

Review of the Species of *Paranomina* (Diptera: Lauxaniidae)

DAVID K. MCALPINE

Australian Museum Research Institute,
Australian Museum, 1 William Street, Sydney NSW 2010, Australia

ABSTRACT. Review of species level taxonomy in the endemic Australian genus *Paranomina* Hendel has become possible through study of the type material of the type species, *P. unicolor* Hendel, and review of the claimed type locality for that species. The following new species are described: *Paranomina nodosa*, *P. hendeli*, *P. danielsi*, *P. stuckenbergi*, *P. martini*, *P. mouldsorum*, *P. dayi*, *P. longa*. There is evidence that most species of *Paranomina* are consistently associated with plants of the endemic Australian genus *Xanthorrhoea* (family Xanthorrhoeaceae).

Introduction

Though many Australian species of Lauxaniidae have been described, taxonomic coverage of these is still very incomplete and outdated, except for those genera treated by Kim (1994). The latter work includes the genera often placed in the subfamily Homoneurinae (e.g., by Stuckenberg, 1971). The generic and higher classification remains a matter of difficulty for the rest of the Australian lauxaniid fauna. *Paranomina* shows at least a slight morphological resemblance to the widespread but perhaps not very coherent genus *Trigonometopus* Macquart. Papp (2007) recognized a tribe Trigonometopini for this and several apparently related genera, but did not mention *Paranomina*. Although *Paranomina*, as an endemic Australian genus, can be morphologically defined, I am unable to determine its most likely relationships.

The known Australian taxa of Lauxaniidae (formerly called Sapromyzidae) were catalogued by Evenhuis and Okadome (1989), but this preceded publication of Kim's work.

Paranomina is one of numerous Australian taxa of insects associated with the endemic Australian plant genus

Xanthorrhoea (family Xanthorrhoeaceae). Other definitely associated dipterous genera include *Octarthria* Brauer (syn. *Ophiodesma* White, family Stratiomyidae; see particularly Fuller, 1934), *Lenophila* Guérin-Méneville (syn. *Celetor* Loew, family Platystomatidae; see McAlpine and Kim, 1977), and *Nothoasteia* Malloch (family Neurochaetidae; see McAlpine, 2011). Ferrar (1987, or perhaps correctly, 1988: pp. 203, 706) mentions and illustrates the puparium of *Paranomina* sp. attached to a "grass blade". Examination of the illustration (figs 43.77, 43.78) seems to confirm this to be really on a *Xanthorrhoea* leaf. As *Xanthorrhoea* plants often occupy a prominent position among native vegetation, it is possible that many other dipterans collected from the foliage or inflorescence may have only a casual association with these plants.

In listing material, the following collectors' names are abbreviated to the initials: D. H. Colless, A. Daniels, G. Daniels, B. J. Day, G. A. Holloway, D. K. McAlpine, S. F. McEvey, B. J. Moulds, M. S. Moulds, A. J. Nicholson, M. A. Schneider.

The following abbreviations refer to institutions holding collections:

Keywords: *Paranomina*; Lauxaniidae; Diptera; taxonomy

Taxonomic registration: (LSID publication) <http://zoobank.org/42B24AEC-FB7A-4C28-B978-9E956B66DCD4>

Received: 3 December 2015 **Accepted:** 11 April 2017 **Published:** 12 June 2019 (in print and online simultaneously)

Publisher: The Australian Museum, Sydney, Australia (a statutory authority of, and principally funded by, the NSW State Government)

Citation: McAlpine, David K. 2019. Review of the species of *Paranomina* (Diptera: Lauxaniidae). *Records of the Australian Museum* 71(3): 71–85. <https://doi.org/10.3853/j.2201-4349.71.2019.1655>

Copyright: © 2019 McAlpine. This is an open access article licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



- AM Australian Museum, Sydney
 ANIC Australian National Insect Collection, Canberra
 MV Museum Victoria, Melbourne
 NMW Natural History Museum, Vienna
 QM Queensland Museum, Brisbane
 SAM South Australian Museum, Adelaide

Systematics

Genus *Paranomina* Hendel

Paranomina Hendel, 1907: 231; 1908: 58–59 (more detailed description). Stuckenberg, 1971: 544, 546.

Type species (original designation): *Paranomina unicolor* Hendel.

The genus is distinguished from other Australasian genera of Lauxaniidae by the following combination of characters: costa with series of short, stout black spinules, becoming distally replaced by finer spinules or hairs well before end of vein 3 (or R_{4+5}), in contrast to *Homoneura* van der Wulp etc.; vein 2 on most of its length not closely approximated to costa, in contrast to *Depressa* Malloch spp. and *Steganopsis* de Meijere spp.; presutural (or posthumeral) bristle of thorax absent, in contrast to condition in *Trigonometopsis* Malloch spp. etc.; anterior one, of two pairs of fronto-orbital bristles, strongly incurved and not reclinate.

Additional significant features of *Paranomina* include the following:

Head: eye rounded in profile, not higher than long; postfrons anteriorly with few inconspicuous setulae which are not distinctly proclinate; fronto-orbital plates not sharply distinct in colour or texture, but sometimes with imperfect indication of colour differentiation; face almost flat, receding ventrally in profile; its surface almost evenly pruinose (microtrichose); cheek region with a series of large posteroventral bristles, much diminishing in size anteriorly; prelabrum (*sensu* Hendel, or anteclypeus *sensu* Crampton, 1942; “clypeus” as error in homology of some modern authors, see McAlpine, 2007) very narrowly transverse; palpus rather small and slender, setulose; proboscis rather short, with broad labella; antenna approximately porrect, with segments 1 and 2 short but prominent, segment 3 bilaterally compressed, ovate, less than twice as long as deep; arista with segment 4 very short, segment 5 subcylindrical, less

than twice as long as its greatest diameter, segment 6 filiform, with short moderately dense black pubescence (erroneously stated to be bare by Hendel and by Stuckenberg).

Thorax slightly elongate, not strongly convex in dorsal profile; dorsocentral bristles usually 0+3 (1+3 in one species); usually one pair of acrostichal bristles and two or four longitudinal series of small acrostichal setulae; scutellum with two pairs of bristles and no setulae; humeral, propleural (proepisternal), and mesopleural (anepisternal) bristles one each; postsutural intra-alar bristle absent, in contrast to *Minettia* Robineau-Desvoidy; sternopleural bristles usually two, of unequal size; pteropleuron bare; prosternum broad, bare, without precoxal bridge. Fore femur with several large posterodorsal and posteroventral bristles; each tibia with one preapical dorsal bristle; fore tibia with variably developed ventral subapical bristle; hind tibia with one very short apical anteroventral spur and several smaller terminal ventral setulae. Wing generally typical of family, moderately elongate, hyaline, without darker markings.

Preabdomen without distinctive features; female postabdomen with tergites and sternites separate and relatively short; male postabdomen approximately symmetrical, its apparent surstyli completely fused to epandrium (surstylar lobes of Papp, 2007).

Examples of *Paranomina* can be generically identified by use of the key to the Old World lauxaniid genera given by Stuckenberg (1971), but not by Malloch’s key to the Australian genera of “Sapromyzidae” (1927: 400), which requires the correction added by Malloch (1928:30). Two undescribed lauxaniid species from South Australia (in AM collection) somewhat resemble *Paranomina*, but have a large presutural bristle and the eye is slightly higher than long. The generic position of these species will need to be determined when there is better study material available.

Monophyly of the genus *Paranomina* is supported by the absence of the presutural bristle and the strong incurvature of the anterior fronto-orbital bristle, both apparently somewhat unusual (but not unique) apomorphic conditions within the Lauxaniidae; together with detailed agreement in most other features of external morphology. The association of the species with plants of the endemic Australian genus *Xanthorrhoea* seems to add further evidence of close relationship among the species, though this probably does not apply to *P. longa*, a species which is also slightly morphologically atypical.

