

## Beach Flies (Diptera: Tethinidae: Tethininae) From Australia and Papua New Guinea, with Descriptions of Two New Genera and Ten New Species

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**ABSTRACT.** This paper deals with the subfamily Tethininae of the Beach Flies Tethinidae from Australia and Papua New Guinea. Two new genera and ten new species are described: *Sigaloethina phaia* n.gen. and n.sp., *Thitena cadaverina* n.gen. and n.sp., *Dasyrhicnoessa atripes* n.sp., *D. ciliata* n.sp., *D. humilis* n.sp., *D. longisetosa* n.sp., *D. macalpinei* n.sp., *D. ostentatrix* n.sp., *D. pallida* n.sp., and *D. priapus* n.sp. A new species group, the *Dasyrhicnoessa ciliata*-group, is proposed. It differs from congeners primarily in its long-haired arista, slender body and legs, and peculiarities in the male terminalia. New records for Australia and Papua New Guinea are also given for species previously described. The recently described *Dasyrhicnoessa clandestina* Munari, 2002 is recorded for the second time from Fiji where it was found in association with *D. insularis* (Aldrich, 1931). A key is proposed to all genera and species of Tethininae known from Australia and Papua New Guinea. An updated checklist to the world species of *Dasyrhicnoessa* as well as a catalogue of the Tethininae of Australia and Papua New Guinea are also given.

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Tethinids are small flies chiefly inhabiting the temperate and tropical shores of all seas and oceans of the world. Some species are also found inland, associated with saline environments, in particular continental salt lakes and alkaline hot springs. Within the family, many species seem to be strictly dependent on proximity to the sea, i.e. true thalassophilous flies mostly inhabiting the intertidal zone, wrack heaps, salt marshes, dune vegetation, lagoon-litoriparian zones, mangroves (particularly species of *Dasyrhicnoessa* Hendel), and salty soils or bare sand. Other species are more widely halophilous, and are commonly found on various types of saline biotopes, irrespective of the presence of littoral environments. Some species in the subfamily Pelomyiinae are associated with meadows that occur in mountain passes, forests, and desert oases. In the

subfamily Apetaeninae, a few subantarctic species occur on seabird guano and are strictly associated with colonies of penguins and other shorebirds. Tethinids are also recorded from habitats that have been adversely modified by human activity, such as meadows polluted by industrial emissions (Bährmann, 1982) or slaughterhouses and poultry farms (Zuska & Laštovka, 1969). These synanthropic habitats are usually sites of salt accumulation and enrichment. The biology and immature stages of this family are poorly known (for a brief synopsis see Mathis & Munari, 1996). Often sites where tethinids occur have numerous individuals of only a few species.

The family is subdivided into five subfamilies that include 15 genera with approximately 160 species (including the new taxa described in the present work).

### Historical review

Records of beach flies from Australia and Papua New Guinea are fragmentary. The oldest citation of tethinids from Australia dates to 1924, when Malloch described *Tethina nigriseta* from Woolgoolga, NSW. This is a very common species on the eastern seashores of Australia. Later, Malloch (1935) described *Tethina (Macrotethina) tibiseta* (a junior synonym of *Pseudorhichnoessa spinipes*), *Dasyrhichnoessa fulvescens* and *D. serratula* from Townsville, Qld. In the same paper, Malloch also described *Tethina (Tethina) pallidiseta* from Collaroy, NSW, a common species in southern and eastern Australia, and he listed *T. nigriseta* from Sydney and Townsville.

The subfamily Zaleinae has an uncertain systematic position between Canacidae and Tethinidae (themselves in turn possible subgroups of a same family) and comprising species with transitional features that prevent satisfactory and reliable taxonomic attribution. D.K. McAlpine (1982, 1985) designated the new subfamily and described the genus *Zalea* represented by three species from New Zealand and New South Wales. A few years later, Colless & D.K. McAlpine (1991) published an important synopsis dealing with the Australian flies, in which the family Tethinidae was concisely defined and included illustrations (head and wing) of *Tethina nigriseta*.

In the only work specifically dealing with beach flies from southwestern Australia, Munari (2000) described the genus *Plesiotethina*, with the single species *P. australis*, and the peculiar species *Tethina hirsuta*. Also, in the same paper, *Tethina ochracea* (Hendel) and *T. pallidiseta* Malloch were reported from southwestern Australia.

Most of the above-mentioned species are also recorded in Mathis & Sasakawa's (1989) and Mathis & Munari's (1996) catalogues dealing with Australasian/Oceanian and World faunas respectively. The citations reported in the two catalogues obviously take into account only the well known records from the literature and do not contain original distribution data. No Tethinid species have been previously recorded from Papua New Guinea.

### Materials and methods

The present work is based on the study of more than 1400 specimens of Tethininae from the collection of the Australian Museum, Sydney. The material is mostly from the eastern coast of Australia with some specimens from

elsewhere in Australia, Papua New Guinea and a few Pacific islands (for the latter localities see the final appendix). Most specimens are glued to triangular points or double mounted by minuten in blocks. Because specimens are small, usually less than 4 mm in length, study and illustration of male terminalia required use of dissecting and compound microscopes. In the text, genera and species as well as the localities of capture under each species, are listed in alphabetical order. Holotype and paratype label data are quoted without interpretation; a slash (/) indicates the end of a line of print or handwriting, two slashes (//) signifies another label. Significant supplementary or qualifying information is presented in brackets. The descriptions of new species are based primarily on their respective holotypes with variation being accounted for in the remarks section or directly added in the description itself.

Under the description of each new species, the holotype measurements are given with paratype range between parentheses where appropriate. The morphological terminology chiefly follows that published in the Manual of Nearctic Diptera (J.F. McAlpine, 1981), except for the first antennal flagellomere for which the term "postpedicel" (*sensu* Stuckenberg, 1999) has been used. The fine figures illustrating the habitus of both *Sigaloethina phaia* and *Thitena cadaverina*, as well as the scutellum of the latter species, have been skillfully drawn and inked by Mrs. Gioiella D'este (courtesy of MCV), an artist of the Natural History Museum, Venice. All remaining figures, mostly illustrating male terminalia, were drawn and inked by the author.

Acronyms for museums, especially to indicate the deposition of a primary type: AM, Australian Museum, Sydney, Australia; BMNH, The Natural History Museum [former British Museum (Natural History)], London, England; BPBM, Bernice P. Bishop Museum, Honolulu, Hawaii, USA; DEI, Deutsches Entomologisches Institut, Eberswald, Germany; MCV, Natural History Museum, Venice, Italy; NMW, Naturhistorisches Museum, Vienna, Austria; TAU, Tel Aviv University, Tel Aviv, Israel; USNM, National Museum of Natural History (former United States National Museum), Smithsonian Institution, Washington, D.C., USA; ZSM, Zoologische Staatssammlung München, Germany. Abbreviations for primary types: HT, holotype; and LT, lectotype. States and territories of Australia are abbreviated as follows: NSW, New South Wales; NT, Northern Territory; QLD, Queensland; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

### Key to genera and species of Tethininae from Australia and Papua New Guinea

Note: the following key should be regarded as preliminary, particularly with regard to the species of the genus *Dasyrhichnoessa*, due to the marked similarity among species as well as the scarcity of available material. The characters of the male specimens are used because female features are not diagnostic. *Plesiotethina australis* has been provisionally inserted in the key for practical purposes, although it may not belong in the Tethininae as it "may be regarded as a possible sister group either to *Tethina* or even to the entire subfamily Tethininae" (Munari, 2000). Conversely, *Dasyrhichnoessa serratula* has been intentionally excluded from the key because of its doubtful specific status (see text).

- |   |   |   |
|---|---|---|
| 1 | Disc of scutellum setulose (Fig. 30); at least mid and hind tibiae with strong setae .....  | 2 |
| — | Disc of scutellum bare; tibiae usually evenly setulose, bearing short setae and setulae (except for <i>Tethina hirsuta</i> having legs strongly setulose) ..... | 3 |

- 2 Costal vein abbreviated, not extending beyond end of vein  $R_{4+5}$ ; legs of male normally setulose, without long villosity; at least hind femur and tibia with more or less extended apical dark ring; 6 rows of acrostichal setulae on anterior half of scutum ..... *Pseudorhichnoessa spinipes* Malloch
- Costal vein not abbreviated, reaching end of  $M_1$ ; legs of male, in particular forelegs, bearing characteristic long and thick villosity (Fig. 29); femora and tibiae unicolorous; 8–9 rows of acrostichal setulae on anterior half of scutum ..... *Thitena cadaverina* n.gen. and n.sp.
- 3 Lower face, just above vibrissal angle, with small, shining, sclerotized tubercle; anterior surstylus of male terminalia absent [genus *Tethina* Haliday] ..... 4
- Lower face simple, without shining, sclerotized tubercle; anterior surstylus of male terminalia present ..... 7
- 4 Setal vestiture of body and legs whitish ..... *Tethina pallidiseta* Malloch
- Setal vestiture of body and legs black ..... 5
- 5 Legs with tibiae bearing rows of strong, posterodorsal setae; 5 (2+3) dorsocentral setae; abdomen distinctly setose, in any case always with setae much more numerous, stronger, and longer than congeners ..... *Tethina hirsuta* Munari
- Legs with tibiae evenly setulose, bearing short black setae and setulae; 4 (1+3) dorsocentral setae; abdomen with unmodified setation ..... 6
- 6 Lateral profile of head with vertically flattened face; longitudinal, subshining stripe of gena distinctly broad; acrostichal setulae usually in 2–3 rows; terminalia of male with surstylus bearing numerous, stout spinulae about as long as or shorter than thickness of apical part of surstylus in posterior view ..... *Tethina ochracea* (Hendel)
- Lateral profile of head with face not vertically flattened but slightly depressed; gena uniformly microtomentose, without longitudinal, subshining stripe; 4 rows of acrostichal setulae; terminalia of male with surstylus bearing numerous, very long, stout spinulae, mostly distinctly longer than thickness of apical part of surstylus in posterior view (Fig. 28) ..... *Tethina nigriseta* Malloch
- 7 Body cuticle distinctly glossy dark brown; anterior surstylus of male terminalia distinctly larger than posterior surstylus, arising from extremity of lower apical part of epandrium, and bearing characteristic triangular patch of microtrichia on outer surface (Fig. 24) ..... *Sigaloethina phaia* n.gen. and n.sp.
- Body cuticle distinctly dull to translucent yellowish, generally covered with more or less dense microtomentum; anterior surstylus of male terminalia usually smaller than posterior surstylus, never arising from extremity of lower apical part of epandrium, and without patch of microtrichia on outer surface ..... 8
- 8 Eye without interfacetal setulae; vibrissal angle of gena poorly marked, gently curved upwards; true vibrissa absent; acrostichal setulae short and thin, almost microscopic in male; ctenidium of fore femur absent; anterior surstylus of male terminalia rudimentary, reduced to small, knoblike sclerite bearing cluster of long, thin setulae ..... *Plesiotethina australis* Munari
- Eye densely micropubescent; vibrissal angle of gena strongly marked; true vibrissa present; acrostichal setulae of normal length in both sexes; ctenidium of fore femur variable; anterior surstylus of male terminalia more or less developed, never rudimentary or knoblike [genus *Dasyrhichnoessa* Hendel] ..... 9

