumpy's Beach, Mount William National Park (AM); Ironhouse Point, near Falmouth (AM). South Australia: vicinity of beach, Victor Harbour (AM).



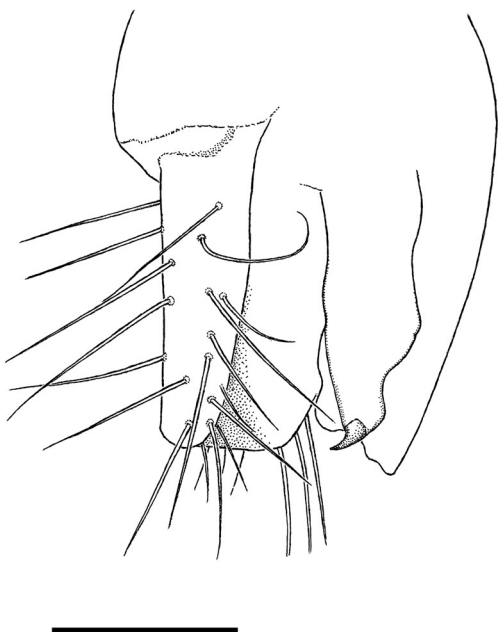
Figures 8, 9. *Microepicausta wirthi* sp. nov., Nullica Beach, NSW. (8) Holotype male. (9) Female, head and thorax.

Description (♂, ♀). Elongate rather small fly, of pale colour for genus, due to extensive whitish pruinescence on much of otherwise largely dark thoracic cuticle.

Coloration (geographically variable). Head largely yellow with white bristles and setulae; fronto-orbital plates broadly white-pruinescent; frontal triangle forming brown-black spot surrounding ocelli, often larger and more distinct in males; upper occipital region with extensive

dark brown cuticular zone, covered with dense greyish white pruinescence; facial carina often partly brownish. Antennal segment 1 yellow; segment 2 yellowish brown (female) to dark brown (typical males); segment 3 grey-black (typical males) or partly yellowish (typical females); arista brown. Palpus yellow; prelabrum brownish, usually paler in females. Thorax typically with shining black ground colour and extensive covering of dense grey-white

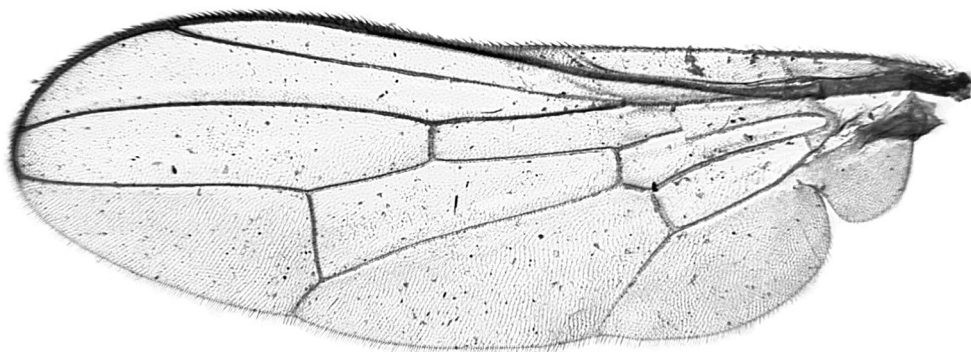
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Figures 10–12. *Microepicausta wirthi* sp. nov., Nullica Beach, NSW. Details of male postabdomen. (10) Right surstyli and fused cerci. Scale = 0.1 mm. (11) Aedeagus (retouched) and associated structures. Scale = 0.2 mm. (12) Left wing.

pruinescence, often more extensive in female, dorsally usually with paired black markings, more developed in males than females; sternopleuron typically with broad shining blackish central zone, and pale pruinescent zones on dorsal and ventromedian margins; scutellum with variable extent of pale dorsal pruinescence, often more developed in female. Wing transparent, without darker markings or shading; veins largely yellowish; distal parts of costa and veins 3 and 4 brown; setulae on vein 1 all pale; halter yellow. Legs yellowish, extensively variegated with brown, more so in males, particularly those of southern populations. Abdominal tergites and sternites shining black or brown-black, with whitish setulae; pleural membrane largely yellowish.