Key to species of *Paranomina*

- 1 Dorsocentral bristles four pairs; eye in profile markedly longer than high *longa* sp. nov.
- Dorsocentral bristles three pairs; eye not or only slightly longer than high 2
- 2 Femora largely dark brown to black, with yellowish apices; mesopleuron (anepisternum) with large dark brown zone *dayi* sp. nov.
- Femora almost uniformly tawny-yellow; mesopleuron without dark brown zone (further species distinguished mainly by male postabdominal features) 3

- 3 Humeral (postpronotal) callus yellowish, with dark brown spot on lower part not extending on to mesopleuron (Fig. 19); male: each lateral rod of aedeagus with pair of apical teeth, one laterally flexed and one shorter and distomedially inclined (Fig. 21) *mouldsorum* sp. nov.
- Humeral callus without such isolated dark brown spot (sometimes shaded with grey or grey-brown below, this coloration extending on to mesopleuron); male: lateral rod of aedeagus not thus flexed apically; females not identifiable from key characters 4
- 4 Distal part of surstylus with two or three prominent rounded tubercles (e.g., Figs 2, 6, 7) 5
- Distal part of surstylus without such prominent tubercles 6
- 5 Distal part of surstylus complex: lateral tubercle extremely posteriorly prominent (externally conspicuous in whole dry specimens—Fig. 9); medial tubercle with double prominence; separate anterior tubercle inwardly prominent, with membranous sac-like distal extension, its surface smooth except for sparse sensilla; each aedeagal rod subapically with broadly rounded expansion; South Australia *nodosa* sp. nov.
- Distal part of surstylus less complex: lateral tubercle less posteriorly prominent but variable; medial tubercle without double prominence, sclerotized and densely micropubescent; aedeagal rod not thus broadly expanded near apex; southern Queensland, New South Wales, western Victoria, Tasmania *unicolor* Hendel
- 6 Surstylus with almost straight lateral outline and straight to slightly concave, oblique distal outline (Fig. 15); aedeagal rod with acute lobe near mid-length, beyond lobe slender, almost straight, tapering to very narrow simple apex (Fig. 16); New South Wales *stuckenbergi* sp. nov.
- Surstylus and aedeagal rod not as above 7
- 7 Surstylus (posterior view) distally broadly swollen (Fig. 13); aedeagal rod as in Fig. 14 *danielsi* sp. nov.
- Surstylus not thus swollen; aedeagal rod otherwise 8
- 8 Coloration of thorax variable, but often (in specimens from New South Wales) humeral callus shaded with grey-brown on ventral part and sternopleuron extensively grey-pruinescent; male: surstylus apically somewhat narrowly rounded (Fig. 10); paired basal hypandrial sclerites strictly transverse (Fig. 11); aedeagal rod not bilaterally compressed *hendeli* sp. nov.
- Entire humeral callus and thoracic pleura tawny-yellow; male: surstylus apically partly subtruncate (Fig. 17); basal sclerites of hypandrium oblique; aedeagal rod distally broadly compressed in almost vertical longitudinal plane and curved anteriorly *martini* sp. nov.

Paranomina unicolor Hendel

Figs 1–4

Paranomina unicolor Hendel, 1907: 231; 1908: pl. 1, figs 4, 5.

Type material examined. Holotype ♂. Queensland: “Thorey 1868 Cap York” [sic] (NMW). In good condition, on long, slightly bent pin. Given type locality now deemed to be erroneous (see below).

Other material examined (morphologically typical males, localities only given). Queensland: Bunya Mountains (AM). New South Wales: West Head, Ku-ring-gai Chase National

Park, near Sydney (AM); Royal National Park, near Sydney (AM, QM); Currarong, near Jervis Bay (AM, QM); Gibraltar Range National Park, W of Grafton (AM); 10 km NE of Tuglo, Singleton district (AM).

Less typical material examined. Victoria: Mount William, Grampians Range (AM). Tasmania: Mount William National Park and vicinity (QM); 3 km S of Tomahawk, 40°52'S 147°45'E (QM); near Barnes Bay, Bruny Island (AM).

Description (male). Agreeing with generic description in general characters.

Coloration generally tawny-yellow. Parafacial with pale



Figure 1. *Paranomina unicolor* Hendel, holotype male, before dissection of abdomen.

pruinescence. Antenna dark brown to blackish. Thorax without darker markings. Tarsi usually not darkened distally. Wing hyaline; halter pale tawny. Abdomen usually tawny, sometimes partly discoloured in dried specimens.

Postabdomen (New South Wales populations). Each sclerite of sternite 6 elongate, oblique; surstylus (Fig. 2) rather large, elongate, with two large, rotund terminal tubercles, the lateral one dorsally (or externally) prominent, the medial one terminally prominent and slightly smaller, also a less conspicuous broader ventral (or inner) terminal prominence; aedeagal rod (Fig 3) complex, with distal section initially broad, but rapidly contracting to narrow apex.

Dimensions. Total length, 4.2–5.2 mm; length of thorax, 2.0–2.2 mm; length of wing, 4.8–5.1 mm.

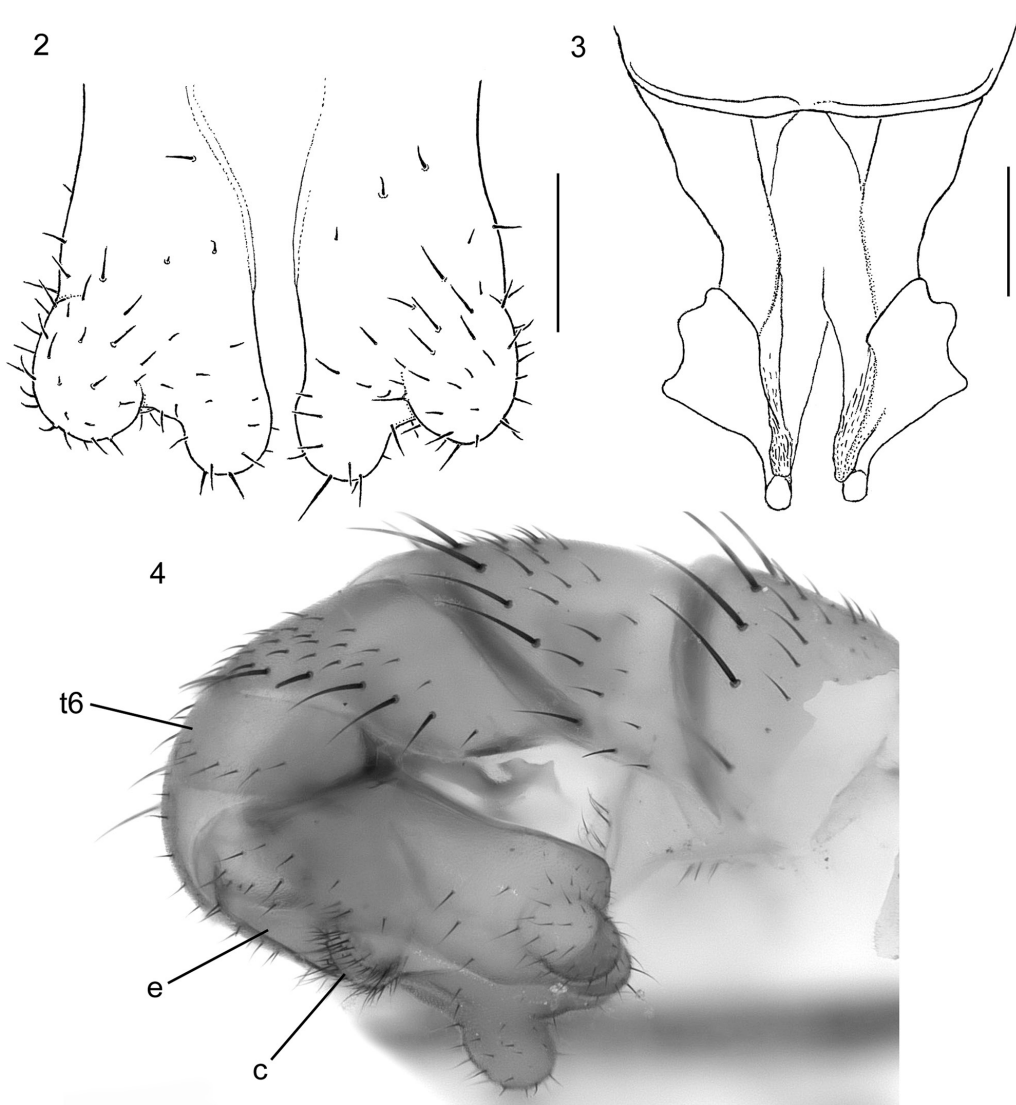
Distribution. 1, typical populations. Queensland: south-eastern districts. New South Wales: coastal districts. 2, Tasmanian population: eastern and southern Tasmania. 3, populations of western Victoria—status unclear.