- 9 Abdomen with 3 (2 lateral and 1 median) dark, rounded spots on each tergite ..... *Dasyrhicnoessa tripunctata* Sasakawa  
 — Abdomen without dark, rounded spots ..... 10
- 10 Arista bearing distinctly long, spaced hairs (Fig. 8); body and legs bright yellow to yellowish; slender flies [*ciliata*-group] ..... 11  
 — Arista micropubescent to short-haired (Fig. 7); colour of body and legs variable; flies of usual aspect within genus ..... 13
- 11 Fore femur with ctenidial comb formed by short, strong, black spinulae, in females distinctly weaker and thinner; 4 rows of acrostichal setulae; mid femur of male with posteroventral armature formed by spine-like, black setae arranged on entire length of femur; posterior surstylus of male terminalia lacking characteristic cluster of thin setulae on inner side (Figs. 5–6) ..... *Dasyrhicnoessa ciliata* n.sp.  
 — Fore femur lacking true ctenidium, only weak row of thin setulae present; 5–6 rows of acrostichal setulae; mid femur of male with posteroventral armature formed by spine-like, black setae mostly arranged on distal half of femur; posterior surstylus of male terminalia with characteristic cluster of thin setulae on inner side (Figs. 11–12, 20–21) ..... 12
- 12 Setae of mesonotum long, distinctly longer than ones of congeners; postocular setae of normal size; last tarsomere of legs very slightly infuscated; cerci of male terminalia small, in lateral view as long as anterior surstylus (Figs. 11–12) ..... *Dasyrhicnoessa longisetosa* n.sp.  
 — Setae of mesonotum of normal size; postocular setae somewhat long and very distinctive; tarsi homogeneously yellowish; cerci of male terminalia strikingly longer and broader than ones of congeners, in lateral view noticeably longer than anterior surstylus (Figs. 20–21) ..... *Dasyrhicnoessa priapus* n.sp.
- 13 Hind tibia of male bearing long, thin, yellowish pubescence on posteroventral distal half; male terminalia (Figs. 13–14) with epandrium bearing characteristic cluster of 8–9 very long setae on entire anteroventral part; anterior surstylus strongly reduced, hardly visible in lateral view; cerci long and narrow in both lateral and caudal views; small-sized, body length < 1.4 mm ..... *Dasyrhicnoessa macalpinei* n.sp.  
 — Hind tibia evenly setulose, bearing short setae and setulae; male terminalia with epandrium not as above, at most bearing 3 long setae on anteroventral part (Fig. 9), in latter case cerci distinctly stumpy; anterior surstylus more or less developed, always well discernible in lateral view; cerci not as above; body length > 1.4 mm ..... 14
- 14 Mid and hind legs with last tarsomere pitch-black, and foreleg with distal two tarsomeres of same colour, strongly contrasting with remaining yellowish tarsomeres; terminalia of male horseshoe-shaped in posterior view (Fig. 4) ..... *Dasyrhicnoessa atripes* n.sp.  
 — Distal tarsomeres of legs at most slightly infuscated; terminalia of male not as above ..... 15
- 15 Acrostichal setulae in 4 rows irregularly arranged on anterior half of scutum; yellow species with first three tergites of abdomen widely pitch-black (this character must be verified by examination of more abundant material), strongly contrasting with remaining tergites; setal vestiture of mesonotum pale brownish to golden yellow; fore femur lacking true ctenidium ..... *Dasyrhicnoessa fulvescens* Malloch  
 — Acrostichal setulae in 6 distinct rows on anterior half of scutum; darker species having brownish yellow to dark grey thorax; first three tergites of abdomen differently coloured, never strongly contrasting with remaining tergites; setal vestiture of mesonotum distinctly brown to black, often with setae showing golden reflections; presence of true ctenidium variable ..... 16

- 16 Gena with distinct, longitudinal, apparently translucent, narrow stripe; abdomen with posterior surstyli of male terminalia noticeably and characteristically exposed outwardly ..... *Dasyrhicnoessa ostentatrix* n.sp.
- Gena homogeneously microtomentose; abdomen with posterior surstyli of male terminalia partially to fully hidden inside postabdominal sclerites ..... 17
- 17 Posteroventral armature of male mid femur with distal part characteristically crest-shaped, formed by strong, close, black spinulae abruptly decreasing in length distally; anterior surstylus of male terminalia large, paddle-shaped, very much longer than small knoblike posterior surstylus ..... *Dasyrhicnoessa ferruginea* (Lamb)
- Posteroventral armature of male mid femur with distal part not crest-shaped, at most entire armature formed by regularly spaced spinulae gradually decreasing in length on distal third; anterior surstylus of male terminalia distinctly to slightly shorter than posterior surstylus, latter never knoblike ..... 18
- 18 Anterior surstylus of male terminalia small, rodlike or similar to short lobe, bearing few apical hairs (Figs. 9, 18) ..... 19
- Anterior surstylus of male terminalia noticeably broad, not rodlike or short lobe-shaped, bearing numerous microspinulae or strong setae on posterior and apical margins ..... 21
- 19 True ctenidium of fore femur present; posterior surstylus of male terminalia posteriorly directed (lateral view), bearing characteristic row of long, strong setae on lower edge (anterior margin) .. *Dasyrhicnoessa sexseriata* (Hendel)
- True ctenidium of fore femur absent; posterior surstylus of male terminalia vertically directed (lateral view), bearing more or less sparse, microscopic hairs on anterior margin (Figs. 9, 18) ..... 20
- 20 Golden yellow patches on both sides of ocellar triangle somewhat broad, merging before anterior ocellus; longest diameter of eye about 5.6× genal height; anterior surstylus of male terminalia short and squat, lobe-shaped; posterior surstylus (lateral view) stumpy, subquadrate, medially only slightly wider than long, pointed apically (Fig. 9) ..... *Dasyrhicnoessa humilis* n.sp.
- Golden yellow patches on both sides of ocellar triangle separated, generally not merging before anterior ocellus; longest diameter of eye about 4.5× genal height; anterior surstylus of male terminalia relatively long and thin; posterior surstylus (lateral view) moderately slender, lobe-shaped, distinctly longer than wide, rounded apically (Fig. 18) ..... *Dasyrhicnoessa pallida* n.sp.
- 21 Yellowish species; anterior surstylus of male terminalia large, subquadrate to subtrapezoidal (lateral view), having both posterior and ventral margins microscopically and very irregularly serrated, bearing some sparse, marginal microspinulae .... *Dasyrhicnoessa vockerothi* Hardy & Delfinado
- Noticeably darker species, brownish grey to dark grey; anterior surstylus of male terminalia distinctly subrectangular in lateral view, kidney-shaped in posterior view, bearing several, close, long and strong setae on both posterior and apical margins ..... *Dasyrhicnoessa insularis* (Aldrich)

### Taxonomic account

#### *Dasyrhicnoessa atripes* n.sp.

Figs. 1–4

**Type material.** HOLOTYPE ♂, Australia, New South Wales “NSW: Wategos / Beach, Cape Byron / 7 Nov. 2000 // Beach, Cape Byron / 7 Nov. 2000 [sic] // HOLOTYPE / *Dasyrhicnoessa atripes* sp. n. ♂ / L. Munari des.” AM K186735. The specimen is headless (see text), for the rest it is in excellent condition, and is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen.

**Description.** *Size.* Body length about 2.3 mm (supposed), wing length 1.92 mm, wing width 0.75 mm. *Habitus.* Grey species with yellow legs and yellowish grey wings. All setae and setulae black, except for abdominal setae having golden reflections. *Head.* Missing. Nevertheless, considering that the morphological characters as well as the chaetotactic pattern of the head in most species belonging to this genus are not very informative at the specific level, I have judged it reasonable to name and describe the new species since the rest of the specimen is in excellent condition. *Thorax.* Entirely dark brown, covered with grey microtomentum; 1+3 dorsocentral setae; 6 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4–6 rows; prescutellar acrostichals long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and distinctly weaker; 1 long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below it 1 shorter and weaker seta; 2 postalars, external one distinctly longer and stronger; scutellum with apical area yellowish, bearing 4 long marginal setae, apical ones longer; both proepisternal and proepimeral setae present; anepisternum with several long setulae, and 3 long, posteriorly directed, postero-marginal setae, mid one longer and stronger, and 1 erect seta at posterodorsal margin; katapisternum with scattered, short pubescence, bearing long and strong posterodorsal seta; anepimeron, katatergite and meron without setae and setulae. *Legs.* Entirely yellow, except for last tarsomeres which are pitch-black; evenly setulose, bearing short black setae and setulae; foreleg having coxa with long and strong setae, and femur with long posterodorsal and posteroventral setae, latter ones on apical half only; fore femur with ctenidial comb formed by short, black spinulae antero-ventrally on distal third; mid femur with comb of posteroventral, short, spine-like setae, decreasing in length distally; hind femur not swollen; mid and hind legs with last tarsomere pitch-black, foreleg with last two tarsomeres of same colour, strongly contrasting with remaining yellowish tarsomeres. *Wing.* Veins yellowish, membrane yellowish grey; alula with fringe formed by several, close, long, black setae; costal vein reaching end of  $M_1$ , bearing several, short, spaced, microscopic setulae on dorsal and ventral surfaces;  $R_{2+3}$  slightly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending at basal third of cell *dm*; crossvein *dm-cu* distinctly shorter than half of last section of  $CuA_1$ ; halter pale yellow. *Abdomen.* Blackish, with setal vestiture formed by dark setulae and black postero-marginal setae on each tergite, latter setae having golden reflections; transverse stripes at posterior

edge of tergites somewhat broad, yellowish. *Male terminalia* (Figs. 1–4). Epandrium bearing pair of moderately long setae dorsally, and several short setae on remaining posterior surface; cercus small, pubescent, covered with microscopic hairs and with long setae dorsally; anterior surstylus stumpy in lateral view, narrow in posterior one, bearing sparse, thin setae on inner side; posterior surstylus very stumpy, bearing several spine-like setae on inner side; aedeagal apodeme long, straight, only slightly bent distally; ejaculatory apodeme large, as long as or slightly longer than half of aedeagal apodeme, with broad distal fan; distiphallus long, ribbon-like, micropubescent.

**Female.** Unknown.

**Distribution.** Australia (NSW).

**Remarks.** Additional material of this interesting species is needed to corroborate the consistency of the character state “colour of last tarsomeres pitch-black” and to see the head.

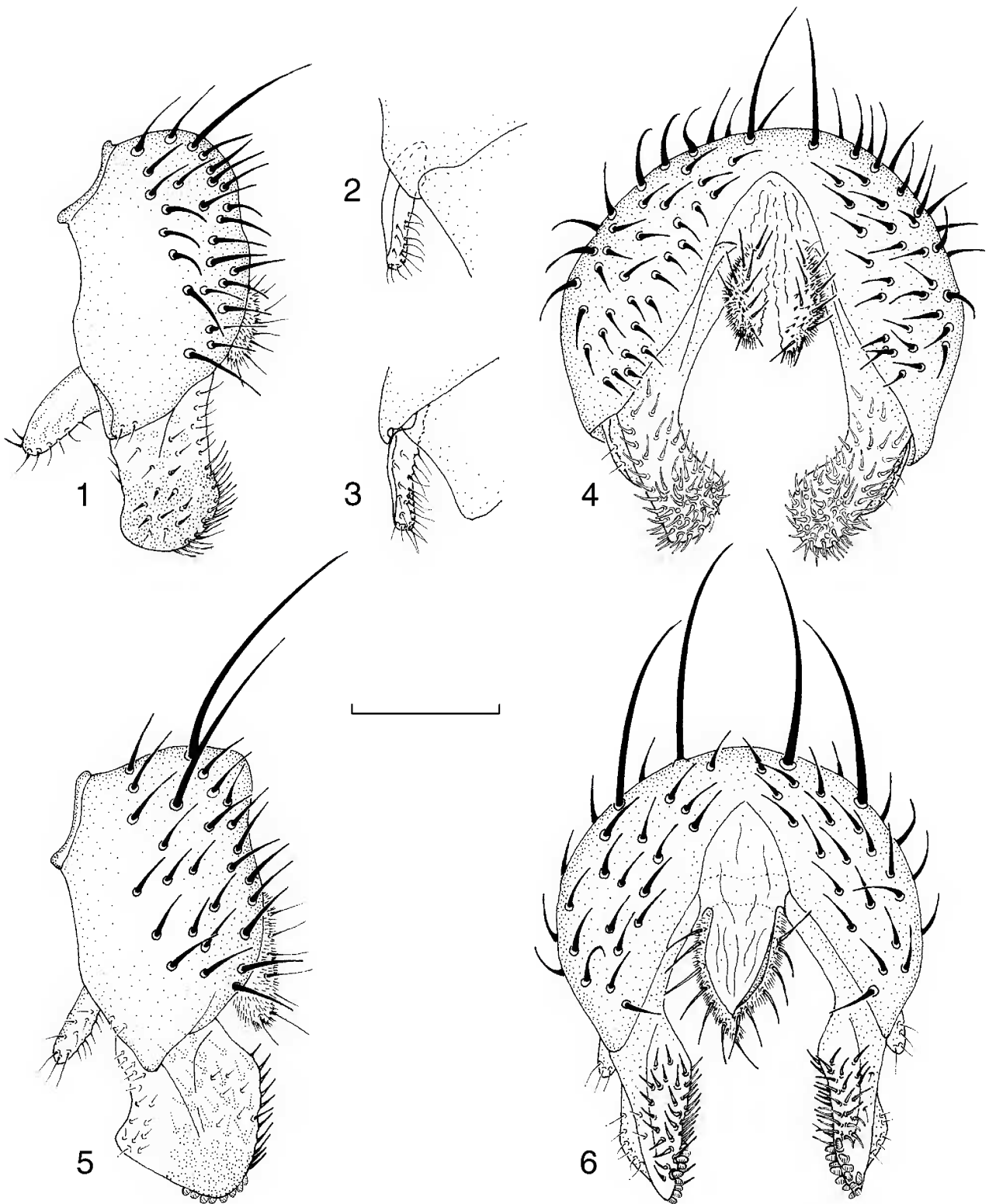
**Etymology.** Compound word, from the Latin *ater* meaning black and *pes* meaning foot. The specific epithet refers to the pitch-black last tarsomeres of the legs.