Head in profile c. as long as high, with postfrons forming acute angle with face; eye small for genus, less than twice as high as cheek; facial carina narrow but elevated, with rounded summit. Antennae in male large, extending at least to

lower margin of face; arista bare. Prelabrum much reduced, not prominent in profile; palpus moderately short.

Thorax elongate; mesoscutum extensively haired, humeral callus less so; scutellum almost semicircular in dorsal outline, with long but not dense dorsal hairs; mesopleuron, pteropleuron, and much of sternopleuron with numerous hairs. Femora armed as in *M. fenestra*; mid tibia with one large terminal ventral spur. Wing as in Fig. 12; membrane entirely microtrichose.

Male postabdomen. Outer surstylus moderately broad, sheathing, simple in shape, its apex very slightly exceeding that of inner surstylus, with sparse minute setulae; inner surstylus with one sharply acuminate apical preniseta and one short compact preniseta on anterior surface far from apex; aedeagus with simple glans, lacking sclerotized bulb and associated process; terminal filament moderately long and tapering.



Figure 13. This depiction of Dee Why, New South Wales (near Sydney), painted by Jules Pierre (Jan) De Leener (1873–1944) before urbanization of the area, shows a typical habitat for *Microepicausta* species: sandy and close to the seashore

Female postabdomen distally very slender; aculeus very small, attenuated, not dorsoventrally compressed, not tapered distally.

Dimensions. Total length, ♂ 3.5–6.0 mm, ♀ 3.9–5.4 mm; length of thorax, ♂ 1.1–1.9 mm, ♀ 1.4–2.0 mm; length of wing, ♂ 2.9–4.1 mm, ♀ 3.5–4.6 mm; length of glans of aedeagus 0.20 mm.

Distribution. East coast of Queensland and New South Wales from Bowen district southwards; Tasmania—east coast as far south as Falmouth district; South Australia—near Victor Harbour. The species is evidently restricted to sandy habitats near the sea-shore (see, for example, *Dee Why* before urbanization, coastal New South Wales near Sydney, early twentieth century, Fig. 13). Although we have no material from Victoria, I consider it probable that the species lives in that state.

Notes. *Microepicausta wirthi* is distinguished from other species of the genus by the extensive dense whitish pruinescence covering most of the black thoracic cuticle, and the entirely pale cephalic and thoracic bristles. The anteriorly pointed head-profile, the small eyes, and reduced prelabrum are also distinctive.

The specific epithet refers to Willis W. Wirth, formerly of the National Museum of Natural History, Washington D.C., who drew my attention to this species when visiting Australia in 1957.

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References

- Evenhuis, N. L. 1989. 64. Family Platystomatidae. In *Catalog of the Diptera of the Australasian and Oceanian Regions*, ed. N. L. Evenhuis. *Bishop Museum Special Publication* 86: 482–497. <https://doi.org/10.5962/bhl.title.49897>
- Hendel, F. 1914a. Diptera, Fam. Muscaridae, Subfam. Platystominae. *Genera Insectorum* 157: 179 pp., 15 pls.
- Hendel, F. 1914b. Die Arten der Platystominen. *Abhandlungen der K. K. Zool. Botan. Gesellschaft in Wien* 8(1): 410 pp., 4 pls.
- Malloch, J. R. 1928. Notes on Australian Diptera, no. xvi. *Proceedings of the Linnean Society of New South Wales* 53: 343–366.
- Malloch, J. R. 1939. The Diptera of the Territory of New Guinea. VII. Family Otitidae (Ortalidae). *Proceedings of the Linnean Society of New South Wales* 64: 97–154, pls iv, v.
- McAlpine, D. K. 1973. The Australian Platystomatidae (Diptera, Schizophora) with a revision of five genera. *The Australian Museum Memoir* 15: 1–256. <https://doi.org/10.3853/j.0067-1967.15.1973.454>
- McAlpine, D. K. 2000. Australian signal flies of the genus *Rhytidortalis* (Diptera: Platystomatidae). *Proceedings of the Linnean Society of New South Wales* 121: 147–174 [Dated 1999, published 22 February 2000].
- McAlpine, D. K. 2001. Review of the Australasian genera of signal flies (Diptera: Platystomatidae). *Records of the Australian Museum* 53(2): 113–199. <https://doi.org/10.3853/j.0067-1975.53.2001.1327>