The eastern mainland populations while showing general uniformity in shape of the surstylus vary a little in details of the aedeagus, so that, even if a higher degree of uniformity is seen in the Tasmanian population, it is doubtful if that population can be considered as consistently

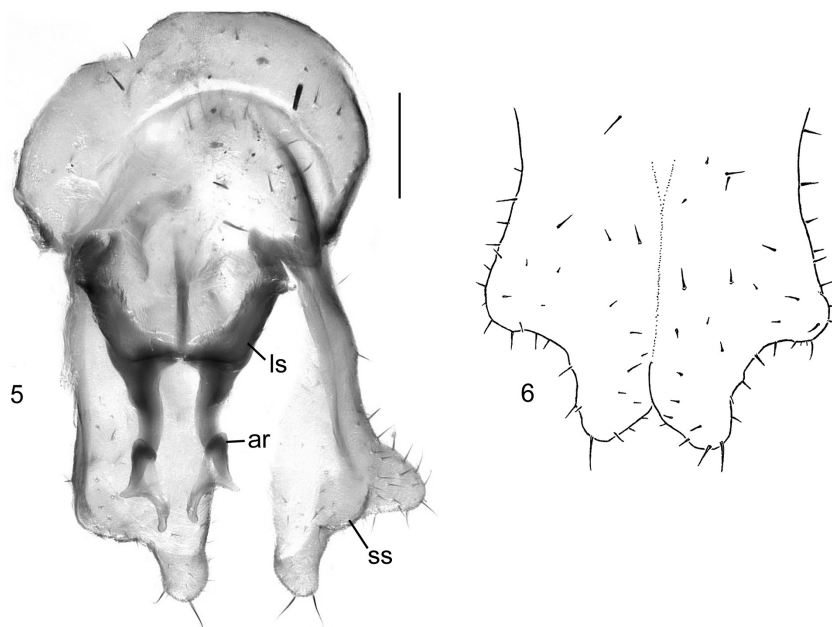
differentiated from the eastern populations. The present unavailability of material from the greater part of Victoria adds a further element of uncertainty in differentiating these populations. Perhaps the population in the Grampians of western Victoria has the surstylus more distinctly shaped, but the two available males from this locality may not be considered adequate to demonstrate the degree of consistency. On the other hand, the related South Australian populations, here separated as *P. nodosa*, show complex and apparently consistent features of the male genitalia, which provide reasonable evidence for separate species status.

Type locality. Georg Thorey was a dealer in insect specimens based in Hamburg, Germany. He supplied a number of specimens to the Natural History Museum, Vienna, some of which became type specimens. It appears, however, that the label data “Thorey 1868 Cap York” were associated with numerous insect specimens and may have been added some time after collection. Froggatt (1909: p. 95) recorded the unreliability of these labels.

As *Paranomina unicolor* probably does not occur in the Queensland tropics, I assume the given locality “Cap York” to be incorrect, and the genitalia details of the holotype are in agreement with specimens from coastal New South Wales.



Figures 2–4. *Paranomina unicolor*, male, Royal National Park. (2) Surstyli, posterior (external) view, scale = 0.2 mm. (3) Aedeagus, anterior view, scale = 0.1 mm. (4) Postabdomen, right oblique lateral view. *c*, cercal complex; *e*, epandrium; *t6*, tergite 6.



Figures 5, 6. *Paranomina ?unicolor*, males of possible geographic variants. (5) Tasmanian variant (near Barnes Bay), anterior view of genital segment, scale = 0.2 mm. *ar*, left aedeagal rod; *ls*, left lateral sclerite of hypandrium; *ss*, left surstylus. (6) *Paranomina* sp. (Mount William, Victoria), distal part of surstyli, posterior view, scale = 0.2 mm. *ar*, left aedeagal rod; *ls*, left lateral sclerite of hypandrium; *ss*, left surstylus.

***Paranomina nodosa* sp. nov.**

<http://zoobank.org/NomenclaturalActs/FF006BA6-B6B6-499C-98AE-663AB3D2664E>

Figs 7–9

Holotype ♂. South Australia: Castle Hill, Kangaroo Island [c. 35°44'S 136°57'E], 29.xi.1977, D.K.M., M.A.S. (AM K.456340). On micropin through polyporus, epandrium exposed. **Paratypes**. South Australia: 15♂♂, same data as holotype (13♂♂ AM K.515433–445, 2♂♂ SAM); 1♂, 2 km S of Willunga, Adelaide district, Nov. 1977, D.K.M., M.A.S. (AM K.515446).

Other material examined. 5♀♀, same data as holotype and probably conspecific (4♀♀AM, 1♀ SAM).

Description (male). Agreeing with generic description in general characters; slightly larger than most species.

Coloration. Largely tawny-yellow. Head: upper part of face and much of parafacial paler, often whitish; postfrons often with narrow brown suffusion on part of anterior margin. Antenna grey-brown to blackish; arista black. Prelabrum and palpus pale tawny. Thorax without darker markings; pleura with whitish pruinescence noticeable from some angles of view. Legs pale tawny; terminal tarsomere usually grey-brown. Wing: hyaline; halter tawny-yellow. Abdomen normally pale tawny, often discoloured in preserved specimens.

Postabdomen somewhat resembling that of *P. unicolor*; distal part of surstylus with major lateral tubercle extremely prominent, always externally conspicuous (Fig. 9); medial tubercle with double prominence; separate anterior tubercle prominent when dissected, with membranous, rounded, sac-like distal extension, its surface smooth, except for sparse sensilla; aedeagal rod with broadly rounded subapical expansion and narrowed apical section very short.

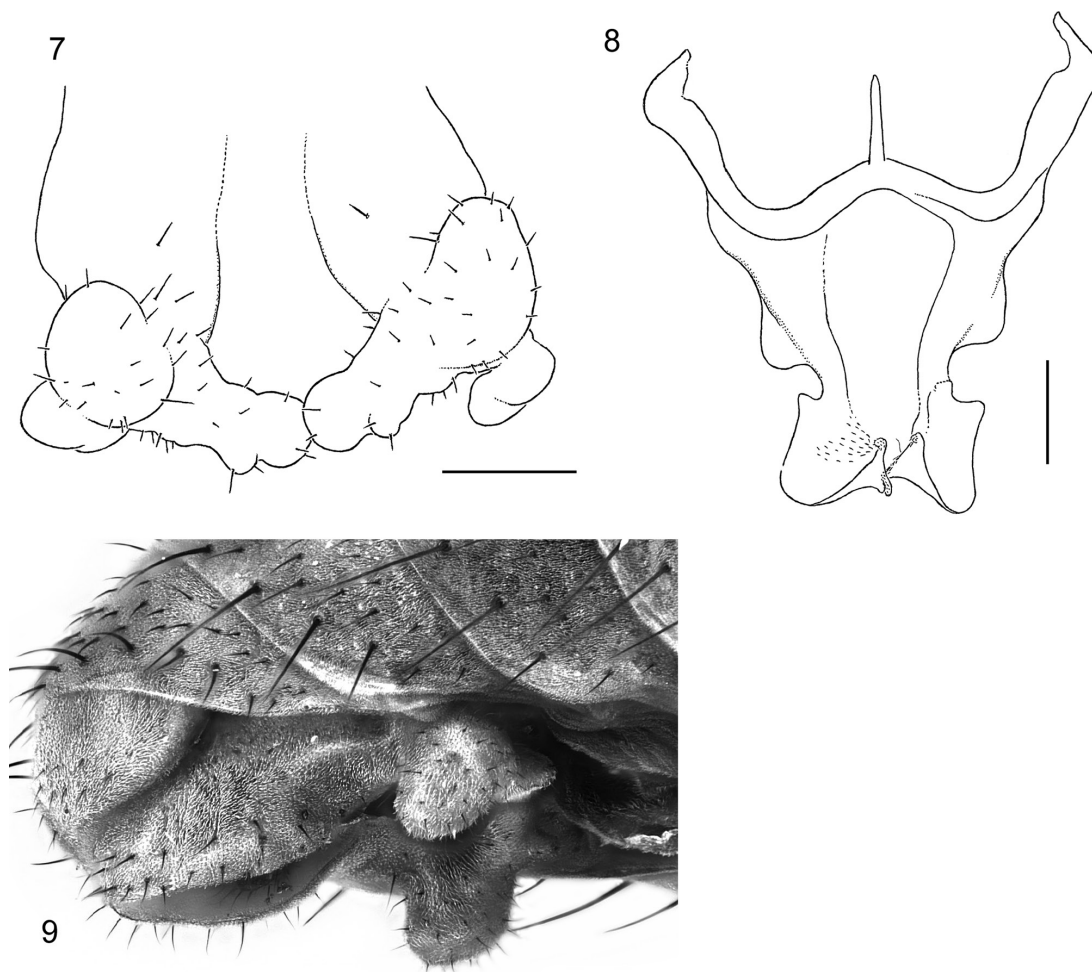
Dimensions. Total length, 4.9–5.2 mm; length of thorax, 2.1–2.4 mm; length of wing, 5.3–5.8 mm.