#### *Dasyrhicnoessa ciliata* n.sp.

Figs. 5–6

**Type material.** HOLOTYPE ♂, Australia, Northern Territory “NT: Buffalo Ck, / Darwin; 2–5 Mar. / 1996; D.K. McAlpine, / G.R. Brown” // “HOLOTYPE / *Dasyrhicnoessa ciliata* sp.n. ♂ / L. Munari des”, AM K186736. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card label); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES 2 ♀♀ same data as holotype. One paratype has an additional, orange label with handwritten “Laboulb.” The holotype and one paratype are deposited in AM, the second paratype is preserved in MCV.

**Description.** *Size.* Body length 2.3 mm (2.1–2.3), wing length 1.9 mm (1.8–1.9), wing width 0.7 mm (0.67–0.72). *Habitus.* Yellow species with setal vestiture of thorax black. Head yellow with antenna bearing very long-haired arista. Wings yellowish grey. *Head.* Entirely yellow; frons, including orbital vittae, homogeneously yellow, except for usual golden yellow patch on both sides of ocellar triangle; paravertic setae well developed, inclinate; inner vertical seta slightly inclinate, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae somewhat long, former setae in 1–2 rows; upper postocular seta long, inclinate towards inner vertical seta; ocellar triangle bearing pair of long, thin pseudopostocellar setae in addition to pair of strong ocellars; 2–3 very short, thin setulae between ocellars and pseudopostocellars; 3 strong, laterocline orbital setae; row of long, thin, inclinate setulae on orbital vitta between two anterior orbitals and frontals; 3 pairs of frontal setae, anterior one short and thin in male holotype, plus 2 pairs of thin setulae, all setae and setulae inclinate, mid pair with setae distinctly cruciate at apex; antenna with large and pubescent postpedicel, bearing blackish, very long-haired arista (Fig. 8); eye micropubescent, very large, distinctly oblong vertically, its longest diameter 5× as long



Figs. 1–6. Terminalia of male. *Dasyrhicnoessa atripes* n.sp.: (1) lateral view; (2) anterior surstylus posterolateral view; (3) anterior surstylus posterior view; (4) posterior view. *Dasyrhicnoessa ciliata* n.sp.: (5) lateral view; (6) posterior view. Scale bar: 0.1 mm.

as genal height; 6–8 blackish peristomal setae, three anteriors, including vibrissa, very strong and long; mouth parts pale yellow, with labellum shorter than length of buccal cavity, and palpus long, slightly clavate, bearing scattered setulae. *Thorax*. Entirely yellow, slightly translucent, with setal vestiture black; 1+3 long dorsocentral setae; 4 rows of

acrostichal setulae on anterior half of scutum, otherwise arranged in 2–3 rows; posterior surface of scutum mostly bare (holotype); prescutellar acrostichals very long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and weaker; 1 long presutural seta; 2 notopleurals

about subequal in length; 1 supra-alar, below it 1 shorter and weaker seta; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; both proepisternal and proepimeral setae present; anepisternum with scattered pubescence, bearing 3 long, posteriorly directed, posteromarginal setae, middle one longer and stronger, and 1 erect, thin seta at posterodorsal margin; katepisternum with few scattered setulae and bearing long posterodorsal seta; anepimeron, katatergite and meron without setae and setulae. *Legs.* Evenly setulose, bearing short blackish to yellowish setae and setulae, except for foreleg having coxa with long, black setae, and femur with a few posterodorsal setae and remarkable row of very long, slightly curved, posteroventral setae; fore femur with ctenidium formed by long, strong, black spinulae (in female distinctly weaker); mid femur of male with row of long, spaced, spine-like, posteroventral black setae evenly arranged on entire length of femur; all legs, including coxae, yellow; last tarsomere slightly infusate. *Wing.* Veins brownish yellow, membrane yellowish grey; alula with fringe formed by erect, black setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on dorsal and ventral surfaces;  $R_{2+3}$  slightly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending before middle of cell *dm*; crossvein *dm-cu* distinctly shorter than one third of last section of  $CuA_1$ ; halter yellowish. *Abdomen.* Brown, bearing several thin setae and setulae; transverse stripes at posterior edge of tergites narrow, whitish. *Male terminalia* (Figs. 5–6). Epandrium bearing two pairs of very long setae dorsally, and several short setae on remaining posterior surface; cercus moderately long, pubescent, covered with microscopic hairs and with long setae dorsally; anterior surstylus small, simple, with sparse, thin setae on both outer and inner sides; posterior surstylus rather broad, with anterior outline markedly sinuous, lobe-shaped; inner side of posterior

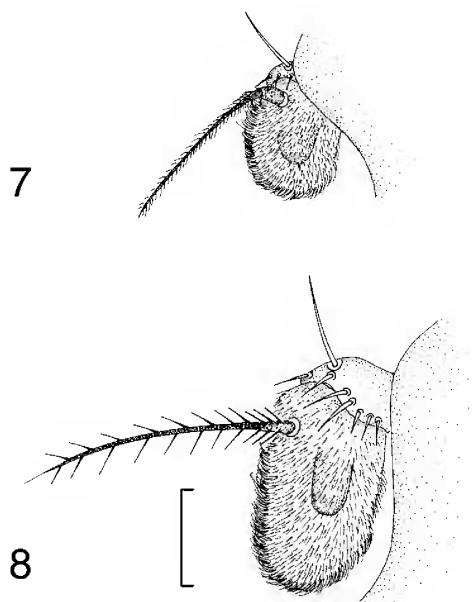
surstylus with many setae and apical cluster of short, stout tubercles; aedeagal apodeme long and straight; distal fan of ejaculatory apodeme poorly developed; distiphallus long, ribbon-like, bearing long micropubescence.

**Female.** Similar to male, except for slight sexual dimorphism. Abdomen pale reddish yellow, marked by medial, longitudinal, brown stripe, and with transverse stripes at posterior edge of tergites hardly discernible; apex of postabdomen with segments telescopically retractile. *Female terminalia.* Cerci moderately long, straight, setulose; spermathecae spherical, smooth.

**Distribution.** Australia (NT).

**Remarks.** This new species is characterized by a long-haired arista (an apomorphic character state with respect to the ground plan of the Tethinidae, Figs. 7–8) as well as by the very enlarged posterior surstylus of the male terminalia (Fig. 5). Both these peculiar features, in addition to the yellow body and legs, and the characteristic slender habitus of the flies, are also found in *D. longisetosa* and *D. priapus* (see below). In my opinion, these three species form a taxonomic group, named here “the *Dasyrhicnoessa ciliata*-group”, in which *D. ciliata* would seem to be the sister species of the monophyletic clade *D. longisetosa* plus *D. priapus*, the latter two species additionally sharing a peculiar cluster of thin setulae arising from the medial side of posteromarginal surface of the posterior surstylus (Figs. 11–12, 20–21) as well as sharing the lack of a true ctenidium which is well developed in *D. ciliata*.

**Etymology.** From the Latin *ciliatum* meaning bearing eyelashes. The specific epithet refers to the long-haired arista of the antennal postpedicel.



Figs. 7–8. Antenna: (7) *Dasyrhicnoessa* spp., arista longest length; (8) *Dasyrhicnoessa ciliata* n.sp. Scale bar: 0.1 mm.

### *Dasyrhicnoessa ferruginea* (Lamb, 1914)

Mathis & Sasakawa, 1989: 667; Mathis & Munari, 1996: 12; Munari & Evenhuis, 2000: 147.

**Material examined.** **Australia, Queensland:** Lloyd Bay, 3 mi N of Claudie River mouth, 25.xii.1971, D.K. McAlpine and G.A. Holloway, 37 ♂♂ 17 ♀♀; Portland Roads, 14.xii.1971, D.K. McAlpine, G.A. Holloway, and D.P. Sands, 1 ♂ 3 ♀♀. **Papua New Guinea,** Port Moresby, Ela Beach, 10.i.1964, D.K. McAlpine, 7 ♂♂ 5 cf. ♀♀ [AM]

**Distribution.** Afrotropical: Kenya, Madagascar, Seychelles (Aldabra, Astove, Mahé). South Indian Ocean Islands: Amsterdam Island. Australasian/Oceanian: Australia (QLD) [new distribution], Caroline Islands (Yap), Mariana Islands (Saipan), Palau, Papua New Guinea [new distribution]. Oriental: China (Hong Kong - Lantau), Malaysia (Sabah, Singapore), Philippines (Balabac, Busuanga, Calicoan, Culion, Leyte, Mindanao, Negros Oriental, Palawan).

**Remarks.** Males of this widespread species are easily distinguished from congeners by the peculiar shape of the posteroventral armature of the mid femur (see key). Conversely, the females are not so easily identifiable, since they are very similar to females of many other species.



***Dasyrhicnoessa fulvescens* Malloch, 1935**

Mathis & Sasakawa, 1989: 667; Mathis & Munari, 1996: 12.

**Distribution.** Australia (QLD).

After thorough examination of the holotype preserved in AM, I am now able (see Munari, 2002) to confirm the validity of this species and dispel any doubt about a possible (see Malloch, 1935) conspecificity with *Dasyrhicnoessa serratula* Malloch. *Dasyrhicnoessa fulvescens* is chiefly characterized by the following combination of characters: body and legs entirely pale to fulvous yellow, except for syntergite 1+2 and tergite 3 broadly blackened (I do not know whether this colour is of pigmental nature or due to *postmortem* factors affecting the internal organs); all setae and setulae golden brownish or golden yellow; arista micropubescent; fore femur lacking true ctenidium, but with 3–4 microscopic, thin hairs present at its place; 4 rather regular rows of acrostichal setulae on anterior half of scutum (thus, not “irregularly sexseriate” as erroneously stated by Malloch [1935]); both proepimeral and proepisternal setae present. No other species of *Dasyrhicnoessa* share these features.

***Dasyrhicnoessa humilis* n.sp.**

Figs. 9–10

**Type material.** HOLOTYPE ♂ **Australia, New South Wales:** “Careel Bay, / Avalon, NSW. / 15 Dec. 1964 / D.K. McAlpine / Mangroves // HOLOTYPUS / *Dasyrhicnoessa / humilis* sp.n. ♂ / L. Munari des.” AM K186737. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES: **Australia, New South Wales:** same data as holotype, 3♂♂ 4♀♀; “Careel Bay / N. South Wales / 27 Oct. 1962 / Mangroves / D.K. McAlpine”, 1♂; “Mangroves / Careel Bay, / Avalon, NSW. / 3 Feb. 1973 / D.K. McAlpine”, 1♂; “In mangroves / North Cronulla / NSW., 1 March, 1962 / D.K. McAlpine”, 1♂. **Australia, Queensland:** “Mangroves. / Gladstone, Qld. / 19 Dec. 1961 / D.K. McAlpine”, 3♂♂ 6♀♀. The holotype and most of the paratypes are deposited in AM, a few paratypes are preserved in MCV.

**Description.** *Size.* Body length 1.7 mm (1.6–2.0), wing length 1.5 mm (1.4–1.7), wing width 0.5 mm (0.5–0.6). *Habitus.* Yellowish grey to dark grey species with setal vestiture golden brown to blackish. Wings yellowish grey. *Head.* Yellowish, with frons reddish yellow and occiput greyish yellow; frons with frontal and orbital vittae covered with whitish microtomentum, and golden yellow patches, on both sides of ocellar triangle, merging before anterior ocellus; paraverticlar setae well developed, strongly inclinate; inner vertical seta inwardly curved, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae short, former ones in two irregular rows; upper postocular seta long, inclinate towards inner vertical seta; ocellar triangle bearing pair of moderately long pseudo-postocellar setae in addition to pair of strong ocellars; 3 very short, thin setulae between ocellars and pseudo-postocellars; 3 strong, laterocline orbital setae; row of thin, inclinate setulae on orbital vitta between 2 anterior orbitals and frontals; 4 short, strong, additional setulae before anterior orbital seta, between this one and anterior margin

of orbital vitta; 3 pairs of frontal setae intercalated with 3 pairs of short, thin setulae, all setae and setulae inclinate, mid pair cruciate at apex; antenna with postpedicel slightly infuscated, brownish, bearing microscopically pubescent, brown arista; Eye micropubescent, large, distinctly oblong vertically, its longest diameter 5.6× as long as genal height; 7 blackish peristomal setae, 3 anterior ones, including vibrissa, long and strong; mouth parts pale yellow, with labellum stumpy, distinctly shorter than length of buccal cavity, and palpus long, slender, bearing scattered black setulae. *Thorax.* Yellowish grey; 1+3 dorsocentral setae; 6 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4 rows; prescutellar acrostichals long; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and weaker; 1 very long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below and before it four short and weak setae; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; proepisternal seta long and strong, proepimeral one weak and slightly shorter; anepisternum with scattered setulae, bearing 3 long, posteriorly directed, posteromarginal setae, mid one distinctly longer and stronger, and 1 erect seta at posterodorsal margin; katepisternum with few scattered setulae, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs.* Evenly setulose, bearing short, blackish setae and setulae, except for foreleg having coxa with scattered, pale brownish, long setae, and femur with posterodorsal and posteroventral rows of spaced, long setae; fore femur without true ctenidium, only with single row of very short, thin, black setulae (possibly spine-like) anteroventrally on distal half; mid femur of male with row of spaced, spine-like, posteroventral black setae, decreasing in length distally; all legs, including coxae, yellow, with last tarsomere slightly infuscated. *Wing.* Veins pale brownish, membrane yellowish grey; alula with fringe formed by long, erect, blackish setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on both dorsal and ventral surfaces;  $R_{2+3}$  distinctly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending at basal third of cell *dm*; crossvein *dm-cu* slightly shorter than one third of last section of  $CuA_1$ ; halter yellowish. *Abdomen.* Syntergite 1+2 yellowish, remaining tergites black, each of them with narrow, apicomarginal, whitish stripe; setal vestiture blackish. *Male terminalia* (Figs. 9–10). Epandrium bearing some long to very long setae on distal half, in particular on anteroapical surface, intermixed with shorter setae on entire posterior surface; cercus small, pubescent, dorsally covered with microscopic hairs and with long setae; anterior surstylus short and stumpy, bearing scattered, thin setae; posterior surstylus rather squat, bearing several long setae and apical cluster of thick tubercles on inner side; aedeagal apodeme long and straight, distinctly sclerotized on distal half; ejaculatory apodeme with well-developed distal fan; distiphallus long and slender, ribbon-like, bearing micropubescence on its basal half and subapically.

**Female.** Similar to male, except for slight sexual dimorphism. *Female terminalia.* Cerci long, straight, bearing scattered, thin setulae; spermathecae spherical, smooth.

**Distribution.** Australia (NSW, QLD).

**Etymology.** From the Latin *humilis* meaning poor, humble or unpretentious. The specific epithet refers to the modest habitus and size of the new species as well as to the simple morphological features of the male terminalia.

*Dasyrhicnoessa insularis* (Aldrich, 1931)

Munari & Evenhuis, 2000: 145–147; Munari, 2002: 546–547, 550.

**Material examined. Australia, Queensland:** Mackay, mangroves, 19.i.1967, D.K. McAlpine & G.A. Holloway, 1 ♂. [AM]

**Distribution.** Afrotropical: Cameroon, Madagascar, Nigeria. Australasian/Oceanian: American Samoa (Tutuila), Australia (QLD) [**new distribution**], Canton Islands, Caroline Islands (Ponhpei, Chuuk, Yap, Palau), Fiji Islands (Ovalau, Suva [**new distribution**, see Appendix], Viti Levu), Hawaii (Hawaii, French Frigate Shoals, Hilo, Maui, Oahu, Pearl and Hermes Reef), Kiribati (Butaritari, Makin, Eita, Tarawa, Abemama), Line Islands (Christmas), Mariana Islands (Saipan, Tinian), Marquesas (Hivaoa, Nuku Hiva), Marshall Islands (Majuro, Japtan, Parry, Lib, Jibu, Jaluit, Namorik), Palmyra Island, Pitcairn Island, Rapa Island, Society Islands (Bora Bora, ?Moorea [see appendix]), Wake Island. Nearctic: Bermuda, USA (Florida). Neotropical: Bahamas (South Bimini), Belize, Brazil (Ceará), Mexico (Tabasco), West Indies (Cuba, Dominica, St. Lucia, St. Vincent).

**Remarks.** A pantropical species easily distinguished from congeners only by examination of the male terminalia. Females not strictly associated with males in the same biotope are not reliably identifiable.

*Dasyrhicnoessa longisetosa* n.sp.

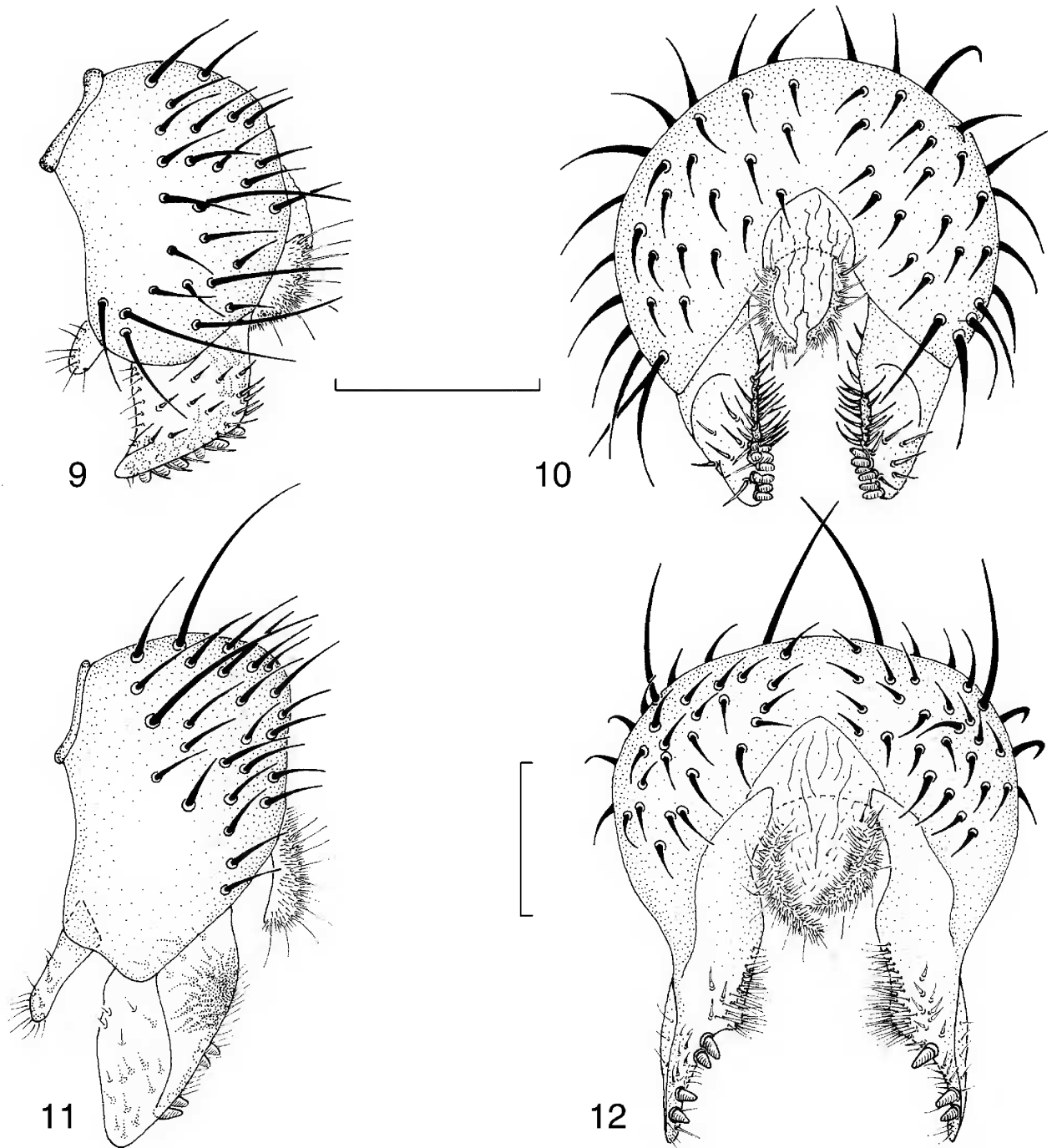
Figs. 11–12

**Type material.** HOLOTYPE ♂ **Papua New Guinea** “Mangroves, / Port Moresby, / Papua 25 Oct. 1963 / D.K. McAlpine” // “HOLOTYPE / *Dasyrhicnoessa longisetosa* sp.n. ♂ / L. Munari des.” AM K186738. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES **Australia, Queensland:** “Mangroves, / Gladstone, Qld. / 19 Dec. 1961 / D.K. McAlpine”, 1 ♂; “Mangroves. / Mackay, Q. / 19 Jan. 1967 // D. McAlpine & / G. Holloway coll.”, 4 ♂ 11 ♀. The holotype and most of the paratypes are deposited in AM, a few paratypes are preserved in MCV.

**Distinguishing features.** The new species is closely related to both *D. ciliata* n.sp. and *D. priapus* n.sp., in particular to the latter species, differing from them noticeably in the morphology of the male terminalia.

**Description.** *Size.* Body length 2.0 mm (2.0–3.1), wing length 1.8 mm (1.8–2.6), wing width 0.6 mm (0.6–1.0). *Habitus.* Yellow species with setal vestiture golden brown. Setae of mesonotum longer than ones of congeners. Head yellow with antenna bearing long-haired arista. Wings yellowish grey. *Head.* Entirely yellow; frons, including orbital vittae, homogeneously yellow, except for usual golden yellow patch on both sides of ocellar triangle; paraverticlar setae well developed, inclinate; inner vertical seta inwardly curved, strong,

about as long as or slightly longer than laterocline outer vertical seta; postocular and postgenal setae somewhat long, former ones in single row; upper postocular seta long and strong, inclinate towards inner vertical seta; ocellar triangle bearing pair of long, thin pseudopostocellar setae in addition to pair of strong ocellars; 2–3 very short, thin setulae between ocellars and pseudopostocellars; 3 strong, laterocline orbital setae; row of long, thin, inclinate setulae on orbital vitta between two anterior orbitals and frontals; 3 pairs of frontal setae plus 2 pairs of thin setulae, all setae and setulae inclinate, two anterior frontal setae cruciate at apex; antenna with large and pubescent postpedicel, bearing blackish, long-haired arista (an apomorphic character state); eye micropubescent, very large, slightly oblong vertically, its longest diameter 7.7× as long as genal height; 6 dark brown peristomal setae decreasing in length and strength from front to back; vibrissal seta long and strong; mouth parts pale yellow, with labellum as long as or slightly shorter than length of buccal cavity, and palpus long, slightly clavate, bearing scattered black setulae. *Thorax.* Entirely yellowish, with mesonotum slightly darker than pleura; 1+3 very long dorsocentral setae; 5–6 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4 rows; prescutellar acrostichals very long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and slightly weaker; 1 long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below and before it two shorter and weaker setae; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; both proepisternal and proepimeral setae present; anepisternum with scattered setulae, bearing 3 long, posteriorly directed, posteromarginal setae, mid one longer and stronger, and 1 erect seta at posterodorsal margin; katapisternum with few scattered setulae, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs.* Evenly setulose, bearing short, yellowish to brownish yellow setae and setulae, except for foreleg having coxa with long setae, and femur with a few posterodorsal and posteroventral setae; fore femur without true ctenidium, only with short row of thin setulae anteroventrally at distal third; mid femur of male with row of posteroventral, spine-like, long, spaced, black setae on distal half; all legs, including coxae, yellow, with last tarsomere very slightly infuscated. *Wing.* Veins yellowish, membrane yellowish grey; alula with fringe formed by long, erect, diaphanous setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on dorsal and ventral surfaces;  $R_{2+3}$  slightly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending before middle of cell *dm*; crossvein *dm-cu* distinctly shorter than half of last section of  $CuA_1$ ; halter yellowish. *Abdomen.* Mostly yellowish, with setal vestiture formed by golden brown setulae and darker posteromarginal setae on each tergite; transverse stripes at posterior edge of tergites yellow, hardly discernible. *Male terminalia* (Figs. 11–12). Epandrium bearing two pairs of long setae dorsally, and several short setae on remaining posterior surface; cercus of normal size, pubescent, dorsally covered with microscopic hairs and with long, thin setae; anterior surstylus simple, straight, bearing sparse, thin setae on inner side; posterior surstylus almond-shaped in lateral view, narrow and pointed in posterior view, bearing few stout tubercles on posterior margin of distal half



Figs. 9–12. Terminalia of male. *Dasyrhicnoessa humilis* n.sp.: (9) lateral view, (10) posterior view. *Dasyrhicnoessa longisetosa* n.sp.: (11) lateral view, (12) posterior view. Scale bars: 0.1 mm.

and characteristic cluster of thin setae on posterior margin of mid surface; aedeagal apodeme straight to slightly bisinuate; ejaculatory apodeme large, as long as or slightly shorter than aedeagal apodeme, with distal fan broad, well developed; distiphallus long, ribbon-like, with ventral micropubescence on basal half as well as subapically; marginal, membranous, aedeagal lobe distinctly visible medially.

**Female.** Similar to male, except for slight sexual dimorphism. *Female terminalia.* Cerci long, straight, bearing several thin setulae; spermathecae spherical, smooth.

**Distribution.** Australia (QLD), Papua New Guinea.

**Remarks.** Apart from the various, often considerable, morphological features of the body and male terminalia, the new species is recognizable by having the mesonotal setae distinctly longer than those of congeners.

**Etymology.** Compound word, from the Latin *longus* meaning long, and *saetosus* meaning bearing setae or bristly. The specific epithet refers to the relatively long setae of the head and thorax.

*Dasyrhicnoessa macalpinei* n.sp.