Distribution. South Australia: from south of Adelaide district to Kangaroo Island. *Paranomina nodosa* is the only species of the genus at present known from South Australia.

Notes. *Paranomina nodosa* is clearly related to *P. unicolor*, and, like that species, has no distinct dark thoracic markings. It averages slightly larger than most other species of the genus. The structure of the surstylus and aedeagal rod is distinctive, and the major lateral tubercle of the former protrudes conspicuously in dried male specimens.

Although label data do not include the host plant, I believe that the type material was collected from *Xanthorrhoea* sp.

The specific epithet is a Latin adjective—knob-bearing, in reference to the surstylus.



Figures 7–9. *Paranomina nodosa*, male, Castle Hill. (7) Surstyli, posterior view, scale = 0.2 mm. (8) Hypandrium and aedeagus, anterior view, scale = 0.1 mm. (9) Postabdomen, right lateroventral view (whole dried specimen).

***Paranomina hendeli* sp. nov.**

<http://zoobank.org/NomenclaturalActs/71CCEB73-4254-41A3-ABE1-49B495F4A848>

Figs 10–12

Holotype ♂. New South Wales: Royal National Park [eastern parts, probably near Flat Rock Creek], near Sydney, 13.vii.1971, D.K.M., G.A.H. (AM K.456341). **Paratypes**. New South Wales: 105 (34♂♂ 26♀♀ in AM K.515447–506, 25♂♂ 20♀♀ in QM), Royal National Park (including Flat Rock Creek, Cascade Creek, Gundamain), v vi vii viii x xi xii.1963–1977, G.D., D.K.M.; 3 (2♂♂ 1♀ in QM), Engadine, Oct. 1977, G.D.; 11 (3♂♂ 1♀ in AM K.515507–510, 2♂♂ 1♀ in ANIC, 3♂♂ 1♀ in QM) Ku-ring-gai Chase National Park (including near Terrey Hills, McCarr's Creek, West Head), i viii ix.1960–1986, G.D., D.H.C., D.K.M.; 1♂ (ANIC), Deep Creek, near Narrabeen, xii 1961, D.H.C.; 15 (7♂♂, 8♀♀ in AM K.556212–226) Halfway Creek, 18 miles [c. 30 km] S of Grafton, v.1972, D.K.M.

Other material examined (localities only given). Queensland: 3♂♂ 1♀ (QM) Cholmondeley Creek, 11 km SW of Heathlands; 1♀ (QM) Gunshot Ck, 13 km NW Heathlands; 2♂♂ (AM) 4 miles [c. 6 km] NE of Mount Lamond, Iron Range district; 3♂♂ 2♀♀ (QM) near Coen Aerodrome; 2♂♂ (AM) Bald Hills Station, 6 km NW of Isabella Falls; 3♂♂ 3♀♀ (AM) Clohesy Road, near Kuranda; 3♂♂ 2♀♀ (AM) 9 miles N [probably more accurately 14 km NW] of Rollingstone; 1♂ 1♀ (AM) 30 miles [c. 48 km] N of Marlborough; 1♂ 1♀ (AM) Deception Bay; 1♂ (QM) Tibrogargen Ck; 1♀ (QM) Brown Lake, North Stradbroke Island; 1♂ (QM) 13 km N Dunwich, North Stradbroke Island; 1♂ (QM) Acacia Ridge.

Description (male, female). Agreeing with generic description given above; size slightly smaller than that of most *Paranomina* species.

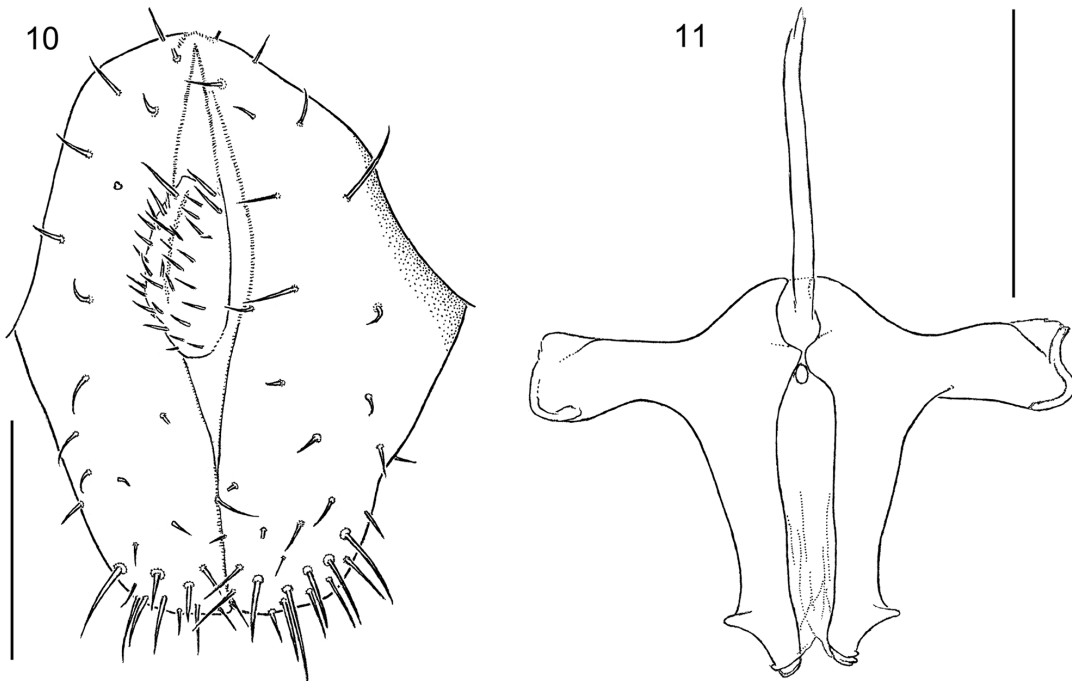
Coloration (typical New South Wales populations) generally tawny with brown tinge (a few specimens paler). Head: parafacial and anterior cheek region paler, often white to creamy. Antenna largely dark brown to greyish brown, arista blackish. Prelabrum tawny to brown; palpus brownish, often darker distally. Thorax without definite dark brown zones; mesoscutum tawny-brown, usually with pair of longitudinal tawny-yellow zones; pleura usually largely tawny brown with greyish pruinescence; humeral callus yellow to tawny yellow on c. dorsal half, becoming greyish brown below, this somewhat darker tone extending on to pleura. Legs tawny yellow. Wing hyaline to faintly smoky; halter yellow. Abdomen normally tawny-yellow, often discoloured in preserved specimens.

Head slightly shorter and more rotund in profile than that of *P. stuckenbergi* and related species; cephalic chaetotaxy typical of genus.

Thorax structurally typical of genus.

Male postabdomen (New South Wales population). Surstylar-epandrial complex somewhat smaller than in related species; surstylus distally simple in outline, slightly narrowly rounded, with rather coarse, irregularly placed setulae; paired basal hypandrial sclerites stout and strictly transverse (Fig. 11); each aedeagal rod almost straight, somewhat shorter and stouter than in related species, with stout, subterminal lateral tooth, more narrowed terminally and joined to other of its pair by transparent membrane almost to apex; aedeagal apodeme long and slender.

Dimensions. Total length, males 3.7–4.2 mm, females 3.4–4.2 mm; length of thorax, males 1.5–1.7 mm, females 1.5–1.6 mm; length of wing, males 4.0–4.4 mm, females 3.9–4.2 mm.



Figures 10, 11. *Paranomina hendeli*, male, Royal National Park. (10) Epandrium with surstyli, posterior view, scale = 0.2 mm. (11) Hypandrium and aedeagus, anterior view, scale = 0.2 mm.



Figure 12. *Paranomina hendeli*, holotype male. Head and thorax.

Distribution. New South Wales: coastal districts, as far south as Royal National Park (c. 34°12'S). Queensland: eastern coastal districts, as far north as Heathlands (c. 11°45'S).

Notes. *Paranomina hendeli* is, on the average, smaller than other species of the genus, and is probably consistently smaller than *P. unicolor*. The usually more greyish toning of the thoracic pleura (at least for the non-tropical populations) is somewhat different from that of the tawny-yellow pleural coloration of the partly sympatric *P. danielsi* and *P. stuckenbergi*, and the slightly darker greyish brown shading of the ventral half of the humeral callus of *P. hendeli* is absent in those two species. This condition of *P. hendeli* is distinct from the dark brown spot on the lower part of the humeral callus present in *P. mouldsorum*. As indicated above, the form of the surstylus and the aedeagal complex enables accurate identification of males of *P. hendeli*, including those from tropical populations.

The specific epithet refers to Friedrich Hendel, the original author of *Paranomina* and basic contributor to the systematic study of Lauxaniidae and other dipterous families.