Figs. 13–14

**Type material.** HOLOTYPE ♂ **Australia, Northern Territory** “NT: Buffalo Ck, / Darwin; 2–5 Mar. / 1996; D.K. McAlpine, / G.R. Brown // HOLOTYPUS / *Dasyrhicnoessa / macalpinei* sp.n. ♂ / L. Munari des.” AM K186739. The specimen is in relatively good condition: the left fore tibia and tarsus are missing, and the head is glued near the specimen. The holotype is deposited in AM, and is double mounted (glued on the tip of a triangular card label); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen.

**Description.** *Size.* Body length 1.3 mm, wing length 1.3 mm, wing width 0.5 mm. *Habitus.* Small fly with body and legs pale yellowish. Setal vestiture pale yellow to dark brownish. Wings yellowish grey. *Head.* Yellowish to greyish yellow; frontal and orbital vittae pale yellow, distinctly paler than rest of frons; ocellar triangle and occiput greyish; golden yellow patch on both sides of ocellar triangle; paraverticlar setae thin, strongly inclinate; inner vertical seta inwardly curved, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae very short, thin, former setae in 1–2 irregular rows; upper postocular seta long, inclinate towards inner vertical seta; ocellar triangle bearing pair of moderately long, thin pseudopostocellar setae in addition to pair of strong ocellars; a few very short, thin setulae between ocellars and pseudopostocellars, and behind latter setae; 3 strong, laterocline orbital setae intermixed with sparse, thin, short setulae; 3 pairs of frontal setae intercalated with 3 pairs of short, thin setulae, all setae and setulae inclinate; antennal postpedicel bearing brownish, short-haired arista; eye micropubescent, very large, slightly oblique, subrectangular, its longest diameter 5.5× as long as genal height; 5 brownish to black peristomal setae, two anterior ones, including vibrissa, long and strong; mouth parts pale yellow, with labellum stumpy, shorter than length of buccal cavity, and palpus long, slender, bearing scattered black setulae. *Thorax.* Yellowish; 1+3 dorsocentral setae; acrostichal setulae in 4 irregular rows; prescutellar acrostichals long; postpronotal lobe bearing 3 setae (only two are discernible in holotype, lower seta being missing), each with different inclination, posterior seta long and strong, anterior setae shorter and weaker; 1 long presutural seta; 2 notopleurals, anterior one slightly longer; 1 supra-alar (missing in holotype), below it 1 shorter and weaker seta; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; both proepisternal and proepimeral setae present; anepisternum with scattered setulae, bearing 3 long, posteriorly directed, posteromarginal setae, mid one distinctly longer and stronger, and 1 erect seta at posterodorsal margin; katepisternum with few scattered setulae, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs.* Evenly setulose, bearing short brownish to blackish setae and setulae, except for foreleg having coxa with scattered, pale brownish, long setae, and femur with posterodorsal and posteroventral rows of spaced, long setae; hind tibia with long, posteroventral pubescence on distal half, formed by several, erect, yellowish setae; fore femur without true ctenidium, only with row of short, thin setulae

anteroventrally on distal half; mid femur with comb of 6 spine-like, short, subequal in length, posteroventral black setae on distal half; all legs, including coxae, yellow; last tarsomere slightly infuscate. *Wing.* Veins yellowish, membrane yellowish grey; alula with fringe formed by erect, blackish setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on both dorsal and ventral surfaces;  $R_{2+3}$  distinctly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending just before middle of cell *dm*; crossvein *dm-cu* distinctly shorter than half of last section of  $CuA_1$ ; halter yellow. *Abdomen.* Yellowish brown, with setal vestiture formed by golden brown setae and setulae; transverse stripes at posterior edge of tergites yellowish. *Male terminalia* (Figs. 13–14). Epandrium bearing characteristic cluster of long, strong setae on entire anteroventral surface, in particular on anterior part, and short setae on all remaining posterior surface; cercus long and narrow, pointed apically, pubescent, dorsally covered with microscopic hairs and with long setae; anterior surstylus strongly reduced, rounded at apex, bearing scattered, thin setae; posterior surstylus subrectangular in lateral view, long, straight, and narrow in posterior view, bearing numerous short setae and cluster of short, stout tubercles on distal third; aedeagal apodeme long and straight, without evident sinuosity; ejaculatory apodeme diaphanous, poorly sclerotized, with distal fan well developed; distiphallus long, slender, ribbon-like, distinctly pointed at apex, bearing several, scattered, microscopic hairs.

**Female.** Unknown.

**Distribution.** Australia (NT).

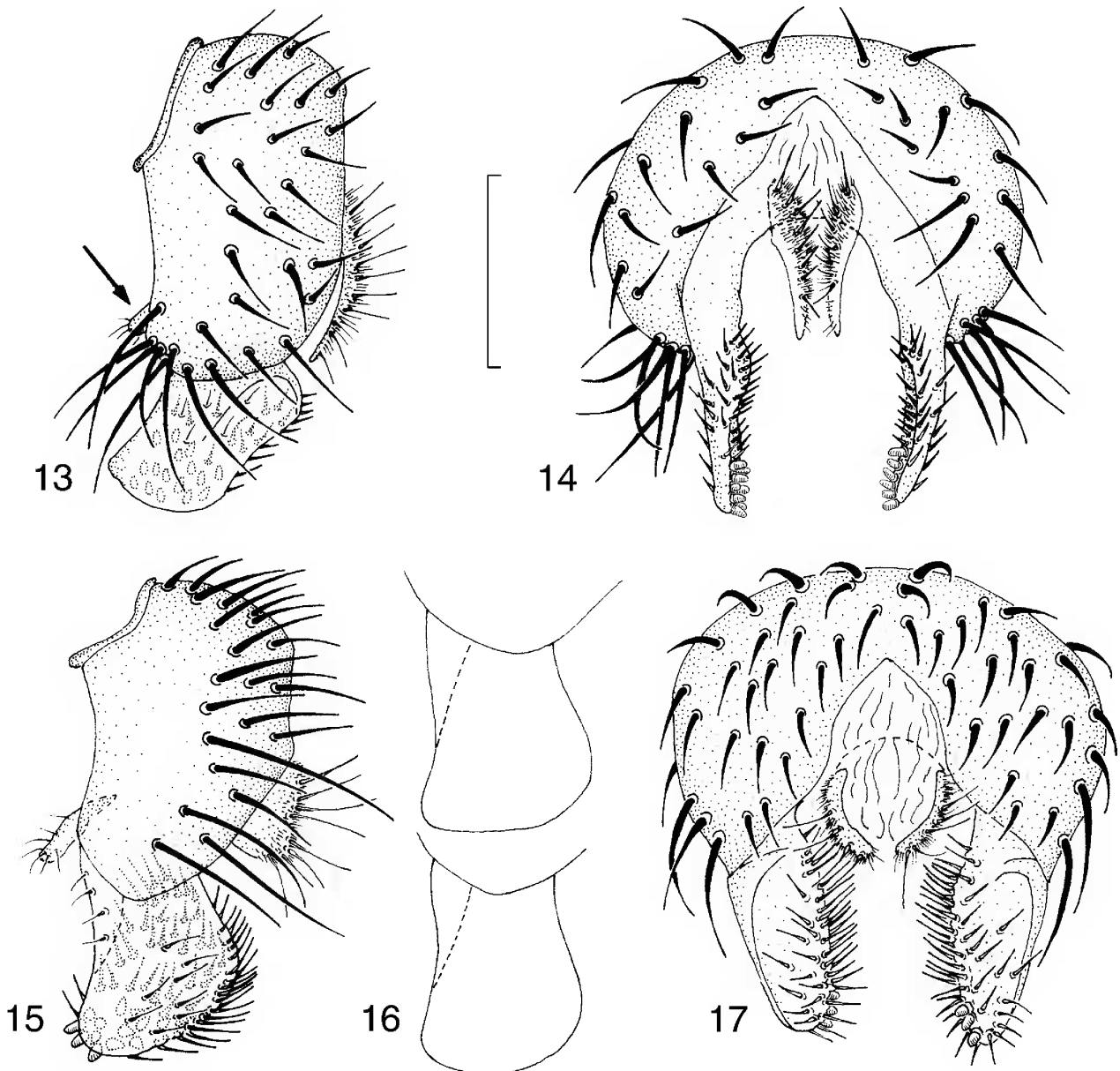
**Remarks.** As regards the external morphology, the new species is particularly characterized by having the hind tibia of the male bearing long, thin, yellowish pubescence on the posteroventral distal half. Personally, I have never observed this character in any other *Dasyrhicnoessa* species. It would be interesting to know whether the females also share such a peculiar feature.

**Etymology.** The new species is gratefully named after Dr David K. McAlpine who collected the holotype and facilitated my study of a large number of specimens held at the Australian Museum.

*Dasyrhicnoessa ostentatrix* n.sp.

Figs. 15–17

**Type material.** HOLOTYPE ♂ **Australia, New South Wales** “Swept Sea grass / Careel Bay, / Avalon, NSW. // 12 May 1984 / D.K. McAlpine / D.J. Bickel // HOLOTYPUS / *Dasyrhicnoessa / ostentatrix* sp.n. ♂ / L. Munari des.” AM K186740. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES (many specimens were prepared by AM technicians using the *brochette* double mounting method): **Australia, New South Wales:** same data as holotype, 45 ♂♂ 28 ♀♀; “NSW: Broken Head / nr Byron Bay / 7–8 Nov. 2000 // Shoreline rocks / D.K. McAlpine”, 3 ♂♂ 2 ♀♀; “Bundagen, via Repton / NSW 15 Jan. 1971 / D.K. McAlpine / & A. Hughes // MV lamp”, 1 ♂; “Careel Bay / N. South Wales / 27 Oct. 1962 // Mangroves / D.K. McAlpine”, 3 ♂♂ 11 ♀♀; *ibidem*,



Figs. 13–17. Terminalia of male. *Dasyrhicnoessa macalpinei* n.sp.: (13) lateral view (the arrow indicates the small anterior surstylus), (14) posterior view. *Dasyrhicnoessa ostentatrix* n.sp.: (15) lateral view, (16) posterior surstylus outline variability, (17) posterior view. Scale bar: 0.1 mm.

“14 March 1963 // on beach / D.K. McAlpine”, 1 ♂; “Careel Bay, / Avalon, NSW. / 15 Dec. 1964 // Mangroves”, 1 ♂ 1 ♀; 14 June 1965, on beach, 5 ♂ ♂ 5 ♀ ♀; 8 Nov 1975, 39 ♂ ♂ 25 ♀ ♀; “Glenfield, near / Sydney, NSW / 2 April 1967 [or 1957?] // D.J. Lee / collector”, 1 ♂; “Little Beach nr / Terrigal, NSW / 29 Jan. 1988 // On beach / D.K. McAlpine / and B.J. Day”, 1 ♂; “Tidal flat, / Merimbula, NSW. / 12 Febr. 1963. / D.K. McAlpine”, 6 ♂ ♂ 2 ♀ ♀; “North Creek, near / Ballina, NSW / 1 March 1965 / McAlpine & Lossin”, 4 ♂ ♂ 10 ♀ ♀; “Mangroves, Nth / Cronulla, NSW. / 21 Jan. 1962 / D.K. McAlpine”, 11 ♂ ♂ 13 ♀ ♀; 29 Jan. 1962, 62 ♂ ♂ 58 ♀ ♀; 1 March 1962, 7 ♂ ♂; 31 March 1972, 43 ♂ ♂ 45 ♀ ♀. **Australia, Victoria:** “Bunarong Cliffs 5 km / SW Inverloch, Vic. / 8 Apr. 1986 / D.K. McAlpine // On stranded kelp”, 1 ♂. The holotype and most of the paratypes are deposited in AM, some paratypes are preserved in MCV.