Paranomina danielsi sp. nov.

<http://zoobank.org/NomenclaturalActs/5A23ED7C-380E-4BC7-A2ED-D617C2152897>

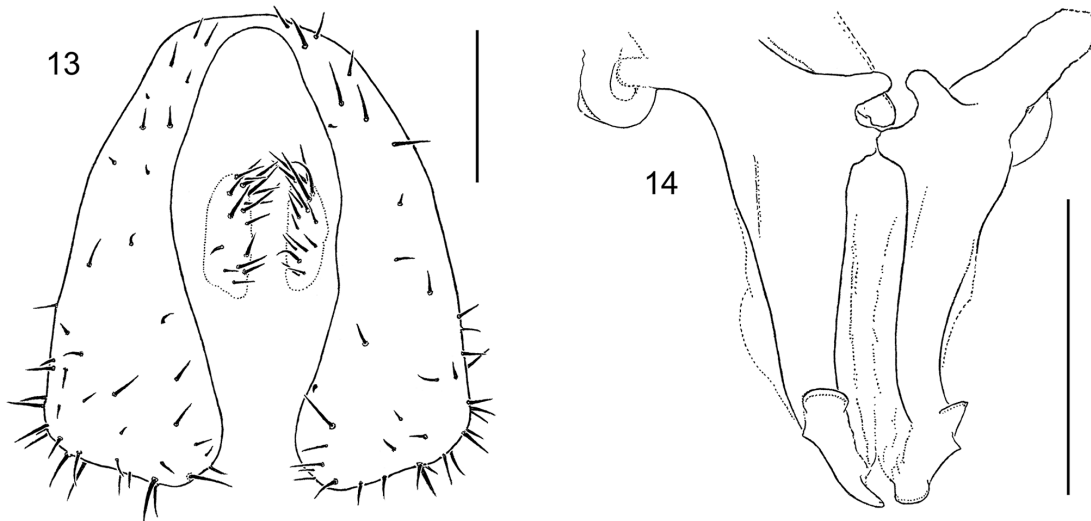
Figs 13, 14

Holotype ♂. New South Wales: Currarong, near Jervis Bay [c. 35°01'S 150°49'E], 15.xi.1970, G.D. (AM K.456342). On leaves of *Xanthorrhoea*. On micropin through polyporus, hind legs and left antenna damaged, postabdomen in microvial on main pin. **Paratypes.** New South Wales: 1♂, same data as holotype (AM); 3♂♂, Gundamain [or Gundamaian], Royal National Park, Jan. 1926, Oct. 1971, A.J.N., G.D. (ANIC, QM); 1♂, Heathcote, Nov. 1970, D.K.M. (AM).

Other material examined. New South Wales: 1♀, same data as holotype (AM), is possibly conspecific.

Description (male). Agreeing with generic description in general characters.

Coloration generally tawny-yellow. Head: without any greyish or brown zones; parafacial pale creamy to white. Antenna mainly brown to blackish, sometimes partly tawny, arista tawny, with darker apex. Thorax without darker grey-pruinescent zones on humeral callus and pleura. Legs without darker zones. Wing membrane faintly tinged with yellow; halter pale tawny. Abdomen typically pale tawny, often partly discoloured in preserved specimens.



Figures 13, 14. *Paranomina danielsi*. (13) Male, Currarong, epandrium with surstyli, posterior view, scale = 0.2 mm. (14) Male, Gundamain, aedeagal complex, anterior view, scale = 0.2 mm.

Postabdomen. Surstylus broadened and swollen distally, with distal margin slightly obliquely transverse (Fig. 13); aedeagus (Fig. 14) having each rod with sharply delimited sclerotization, broad and complex basally, slender distally, on anterior surface with preapical wedge-like tooth, smaller compressed apical tooth, and often a less marked intermediate prominence.

Dimensions. Total length, 4.0–4.1 mm; length of thorax, 1.8–1.9 mm; length of wing, 4.2–4.6 mm.

Distribution. New South Wales: coastal districts south of Sydney.

Notes. *Paranomina danielsi* has the thorax more uniformly tawny orange than is usual in sympatric southern populations of *P. hendeli*. The surstyli are broadened distally but distinctly narrowed where they merge with the epandrium, and the apical part of the aedeagal rod is slender with distinctive armature (Fig. 14).

The specific epithet refers to Greg Daniels, who has made very significant collections of *Paranomina*.

Paranomina stuckenbergi sp. nov.

<http://zoobank.org/NomenclaturalActs/FCB35A58-4787-4408-B3AB-AB0439C06C30>

Figs 15, 16

Holotype ♂. New South Wales: Hat Hill, near Blackheath [c. 33°37'S 150°18'E], 16.iv.1971, D.K.M. (AM K.456343). On micropin through polyporus, postabdomen in genitalia tube on same pin. **Paratypes.** New South Wales: 5♂♂, same data as holotype (AM); 1♂, Evans Lookout, near Blackheath, Nov. 1975, G.D. (QM); 1♂, 3 km S of Mount Wilson, Blue Mountains, March 1979, G.D. (AM); 1♂, near Native Dog Hill, 38 km E of Rylstone, Dec. 1977, G.D. (AM); 1♂, [Goonoo State Forest] 5 miles [c. 8 km] S of Mendooran, Sept. 1973, G.D. (QM); 2♂♂, Royal National Park, July, Nov. 1971–1975, G.D., D.K.M., G.A.H. (AM, QM); 1♂, road to Mulligan's Hut, Gibraltar Range National Park, Feb. 1982, B.J.D. (AM).

Other material examined. New South Wales: some females from above listed localities may be conspecific with associated males (AM). 1♂, Tasmania: Mount William National Park (QM).

Description (male). Agreeing with generic description given above.

Coloration generally tawny-yellow. Head: parafacial white-pruinescent. Antenna largely dark brown. Thorax without darker markings. Fore tarsus faintly browned apically. Wing hyaline; halter yellow to tawny-yellow.

Postabdomen. Sclerites of sternite 6 little developed and pigmented; surstylus (Fig. 15) with almost straight lateral outline and with distal outline oblique, straight to slightly curved; aedeagal rod with acute, usually deflexed lobe near mid-length, beyond lobe slender, almost straight, tapering to very narrow simple apex.

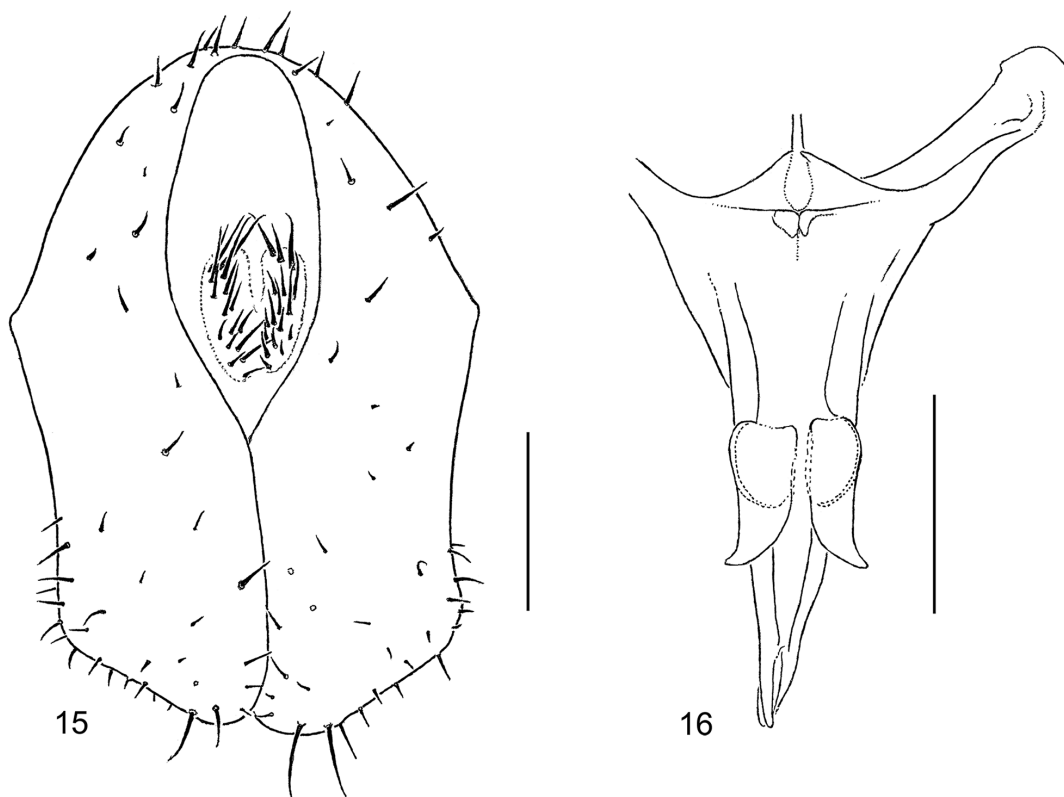
Dimensions. Total length, 4.1–4.9 mm; length of thorax, 2.2 mm; length of wing, 4.9–5.2 mm.