**Description.** *Size.* Body length 1.8 mm (1.2–2.1), wing length 1.8 mm (1.5–1.9), wing width 0.6 mm (0.5–0.6). *Habitus.* Dark grey to ochreous yellow species, with setal vestiture dark brown to black. Wings yellowish grey. *Head.* Frons brownish yellow, with frontal and orbital vittae pale yellowish, and with golden brown patch on both sides of dark grey ocellar triangle, latter concolorous with postcranium; antennal postpedicel infuscated; face, parafacial, and gena pale yellow; gena with distinct, longitudinal, narrow, translucent stripe as in many species of *Tethina* Haliday; paraverticlar setae long and thin; inner vertical seta inclinate, strong, about as long as laterocliniate outer vertical seta; postocular and postgenal setae short, former ones in 1–2 irregular rows; upper postocular seta long, inclinate towards inner vertical seta; ocellar triangle bearing pair of moderately long pseudopostocellar setae in

addition to pair of strong ocellars; few short, thin setulae between ocellars and pseudopostocellars; 3 strong, laterocline orbital setae; row of thin, inclinate setulae on orbital vitta between two anterior orbitals and frontals; 3–4 short, additional setulae before anterior orbital seta, between this one and anterior margin of orbital vitta; 3 pairs of frontal setae intercalated with 3–4 pairs of short, thin setulae, all setae and setulae inclinate; antenna with brownish postpedicel, bearing short-haired, black arista; eye micropubescent, large, oblique, its longest diameter 5.2× as long as genal height; 6–7 black peristomal setae, three anterior ones, including vibrissa, long and strong; mouth parts pale yellowish, with labellum slightly shorter than length of buccal cavity; palpus long, slender, bearing scattered black setulae. *Thorax*. Dark grey to ochreous; 1+3 dorsocentral setae; 6 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4 rows; prescutellar acrostichals long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and weaker; 1 long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below it 1 short seta; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; both proepisternal and proepimeral setae present; anepisternum with few, scattered setulae (more numerous in most paratypes), bearing 3 long, posteriorly directed, posteromarginal setae, mid one distinctly longer and stronger, and 1 erect seta at posterodorsal margin; katapisternum with few, scattered setulae, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs*. Evenly setulose, bearing short, blackish setae and setulae, except for foreleg having coxa with scattered, black, long setae, and femur with posterodorsal and posteroventral rows of spaced, long, strong setae; ctenidium of fore femur formed by few (4 in holotype), weak, short, spinulae; mid femur of male with long row of spaced, spine-like, posteroventral black setae, decreasing in length distally; all legs, including coxae, yellowish grey; last two tarsomeres slightly infuscated. *Wing*. Veins pale brownish, membrane yellowish grey to grey; alula with fringe formed by long, erect, blackish setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on both dorsal and ventral surfaces;  $R_{2+3}$  distinctly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending on basal third of cell *dm*; crossvein *dm-cu* slightly shorter than one third of last section of  $CuA_1$ ; halter yellowish. *Abdomen*. Dark brown to blackish, with tergites showing very narrow, apico-marginal, yellowish stripes; setal vestiture blackish. *Male terminalia* (Figs. 15–17). Epandrium bearing long and strong setae on distal half, and several shorter setae on all remaining posterior surface; cercus of normal size, pubescent, dorsally covered with microscopic hairs and with long setae; anterior surstylus very small, slightly bent medially, bearing sparse, thin setae; posterior surstylus lobe-shaped, with lateral profile variable in many paratypes (Figs. 15–16), bearing several long setae and apical cluster of stout tubercles on inner side; aedeagal apodeme long, straight, only slightly bent distally; ejaculatory apodeme with distal fan well developed, more or less sclerotized; distiphallus long, ribbon-like, micropubescent.

**Female**. Similar to male, except for slight sexual dimorphism. *Female terminalia*. Cerci moderately long, setulose; spermathecae spherical, smooth.

**Distribution**. Australia (NSW, VIC).

**Remarks**. The new species shows a marked variability in coloration, with individuals having dark grey to ochreous yellow thorax, and with dark brown to black setal vestiture. That implies a considerable degree of difficulty in identifying the female specimens, unless they are strictly associated with several male specimens from the same biotope. In the preserved material, the males are easily distinguished from congeners in having the abdomen, when observed laterally, with the posterior surstyli distinctly and characteristically exposed outwards. Also, the lateral outline of the surstylus often exhibits a fair variability (Figs. 15–16).

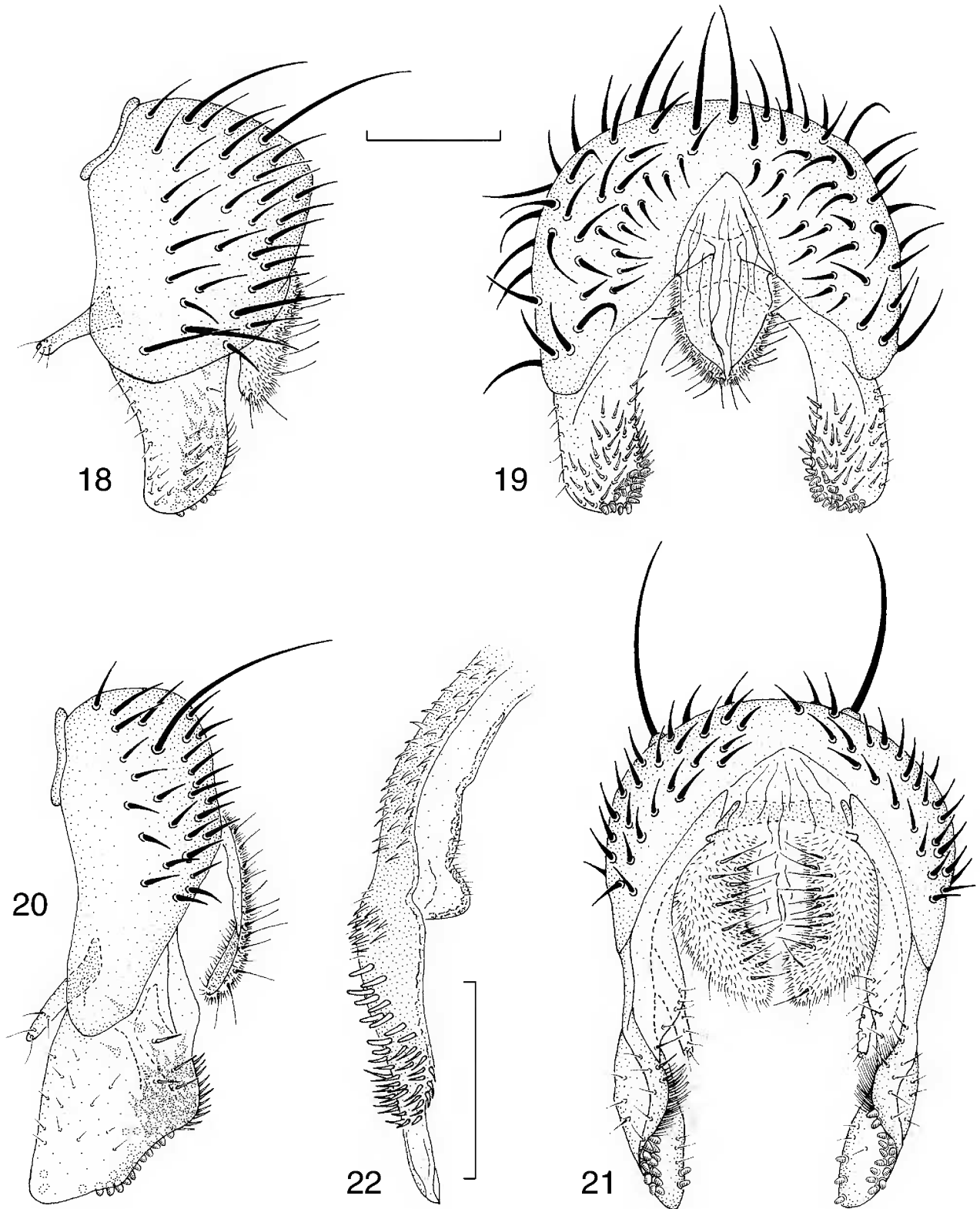
**Etymology**. From the Latin *ostentatrix* meaning exhibitionist, parading or showing. The specific epithet refers to the external male terminalia which are distinctly exposed outwards.

### *Dasyrhicnoessa pallida* n.sp.

Figs. 18–19

**Type material**. HOLOTYPE ♂ **Australia, Queensland** “Mangroves. / Mackay, Q. / 19 Jan. 1967. // D. McAlpine & / G. Holloway coll. // HOLOTYPUS / *Dasyrhicnoessa* / *pallida* sp.n. ♂ / L. Munari des.” AM K186741. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES **Australia, Queensland**: same data as holotype, 2♂ 6♀. The holotype and most of the paratypes are deposited in AM, a couple of paratypes are preserved in MCV.

**Description**. *Size*. Body length 2.2 mm (2.1–2.5), wing length 1.8 mm (1.7–2.0), wing width 0.7 mm (0.6–0.8). *Habitus*. Yellowish to greyish yellow species with setal vestiture dark brown to blackish. Wings yellowish grey. *Head*. Yellow, except for frons reddish yellow having orbital vittae distinctly lighter and usual golden yellow patch on both sides of ocellar triangle; paraverticlar setae well developed, thin, inclinate; inner vertical seta inclinate, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae short, former ones in single row; upper postocular seta long, inclinate towards inner vertical seta. Ocellar triangle bearing pair of moderately long, thin pseudopostocellar setae in addition to pair of strong ocellars; a few very short, thin setulae between ocellars and pseudopostocellars; 3 strong, laterocline orbital setae; row of thin, inclinate setulae on orbital vitta between two anterior orbitals and frontals; 6 short, strong, additional setulae before anterior orbital seta, between this one and anterior margin of orbital vitta; 3 pairs of frontal setae intercalated with 3 pairs of short, thin setulae, all setae and setulae inclinate, frontal setae often cruciate at apex. Antenna with large and pubescent postpedicel, bearing blackish, microscopically pubescent arista. Eye micropubescent, large, slightly oblong vertically, its longest diameter



Figs. 18–22. Terminalia of male. *Dasyrhicnoessa pallida* n.sp.: (18) lateral view, (19) posterior view. *Dasyrhicnoessa priapus* n.sp.: (20) lateral view, (21) posterior view, (22) apex of distiphallus. Scale bars: 0.1 mm.

4.6× as long as genal height; 6 blackish peristomal setae, three anterior ones, including vibrissa, long and strong. Mouth parts pale yellow, with labellum stumpy, shorter than length of buccal cavity, and palpus long, slightly clavate, bearing scattered black setulae. *Thorax*. Yellowish with scutum greyish,

slightly darker than pleura and scutellum; 1+3 dorsocentral setae; 6 irregular rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4 rows; prescutellar acrostichals long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long

and strong, anterior setae shorter and weaker; 1 long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below and before it 2–3 short and weaker setae; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; proepisternal seta long and strong, proepimeral one weak and slightly shorter; anepisternum with scattered setulae, bearing 2–3 long, posteriorly directed, posteromarginal setae, mid one distinctly longer and stronger, and 1 erect seta at posterodorsal margin; katapisternum with few scattered setulae, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs.* Evenly setulose, bearing short blackish setae and setulae, except for foreleg having coxa with few pale brownish to black long setae, and femur with posterodorsal and posteroventral rows of spaced, long setae; fore femur without true ctenidium, only with simple row of very short, thin setulae anteroventrally on distal half; mid femur of male with posteroventral comb of spine-like, short, subequal in length, slightly but distinctly curved forward, black setae on distal half. All legs, including coxae, yellow; last tarsomere not or indistinctly infuscated. *Wing.* Veins yellowish, membrane yellowish grey; alula with fringe formed by long, erect, blackish setae; Costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on both dorsal and ventral surfaces;  $R_{2+3}$  distinctly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending before middle of cell *dm*; crossvein *dm-cu* distinctly shorter than one third of last section of  $CuA_1$ ; halter yellow. *Abdomen.* Mostly yellowish to brownish yellow, with median, longitudinal, brown stripe, and setal vestiture formed by golden brown setae and setulae; transverse stripes at posterior edge of tergites yellow, hardly discernible. *Male terminalia* (Figs. 18–19). Epandrium bearing some long setae dorsally and ventrolaterally, and several short setae on all remaining posterior surface; cercus of normal size, dorsally covered with microscopic hairs and with long setae; anterior surstylus short, straight, narrow, bearing few apical, thin setae; posterior surstylus lobe-shaped, distinctly squat in caudal view, bearing many short setae and apical cluster of stout tubercles on inner side; aedeagal apodeme long and straight; ejaculatory apodeme stumpy, with distal fan moderately though distinctly developed; distiphallus long and slender, ribbon-like, with evident micropubescence on basal half as well as subapically.

**Female.** Similar to male, except for slight sexual dimorphism. *Female terminalia.* Cerci long, straight, bearing thin setulae dorsally and apically; spermathecae spherical to subspherical, in a few paratypes with chitinous wall surrounding spermathecal duct opening distinctly invaginated (possibly collapsed).

**Distribution.** Australia (QLD).

**Remarks.** In this species the lateral profile of the male terminalia vaguely resembles that of *Dasyrhicnoessa mathisi* Munari even though the latter species has the anterior surstylus noticeably longer and stouter. Additionally, the two species are easily separable by the different colour of the body and legs.

**Etymology.** From the Latin *pallidus* meaning pale. The specific epithet refers to the pale hue of the body in this new species.

### *Dasyrhicnoessa priapus* n.sp.

Figs. 20–22

**Type material.** HOLOTYPE ♂ Australia, Queensland “Mangroves / Eurimbula, Qld. / 28 Mar. 1975 / D.K. McAlpine // HOLOTYPUS / *Dasyrhicnoessa priapus* sp.n. ♂ / L. Munari des.” AM K186742. The specimen is in relatively good condition: head, thorax, wings, and forelegs are very well preserved (including setal vestiture), but, unfortunately, the hind legs are missing, the left mid leg is glued near the specimen, the right mid leg has both tibia and tarsus missing, and the surviving femur is broken medially. The specimen is double mounted (glued on the tip of a triangular card); abdomen dissected, stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPE: same data as holotype, 1 ♀. Holotype and paratype are deposited in AM.