Distribution. New South Wales: Blue Mountains and north to ranges east of Glenn Innes; coast district just south of Sydney. Tasmania: north-east.

Notes. *Paranomina stuckenbergi* resembles *P. mouldsorum* and *P. hendeli*. It is without any distinct brown markings on the thorax, and in the male the surstylus and aedeagal rod are of characteristic shape. Females cannot be determined with certainty, though some specimens associated with males are provisionally sorted to this species.

Probably all or most of the specimens were taken on *Xanthorrhoea* plants, though few are so labelled.

The specific epithet refers to my late friend Brian R. Stuckenberg, formerly of the Natal Museum, Pietermaritzburg, who made a significant contribution to knowledge of Old World Lauxaniidae.



Figures 15, 16. *Paranomina stuckenbergi*, male, Hat Hill. (15) Epandrium with surstyli, posterior view, scale = 0.2 mm. (16) Aedeagal complex, anterior view, scale = 0.2 mm.

Paranomina martini sp. nov.

<http://zoobank.org/NomenclaturalActs/4F709BBB-EB1E-4FAB-925E-17C3256E50AA>

Figs 17, 18

Holotype ♂. New South Wales: Goonoo State Forest, 17 miles [c. 27 km] NE of Dubbo, 25.iii.1971, D.K.M. (AM K.456344). On leaves of *Xanthorrhoea*. On micropin through polyporus, right antenna damaged, postabdomen in microvial on main pin. **Paratypes**. New South Wales: 1♂, near Native Dog Hill, 38 km E of Rylstone, Nov. 1978, G.D. (AM); 1♂, Mount Kaputar National Park, Narrabri district, c. 900 m, Jan. 1978, G.D. (AM).

Other material examined. New South Wales: 2♀♀, from Goonoo State Forest and Native Dog Hill respectively (AM) are doubtfully referred to this species. 1♂, with same collection data as holotype, has slightly differently shaped aedeagal rods, and is considered doubtfully conspecific, in view of the paucity of study material.

Description (male). Agreeing with generic description in most characters.

Coloration generally tawny-yellow. Head: face and parafacial partly whitish-pruinous. Antenna tawny-brown to darker brown. Palpus tawny, usually not much darker apically. Thorax without darker markings. Legs uniformly pale; tarsi not darkened distally. Wing hyaline; halter pale tawny, usually without darker markings. Abdomen tawny, sometimes partly discoloured in preserved specimens.

Postabdomen. General features as in *P. stuckenbergi*; surstylus (Fig. 17) straight, without lobes or tubercles, slightly expanded distally, but less so than in *P. danielsi*, with

apical margin transverse but not straight, with slightly larger setulae; lateral sclerites of hypandrium oblique; aedeagal rod broad basally (Fig. 17), distally anteriorly curved, broadly compressed in almost vertical longitudinal plane, with small sclerotized ridge on medial surface (Fig. 18).

Dimensions. Total length, 4.5 mm; length of thorax, 2.1–2.3 mm; length of wing, 5.1–5.3 mm.

Distribution. New South Wales: mainly Western Slopes district, nearest coast record at Native Dog Hill, apparently c. 32°50'S 150°15'E. As the species has been rarely collected, its limits of distribution are probably incompletely known.

Notes. *Paranomina martini* apparently has the shape of the surstylus distinct from such related species as *P. danielsi*, *P. stuckenbergi* and *P. mouldsorum*. The distal part of the aedeagal rod (Fig. 18) is distinct from all other known species but may prove to be slightly variable when the species is better known.

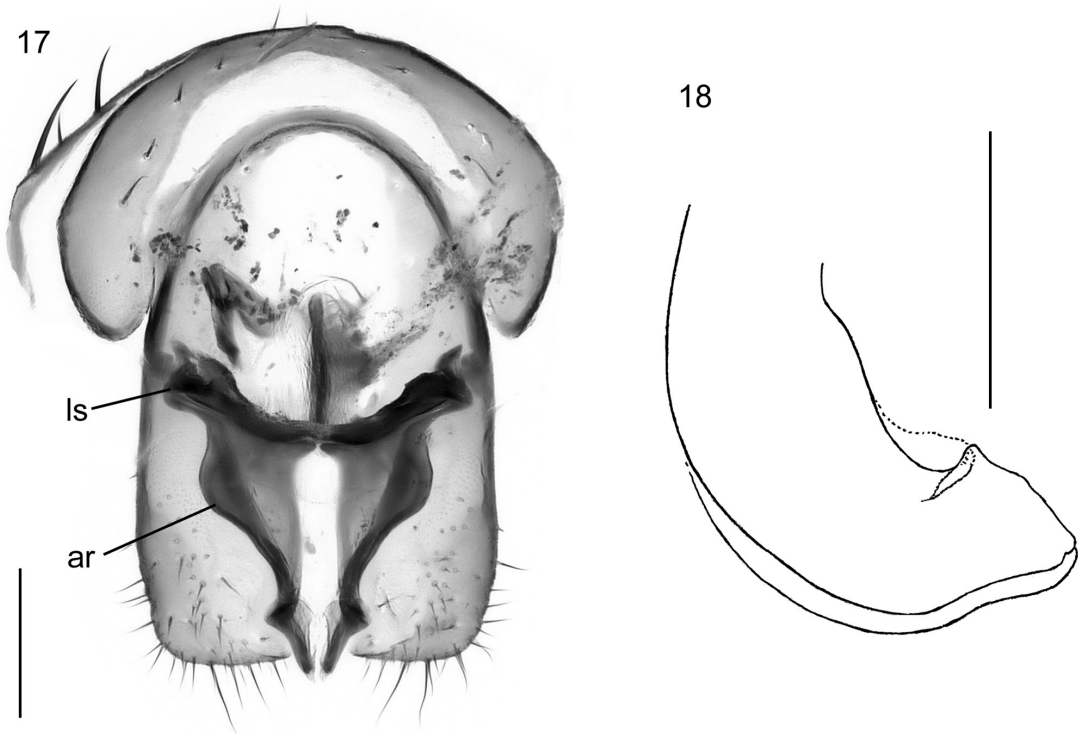
The specific name refers to John C. Martin, in recognition of help with photographic studies of *Paranomina*.

Paranomina mouldsorum sp. nov.

<http://zoobank.org/NomenclaturalActs/2FB40BAE-193A-4087-98DC-19B32F2D581A>

Figs 19–21

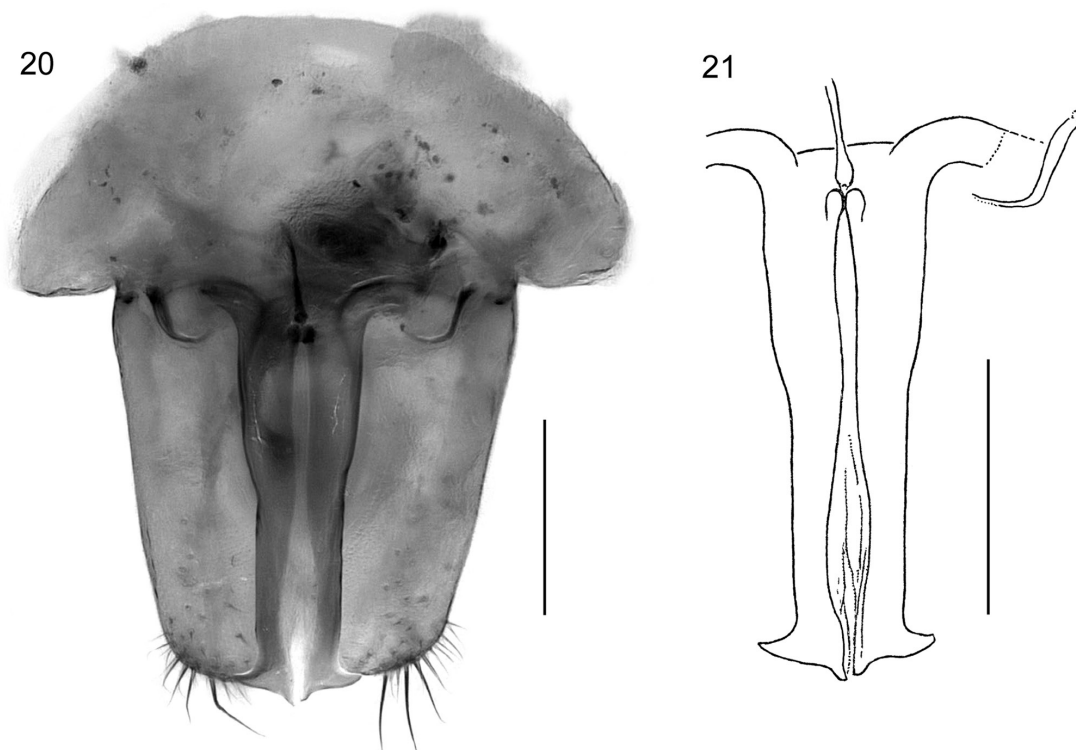
Holotype ♂. Victoria: Hall's Gap, Grampians Ranges [c. 37°08'S 142°32'E], 10.i.1976, M.S.M., B.J.M. (AM K.456345). Double mounted on micropin through polyporus; genitalia intact, partly exposed. **Paratypes**. Victoria: 6♂♂, same data as holotype (AM, MV); 1♂, Mount William, near



Figures 17, 18. *Paranomina martini*, holotype male. (17) Genital segment, anterior view, scale = 0.2 mm. *ls*, right lateral sclerite of hypandrium; *ar*, right aedeagal rod. (18) Distal part of aedeagus, right lateral view, scale = 0.2 mm.



Figure 19. *Paranomina mouldsorum*, holotype male. Head and thorax.



Figures 20, 21. *Paranomina mouldsorum*, male, Hall's Gap. (20) Genital segment, anterior view, scale = 0.2 mm. (21) Aedeagus, anterior view, scale = 0.2 mm.

summit, Grampians, Dec. 1977, D.K.M., M.A.S. (AM); 1♂, Princess Margaret Rose Caves, 8 km NNW of Nelson, Nov. 1992, M.S.M., S.F.M., D.K.M. (AM; McEvey 10750). Tasmania: 2♂♂, near Barnes Bay, Bruny Island, Dec. 1987, D.K.M. (AM).

Other material examined. Victoria: some females from Hall's Gap and Mount William (AM) are probably conspecific with the males with which they were collected.

Description (male). Agreeing with generic description.

Coloration generally tawny-yellow. Head: face and parafacial yellow to creamy. Antenna largely dark brown to blackish. Humeral callus yellow, with isolated dark brown spot on lower margin. Fore tarsus usually tawny, sometimes brown distally. Wing hyaline; halter tawny-yellow, sometimes with darker capitellum.

Postabdomen. Sternite 5 undivided; sclerite of sternite 6 little pigmented; surstylus (Fig. 20) somewhat elongate, slightly tapered distally, with rounded apex, with scattered setulae and compact sublateral apical tuft of setulae; each lateral rod of aedeagus (Fig. 21) long and almost straight, with pair of apical teeth, one acute and laterally directed and one shorter, narrow, and medially inclined.

Dimensions. Total length, 4.2–4.8 mm; length of thorax, 1.9–2.1 mm; length of wing, 4.7–5.1 mm.

Distribution. Victoria: districts W of 143°E. Tasmania: Bruny Island.

Notes. Both sexes of *Paranomina mouldsorum* can generally be distinguished from those of other species with tawny-yellow thorax and legs by the presence of a well defined dark brown spot on the lower part of the humeral callus (Fig. 19). Some specimens of *P. hendeli* have a slight brown or greyish brown suffusion in this position, but this tends to

merge with the greyish pruinescence of the mesopleuron, and that species is apparently geographically separated. The apex of the aedeagal rod in the male, with pair of divergent tooth-like lobes, is also distinctive, but somewhat resembles that of *P. dayi*.

Probably all or most specimens were collected on foliage of *Xanthorrhoea*, though they are not all so labelled.

The specific epithet refers to Barbara and Maxwell Moulds, who collected most of the specimens.

Paranomina dayi sp. nov.

<http://zoobank.org/NomenclaturalActs/D5B378FE-8EB5-4A75-8FE2-FD461A6BE4A5>

Figs 22–24

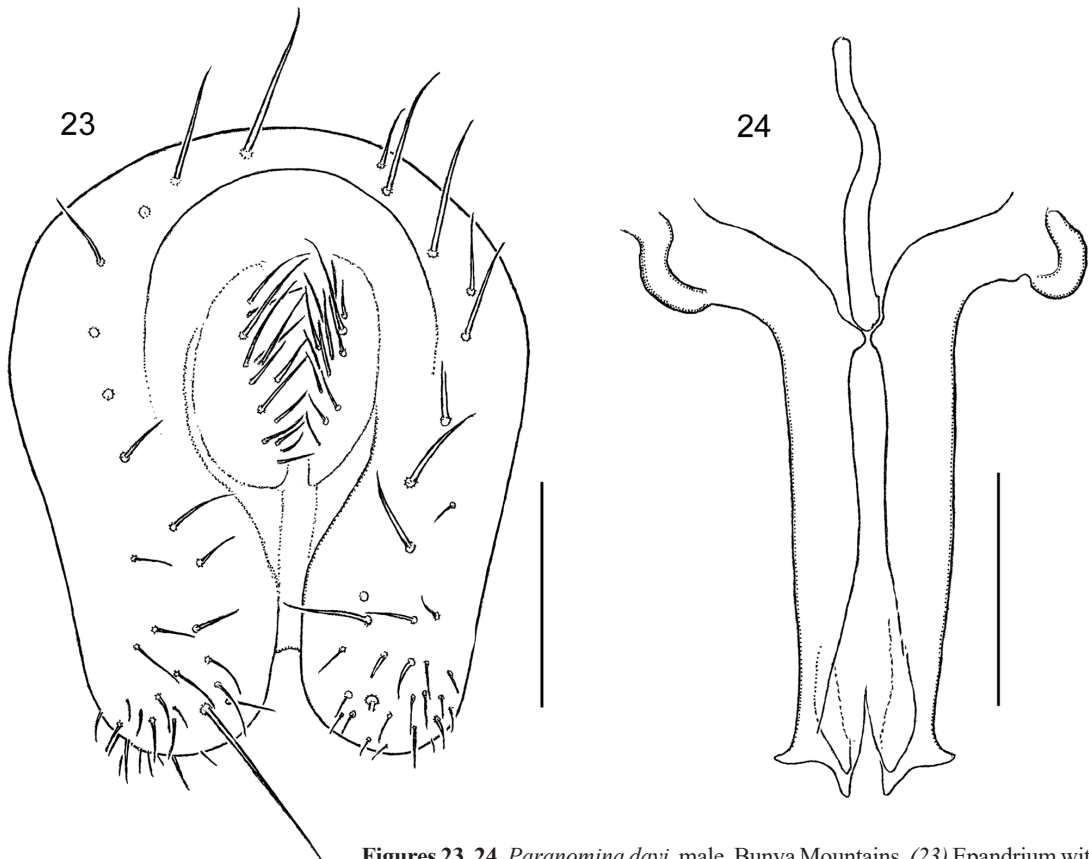
Holotype ♂. New South Wales: Gibraltar Range National Park, swamp area, 9.ii.1982, B.J.D. (AM K.456346). On leaves of *Xanthorrhoea*. On micropin through polyporus. **Paratypes.** New South Wales: 3♀♀, 10 km NW of "Tuglo", 48 km N of Singleton, 9–10 Dec. 1981, B.J.D. (AM). Queensland: 3♂♂, 2♀♀, Bunya Mountains, April 1972, G.D. (AM, QM).

Description (male, female). Agreeing with generic description, but with distinctive pigmentation of thorax and legs.

Coloration Head largely tawny to tawny-brown; face and parafacial more or less whitish-pruinescent, lower and some lateral parts of face grey-brown. Antenna tawny-brown with some grey pruinescence; segment 3 often partly darker; arista black. Prelabrum tawny-brown; palpus tawny to brown. Thorax largely tawny-brown; humeral callus blackish brown on c. lower quarter of surface; mesopleuron with dark brown zone covering anterior half and extending narrowly



Figure 22. *Paranomina dayi*, male, Bunya Mountains.



Figures 23, 24. *Paranomina dayi*, male, Bunya Mountains. (23) Epandrium with surstyli, posterior view, scale = 0.2 mm. (24) Aedeagal complex, anterior view, scale = 0.2 mm.

to posteroventral extremity; sternopleuron largely brown, with greyish pruinescence. Coxae largely tawny; femora brown-black, narrowly tawny apically; tibiae dark brown to blackish; tarsi brown. Wing hyaline; halter dull yellow. Abdominal tergites tawny-brown to dark brown.