**Description.** *Size.* Body length 2.2 mm (3.0), wing length 1.9 mm (2.6), wing width 0.7 mm (0.9). *Habitus.* Yellowish species with setal vestiture dark brown having golden reflections. Head yellow with antenna bearing long-haired arista. Wings yellowish grey. *Head.* Entirely yellow; frons, including orbital vittae, homogeneously yellow, except for usual, golden yellow patch on both sides of ocellar triangle; paravertic setae very long and rather strong, inclinate; inner vertical seta inwardly curved, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae somewhat long, former ones very distinctive and in single row; upper postocular seta long and strong, inclinate towards inner vertical seta; ocellar triangle bearing pair of long pseudopostocellar setae in addition to pair of strong ocellars; two very short, thin setulae between ocellars and pseudopostocellars; 3 very strong, laterocline orbital setae; a few long, thin setulae on orbital vitta in addition to orbital setae; 3 pairs of frontal setae plus 2 pairs of thin setulae, all setae and setulae inclinate, former ones cruciate at apex; antenna with large and pubescent postpedicel, bearing dark brown, long-haired arista; eye micropubescent, very large, slightly oblong vertically, its longest diameter 6.6× as long as genal height; parafacial very narrow, as a consequence vibrissal angle distinctly protruding; anterior margin of gena distinctly curved upwards, bearing three strong peristomal setae (including vibrissa); 5 dark brown peristomal setae decreasing in length and strength from front to back; vibrissal seta very long and strong; mouth parts pale yellow, with labellum distinctly shorter than length of buccal cavity; palpus long, slightly clavate, bearing scattered black setulae. *Thorax.* Entirely yellowish, with mesonotum slightly darker than pleura; 1+3 long dorsocentral setae; 6 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 4 rows; prescutellar acrostichals very long and strong; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta long and strong, anterior setae shorter and slightly weaker; 1 long presutural seta; 2 notopleurals about subequal in length; 1 supra-alar, below and before it 2 shorter and weaker setae; 2 postalars, external one distinctly longer and stronger; scutellum with 4 long marginal setae; both proepisternal and proepimeral setae present; anepisternum with scattered pubescence, bearing 2–3 long, posteriorly directed, posteromarginal setae, mid one (missing in holotype) longer and stronger, and 1 erect seta (missing in holotype) at posterodorsal margin;



katepisternum with scattered pubescence on anterior part, bearing long and strong posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs.* (In holotype the hind legs and the tibia and tarsus of the right mid leg are missing, the left mid leg is glued near the specimen) Evenly setulose, bearing short black setae and setulae, except for foreleg having coxa with very long setae, and femur with posterodorsal and posteroventral setae; fore femur without true ctenidium, only with long row of thin setulae; mid femur of male with posteroventral armature formed by spine-like, very long and spaced setae on distal half; legs, including coxae, yellow; tarsi entirely yellowish. *Wing.* Veins yellowish brown, membrane yellowish grey; alula with fringe formed by very long, erect, diaphanous setae; costal vein reaching end of  $M_1$ , bearing several, spaced, microscopic setulae on dorsal and ventral surfaces;  $R_{2+3}$  slightly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending at basal third of cell *dm*; crossvein *dm-cu* distinctly shorter than half of last section of  $CuA_1$ ; halter yellowish, slightly infusate on outer surface. *Abdomen.* Mostly yellowish, with setal vestiture formed by dark setulae and blackish posteromarginal setae on each tergite; transverse stripes at posterior edge of tergites yellowish, hardly discernible. *Male terminalia* (Figs. 20–22). Epandrium unusually long and narrow in lateral view, tapered on distal half, bearing pair of very long setae dorsally, and several short setae on remaining posterior surface; cercus very large, pubescent, covered with microscopic hairs and with long setae dorsally; anterior surstylus small and narrow, very slightly sinuous, bearing few, thin setae; posterior surstylus very large, of peculiar shape (Figs. 20–21), bearing characteristic cluster of several, thin setae as well as numerous stout tubercles on posteromarginal inner surface, 2–3 of such tubercles also present on subapical anterior inner side; aedeagal apodeme long, sinuous at basal half, slightly bent apically; ejaculatory apodeme diaphanous, with broad apical fan; distiphallus (Fig. 22) long, ribbon-like, bearing several, short, spine-like papillae on basal half, and cluster of numerous, more or less pointed, papillae subapically; ventral membranous lobe distinctly visible before apex of distiphallus.

**Female.** Unknown.

**Distribution.** Australia (QLD).

**Etymology.** From the Latin *Priapus* or *Priapos*, a god from classical mythology, represented by a creature having a misshapen subhuman body endowed with an enormous phallus. The specific epithet refers to the large surstyli of the male terminalia in the new species.

***Dasyrhicnoessa serratula* Malloch, 1935, sp.inq.**

Mathis & Sasakawa, 1989: 667; Mathis & Munari, 1996: 12; Munari, 2002: 550.

**Distribution.** Australia (QLD).

After examining Malloch's holotype labelled "Townsville / Queensland / col. by J. Claffy // *Dasyrhicnoessa / serratula* / Type / det. JRMALLOCH // SPHTM / Coll.", I have come to the conclusion that the nomenclatural status of this species remains unresolved (Munari, 2002), as the holotype is

female and no male specimen is known, and the species of *Dasyrhicnoessa* are distinguished primarily by structures of the male terminalia. Considering the external morphology and colour of this species as well as its chaetotaxy, including the presence of a strong ctenidial comb on entire distal half of the fore femur, I have not found any consistent character that could safely bring *D. serratula* near any species. It shares a very similar habitus and identical chaetotaxy with various other congeners. Thus, I here consider Malloch's species as *species inquirenda*.

Also, it should be stressed that in most *Dasyrhicnoessa* species there is no consistent external character useful for identification. The colour of the body and legs generally shows considerable variability. On male specimens it is possible to evaluate the consistency of the chaetotactic pattern of the mid femur posteroventral armature as well as, obviously, to study the morphology of the terminalia, the latter being always distinctive. Therefore, considering the range of variability that occurs in the species of *Dasyrhicnoessa* from the Indo-Pacific area, it would be irresponsible to associate a given male specimen to this unresolved species.

***Dasyrhicnoessa sexseriata* (Hendel, 1913)**

Mathis & Sasakawa, 1989: 668; Mathis & Munari, 1996: 12; Munari, 2002: 548, 550.

**Material examined.** Australia, Queensland: Bowen, on beach, 28.xii.1966, D.K. McAlpine & G.A. Holloway, 1 ♂ 1 ♀; Mackay, mangroves, 19.i.1967, D.K. McAlpine & G.A. Holloway, 3 ♂ 1 ♀. Papua New Guinea, Port Moresby, mangroves, 25.x.1963, D.K. McAlpine, 1 ♂.

**Distribution.** Australasian/Oceanian: Australia (QLD) [**new distribution**], Caroline Islands (Yap, Palau, Pohnpei, Ponape), Fiji Islands (Ovalau, Viti Levu), Mariana Islands (Guam, Saipan), Marshall Islands (Namorik), Papua New Guinea [**new distribution**], Wake Island. Oriental: China (Hong Kong), Philippines, Taiwan.

**Remarks.** This species is easily distinguished from most congeners by the distinctive male terminalia.

***Dasyrhicnoessa tripunctata* Sasakawa, 1974**

Mathis & Munari, 1996: 12; Munari, 2002: 548, 550.

**Material examined.** Australia, Queensland: Gladstone, mangroves, 19.xii.1961, D.K. McAlpine, 1 ♀. Papua New Guinea, Oro Bay, Northern Dist., 9.xii.1972, G.A. Holloway, 2 ♀ 2 ♀; Port Moresby, mangroves, 25.x.1963, D.K. McAlpine, 1 ♂ 1 ♀.

**Distribution.** Australasian/Oceanian: Australia (QLD) [**new distribution**], Caroline Islands (Kosrae, Palau, Pohnpei), Mariana Islands (Guam), Papua New Guinea [**new distribution**]. Oriental: Japan (Ryukyus), Malaysia (Sabah, Sarawak), Philippines (Culion, Palawan).

**Remarks.** With its characteristically patterned abdomen (see key), *Dasyrhicnoessa tripunctata* is the most easily distinguishable species among all congeners.

***Dasyrhicnoessa vockerothi* Hardy & Delfinado, 1980**

Mathis & Sasakawa, 1989: 667; Mathis & Munari, 1996: 12–13; Munari, 2002: 548, 550.

**Material examined.** **Australia, New South Wales:** Lord Howe I., North Bay, on beach, 21.ii.1971, D.K. McAlpine, 12♂♂ 3♀♀; *ibidem*, 24.ii.1971, 8♂♂ 6♀♀; **Australia, Northern Territory:** Smith Point, Cobourg Pen., 5.iii.1996, D.K. McAlpine, 38♂♂ 14♀♀. **Australia, Queensland:** Lloyd Bay, 3 mi N of Claudie River mouth, on beach, 25.xii.1971, D.K. McAlpine and G.A. Holloway, 1♂. **Papua New Guinea,** Port Moresby, Ela Beach, 6.x.1963, D.K. McAlpine, 4♂♂; *ibidem*, 16.x.1963, D.K. McAlpine, 3♂♂ 2 (cf.) ♀♀.[AM]

**Distribution.** Afrotropical: Seychelles (Aldabra, Mahé). Australasian/Oceanian: Australia (NSW, NT, QLD) [**new distribution**], Caroline Islands (Truk, Palau), Gilbert Islands, Hawaii (Hawaii, Hilo, Kauai, Maui, Molokai, Oahu), Mariana Islands (Guam, Saipan), Marshall Islands, ?New Caledonia, Papua New Guinea [**new distribution**], Wake Island. Oriental: Japan (Ryukyus), Sri Lanka, Malaysia (Sarawak).

**Remarks.** A rather common, Indopacific species characterized by having uniformly yellowish body and male terminalia with anterior surstylus of peculiar and unmistakable shape (Sasakawa, 1995, fig. 6).

An updated checklist of the world species of *Dasyrhicnoessa* Hendel, 1934

<i>Dasyrhicnoessa</i> spp	distribution
<i>aquila</i> Munari, 2002 .....	Australasian/Oceanian
<i>atripes</i> n.sp. ....	Australasian/Oceanian
<i>bicolor</i> Munari, 2002 .....	Australasian/Oceanian
<i>boninensis</i> Sasakawa, 1995 .....	Australasian/Oceanian
<i>ciliata</i> n.sp. ....	Australasian/Oceanian
<i>clandestina</i> Munari, 2002 .....	Australasian/Oceanian
<i>ferruginea</i> (Lamb, 1914) .....	Afrotropical, South Indian Ocean Islands, Oriental, Australasian/Oceanian
<i>fulva</i> (Hendel, 1913) .....	Oriental
<i>fulvescens</i> Malloch, 1935 .....	Australasian/Oceanian
<i>humilis</i> n.sp. ....	Australasian/Oceanian
<i>insularis</i> (Aldrich, 1931) .....	Nearctic, Neotropical, Afrotropical, Australasian/Oceanian
<i>longisetosa</i> n.sp. ....	Australasian/Oceanian
<i>mathisi</i> Munari, 2002 .....	South Pacific Islands
<i>macalpinei</i> n.sp. ....	Australasian/Oceanian
<i>ostentatrix</i> n.sp. ....	Australasian/Oceanian
<i>pallida</i> n.sp. ....	Australasian/Oceanian
<i>platypes</i> Sasakawa, 1986 <sup>a</sup> .....	Oriental
<i>priapus</i> n.sp. ....	Australasian/Oceanian
<i>serratula</i> Malloch, 1935 <sup>b</sup> , sp.inq.	Australasian/Oceanian
<i>sexseriata</i> (Hendel, 1913) .....	Oriental, Australasian/Oceanian
<i>tripunctata</i> Sasakawa, 1974 .....	Oriental, Australasian/Oceanian
<i>vockerothi</i> Hardy&Delfinado, 1980	Afrotropical, Oriental, Australasian/ Oceanian
<i>yoshiyasui</i> Sasakawa, 1986 .....	Oriental

<sup>a</sup> *platypes* needs revision, its generic status being questionable.

<sup>b</sup> *serratula* of uncertain specific status.

***Pseudorhicnoessa spinipes* Malloch, 1914**

Mathis & Munari, 1996: 13; Munari, 2002: 549–550.