Male postabdomen very similar to that of *P. mouldsorum* except as indicated. Surstylus on distal surface commonly with one or two larger, prominent setulae; aedeagal rod resembling that of *P. mouldsorum*, but longer relative to surstylus, with medially placed terminal tooth compressed, broadly rounded in lateral view.

Dimensions. Total length, males 4.3–5.1 mm, female 4.6 mm; length of thorax, males 2.1–2.2 mm, female 2.1 mm; length of wing, males 5.3–5.5 mm, females 4.9–5.2 mm.

Distribution. Higher rainfall areas of south-eastern Queensland and north-eastern New South Wales.

Notes. *Paranomina dayi* is readily distinguished from other species by the extensive brown-black zones on the legs, thoracic pleura, and abdominal tergites. It is closest morphologically to *P. mouldsorum*, but the tooth-like projections on the aedeagal rod differ in shape.

The specific epithet refers to Barry James Day, who collected significant material for this project.

Paranomina longa sp. nov.

<http://zoobank.org/NomenclaturalActs/74237910-7955-458E-9673-A5295151DC8D>

Figs 25, 26

Holotype ♂. Tasmania: Tyenna River, near [Mount Field] National Park, 400 ft [c. 122 m], 12.i.1960, D.K.M. (AM K.456347). **Paratypes.** Tasmania: 1♀, Seven Mile Beach, near Hobart, March 2005, B.J.D., D.K.M. (AM); 1♂, Mount William National Park, Jan. 1988, G.D., A.D. (QM).

Description (male, female). Agreeing with generic description in most characters, but body more elongate than in other species and head more pointed in profile.

Coloration generally tawny yellow. Head with somewhat variable brownish spot between antennal base and eye; face, parafacial, prelabrum and palpus paler yellowish. Thorax without brown markings, largely shining, with relatively slight development of pruinescence. Legs without darker zones. Wing hyaline; halter yellow. Abdomen pale tawny-yellow.

Head (Fig. 25) more acutely produced anteriorly in profile than other species of genus.

Thorax. Dorsocentral bristles 1+3, anterior one markedly anterior to transverse suture and only very slightly smaller than posterior ones; prescutellar acrostichal bristle well developed; small acrostichal setulae extensively biseriolate; scutellum slightly longer than in *P. unicolor* and other species, more convexly protruding between apical pair of bristles.

Male postabdomen. Surstyler-epandrial complex (Fig. 26) more elongate than in other *Paranomina* species, with numerous scattered short setulae; each surstylus apically slightly expanded and indistinctly bilobed; aedeagus not examined in detail.



Figure 25. *Paranomina longa*, female, Seven Mile Beach.

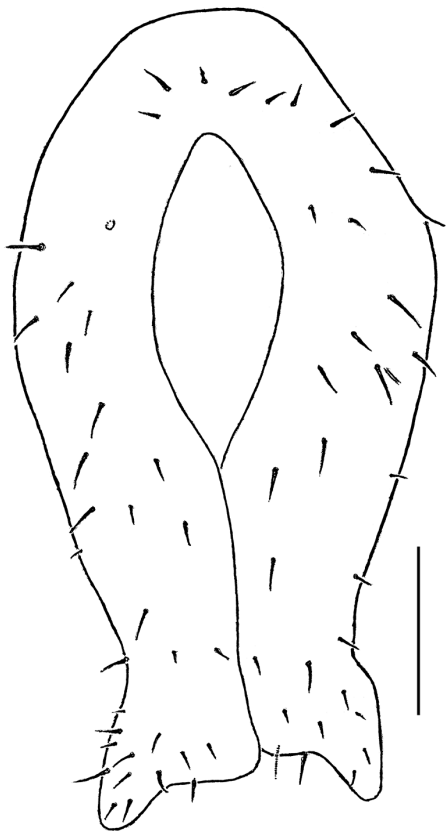


Figure 26. *Paranomina longa*, male, Mount William National Park. Epandrium with surstyli, scale = 0.2 mm.

Dimensions. Total length, males 5.1 mm, female 4.6 mm; length of thorax, males 2.0–2.1 mm, female 2.2 mm; length of wing, males 4.9–5.0 mm, female 5.3 mm.

Distribution. Tasmania: apparently widely distributed.

Notes. *Paranomina longa* differs most obviously from other species of the genus in its more elongate head and thorax and the presence of four pairs of long dorsocentral bristles, instead of the usual three pairs. In the male, the shape of the surstylus is distinctive, but the material has not proved adequate for a description of the aedeagal features.

I particularly noted that there were absolutely no plants of *Xanthorrhoea* in the habitat where I collected *P. longa* at Seven Mile Beach. It appears possible that this is the only species of *Paranomina*, if it is correctly placed in this genus, which is not closely associated with *Xanthorrhoea* species.

The specific epithet refers to the comparatively elongate head and thorax of this species.

ACKNOWLEDGMENTS. The following helped with field collection of flies from *Xanthorrhoea* plants: Greg Daniels, Barry Day, Geoff Holloway, Barbara and Max Moulds, Margaret Schneider. John C. Martin has contributed much through his work on microphotography. Geoff Monteith, Peter Sehnal, and Jacquie Recsei arranged loan of significant material. Russell Cox, Helen Smith, and Shane McEvey helped check details for the manuscript.

References

- Crampton, G. C. 1942. The external morphology of the Diptera. Guide to the Insects of Connecticut. *State Geological and Natural History Survey Bulletin* 64: 10–165.
- Evenhuis, N. L., and T. Okadome. 1989. Family Lauxaniidae. In *Catalog of the Diptera of the Australasian and Oceanian Regions*, ed. N. L. Evenhuis. *Bishop Museum Special Publication* 86: 576–589.
<https://doi.org/10.5962/bhl.title.49897>
- Ferrar, P. 1987 (1988). A guide to the breeding habits and immature stages of Diptera Cyclorrhapha, 907 pp. Leiden: E. J. Brill and Scandinavian Press.
- Froggatt, W. W. 1909. Report on parasitic and injurious insects. New South Wales Department of Agriculture. Pp. 1–116, pl. 1–8.
- Fuller, M. E. 1934. Notes on the genus *Ophiodesma* (Dipt., Stratiomyiidae). *Proceedings of the Linnean Society of New South Wales* 59: 421–429.
- Hendel, F. 1907. Neue und interessante Dipteren aus dem kaiserl. Museum in Wien. *Wiener entomologische Zeitung* 26: 223–245.
<https://doi.org/10.5962/bhl.part.8886>
- Hendel, F. 1908. Diptera Fam. Muscaridae, Subfam. Lauxaniinae. *Genera Insectorum* 68: 66 pp., 3 pls.
- Kim, S. P. 1994. *Australian lauxaniid flies: revision of the Australian species of Homoneura van der Wulp, Trypetisoma Malloch, and allied genera (Diptera: Lauxaniidae)*. *Monographs on Invertebrate Taxonomy* vol. 1. East Melbourne: CSIRO Australia. Pp. vii + 417.
<https://doi.org/10.1071/9780643105164>
- Malloch, J. R. 1927. Notes on Australian Diptera, No. xiii. *Proceedings of the Linnean Society of New South Wales* 52: 399–446.
- Malloch, J. R. 1928. Notes on Australian Diptera, No. xv. *Proceedings of the Linnean Society of New South Wales* 53: 319–335.
- McAlpine, D. K. 2007. The surge flies (Diptera: Canacidae: Zaleinae) of Australasia and notes on tethinid-canacid morphology and relationships. *Records of the Australian Museum* 59(1): 27–64.
<https://doi.org/10.3853/j.0067-1975.59.2007.1468>
- McAlpine, D. K. 2011. The clawless upside-down fly, *Nothoasteia clausa* (Diptera: Neurochaetidae): notes on distribution, behaviour, and comparative morphology. *Tijdschrift voor Entomologie* 154: 159–165.
<https://doi.org/10.1163/004074912X13397496981346>
- McAlpine, D. K., and S. P. Kim. 1977. The genus *Lenophila* (Diptera: Platystomatidae). *Records of the Australian Museum* 30(13): 309–336.
<https://doi.org/10.3853/j.0067-1975.30.1977.391>
- Papp, L. 2007. A review of the Old World Trigonometopini Becker (Diptera: Lauxaniidae). *Annales Historico-Naturales Musei Nationalis Hungarici* 99: 129–169.
- Stuckenberg, B. R. 1971. A review of the Old World genera of Lauxaniidae (Diptera). *Annals of the Natal Museum* 20: 499–610.