**Material examined.** **Australia, Northern Territory:** Smith Point, Cobourg Pen., 5.iii.1996, D.K. McAlpine, 18♂♂ 7♀♀. **Australia, Queensland:** Kurrimine Beach, 43 km South of Innisfail, 23.i.1991, D.K. McAlpine & B. Day, 1♀; Lloyd Bay, 3 mi N of Claudie River mouth, on beach, 25.xii.1971, D.K. McAlpine and G.A. Holloway, 13♂♂ 15♀♀; Lloyd Bay, Lockhart River, MV lamp, 24.x.1974, G. and A. Daniels, 2♂♂ 4♀♀; Restoration Beach, near Portland Roads, 13.x.1974, G. Daniels, 4♂♂ 1♀; [as *P. tibiseta* (Mall.)] Townsville [type locality of the junior synonym *Tethina tibiseta* Malloch], [without date], F.H. Taylor, (SPHTM Coll.), 2♂♂ 2♀♀; [as *P. tibiseta* (Mall.)] *ibidem*, at light, 1♀. **Papua New Guinea,** Oro Bay, Northern Distr., 9.xii.1972, G.A. Holloway, 3♀♀; Port Moresby, Ela Beach, 6.x.1963, D.K. McAlpine, 10♂♂ 18♀♀; *ibidem*, 10.i.1964, 1♀.[AM]

**Distribution.** Australasian/Oceanian: Australia (NT [**new distribution**], QLD), Caroline Islands (Palau, Tobi, Yap), Mariana Islands (Guam, Saipan), Marshall Islands (Alu, Likiep, Majuro), Papua New Guinea [**new distribution**]. Oriental: Malaysia (Sabah, Sarawak, Singapore), Philippines, Japan (Ryukyus), Taiwan, Vietnam.

***Sigaloethina* n.gen.**

**Type species.** *Sigaloethina phaia* n.sp. (Fig. 23).

**Diagnosis.** Dark flies having fairly to noticeably glossy cuticle; head higher than long; face depressed and partially membranous; lower face, above vibrissal angle, without tubercle (like *Dasyrhicnoessa*); cephalic chaetotaxy typical of subfamily (though with setulae of frons and vittae a little impoverished in numbers); frons without discernible shining patch on both sides of ocellar triangle; arista of postpedicel bearing spaced, long hairs; eye densely micropubescent, very large, its longest diameter over 8× as long as genal height. Thorax entirely dark brown, glossy, slightly convex dorsally, with chaetotaxy typical of subfamily; disc of scutellum bare; thoracic cuticle covered with more or less faint grey microtomentum. Legs evenly setulose except for foreleg having coxa and femur with long setae; ctenidium of fore femur vestigial or even absent; mid femur of male with row of posteroventral, spine-like setae on entire length of femur; all legs with femora dark brown, remaining parts yellow to yellowish brown. Wing like those in *Dasyrhicnoessa* species, that is with vein R<sub>2+3</sub> slightly bisinuate; halter yellowish. Abdomen shining, black, with narrow, apicomarginal, pale brownish stripe on each tergite; tergites bearing several black setae and setulae. Male terminalia with lobe-shaped anterior surstylus (Fig. 24) noticeably larger than posterior surstylus, latter straight and relatively narrow; anterior surstylus bearing characteristic triangular patch of microtrichia on outer surface; both surstyli bearing several tubercles on inner sides (Fig. 25); cerci small; distiphallus (Fig. 26) fairly complex, bearing membranous lobe medially; postabdomen of female with two spherical, smooth spermathecae.

**Remarks.** *Sigaloethina* is closely related to *Dasyrhicnoessa* differing from it particularly in having the body cuticle noticeably glossy, the frons lacking a discernible shining patch on both sides of the ocellar triangle, the setal vestiture of the frons slightly, even though distinctly, sparse, and for

the peculiar morphology of the male terminalia. On the basis of the present knowledge, *Sigaloethina* might be regarded as the sister group of *Dasyrhicnoessa*.

**Etymology.** The generic epithet derives from the fusion of the ancient Greek word *sigaloeis* meaning glossy or shiny, with the generic name *Tethina*, and refers to the body of these flies having glossy cuticle. Gender feminine.

***Sigaloethina phaia* n.sp.**

Figs. 23–26

**Type material.** HOLOTYPE ♂ **Australia, New South Wales** “Mangroves / Careel Bay, / Avalon, NSW. / 3 Feb. 1973 / D.K. McAlpine // HOLOTYPUS / *Sigaloethina phaia* / gen. n., sp. n., ♂ / L. Munari des.” AM K186743. The specimen is in excellent condition, and is double mounted (glued on the tip of a triangular card label); abdomen dissected and stored in glycerol in a small plastic tube, and pinned below the specimen. PARATYPES **Australia, New South Wales:** same data as holotype, 3 ♂ 11 ♀; “Careel Bay / N. South

Wales / 27 Oct. 1962 // Mangroves / D.K. McAlpine”, 1 ♂; *ibidem*, “14 March 1963”, 1 ♀; “Careel Bay, / Avalon, NSW. / 15 Dec. 1964 / D.K. McAlpine // Mangroves”, 1 ♂; *ibidem*, “26 Dec. 1964”, 1 ♂; “North Creek, near / Ballina, NSW. / 1 March 1965 / McAlpine & Lossin”, 1 ♀; “Mangroves, Nth / Cronulla, NSW. / 21 Jan. 1962 / D.K. McAlpine”, 1 ♂; “NSW: Towra Pt., / Botany Bay; 29–/ iii–1986; Bickel / mangroves”, 1 ♂. **Australia, Northern Territory:** “NT: Buffalo Ck, / Darwin; 2–5 Mar. / 1996; D.K. McAlpine, / G.R. Brown”, 1 ♂ 1 ♀. The holotype and most of the paratypes are deposited in AM, some paratypes are preserved in MCV.

**Description.** *Size.* Body length 2.1 mm (1.6–2.3), wing length 2.1 mm (1.5–2.3), wing width 0.8 mm (0.5–0.8). *Habitus* (Fig. 23). Dark brown species having glossy cuticle, generally covered with thin, greyish microtomentum. Wings yellowish grey. *Head.* Dark brown, except for anterior surface of frons, antenna, face, parafacial, and gena being yellow; frons without discernible golden patch on both sides

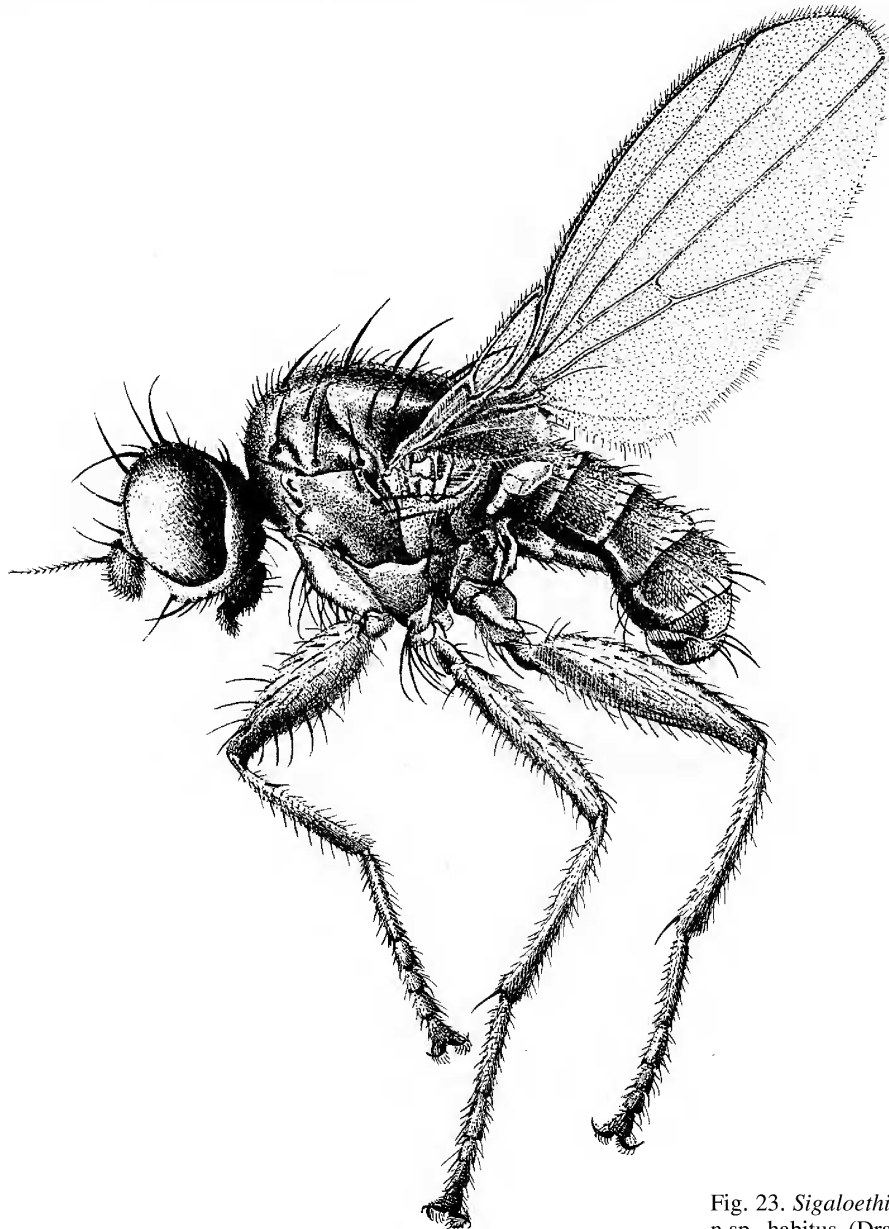


Fig. 23. *Sigaloethina phaia* n.gen. and n.sp., habitus. (Drawing by G. D'Este).

of ocellar triangle, or, if weakly present, absolutely not contrasting with rest of glossy, dark surface; paravertic setae thin, strongly inclinate; inner vertical seta inwardly curved, strong, about as long as laterocline outer vertical seta; postocular setae relatively long and strong, arranged in single row; upper postocular seta long, inclinate towards inner vertical seta; ocellar triangle bearing pair of thin pseudopostocellar setae in addition to pair of strong ocellars; 3 strong orbital setae, mid one distinctly laterocline, anterior and posterior setae more weakly laterocline to posteriorly directed; orbital vitta, apart from strong orbitals, almost entirely bare, at most with very few, thin setulae; 2 pairs of frontal setae, posterior pair with short, thin setae (some paratypes bear 1 to 3 pairs of such setae), anterior pair (in most paratypes equivalent to mid pair) with setae cruciate at apex; antenna with pedicel bearing very long dorsal seta, and postpedicel with arista bearing several long hairs; eye densely micropubescent, large, subrectangular, its longest diameter 8.2x as long as genal height; 7 black peristomal setae, four anteriors, including vibrissa, distinctly spaced, strong and long; shining knob above vibrissal angle absent (like *Dasyrhicnoessa*); mouth parts yellowish, with labellum small and stumpy, and palpus long and slender, bearing few black setulae. *Thorax*. Entirely dark brown, noticeably glossy, with setal vestiture black, mostly covered with light grey microtomentum; 1+3 dorsocentral setae; 4 rows of acrostichal setulae on entire length of scutum; prescutellar acrostichals long and thin; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta very long and strong, anterior setae shorter and weaker; 1 long presutural seta; 2 notopleurals subequal in length; 1 supra-alar, below it 1 shorter seta; 2 postalars, external one very long; scutellum bare, except for usual 4 long marginal setae; both proepisternal and proepimeral setae present, latter seta distinctly thinner; anepisternum with scattered pubescence, bearing 2–3 long, posteriorly directed, posteromarginal setae, mid one distinctly longer and stronger, and 1 erect, thin seta at posterodorsal margin; katapisternum with scattered pubescence, bearing long, erect, posterodorsal seta; anepimeron, katatergite, and meron without setae and setulae. *Legs*. Evenly setulose, bearing short blackish setae and setulae, except for foreleg having coxa with long black setae, and femur with very long, markedly spaced, posterodorsal and posteroventral setae; fore femur having vestigial ctenidium, at most with 1–2 spine-like setae (among the paratypes there are specimens without evident ctenidial spinulae, only with few, spaced, thin setae; conversely, a few other specimens show 1–4 weak, spaced spinulae which could represent the rudiments of a true ctenidium); mid femur of male with row of robust, subequal in length, posteroventral, spine-like setae arranged on entire length of femur; all legs show yellow coxae, dark brown femora, yellowish brown to yellow tibiae, and yellow tarsi; fore and hind femurs of male slightly swollen. *Wing*. Veins brownish yellow, membrane yellowish grey; alula with fringe formed by erect, blackish setae; costal vein reaching end of  $M_1$  (sometimes as faint segment), bearing microscopic setulae on both dorsal and ventral surfaces;  $R_{2+3}$  slightly bisinuate, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending before middle of cell *dm*; crossvein *dm-cu* distinctly shorter than one third of last section of  $CuA_1$ ; halter yellowish. *Abdomen*. Shining, black, with narrow, apicomarginal, pale brownish stripe on each tergite; tergites bearing several black

setae and setulae. *Male terminalia* (Figs. 24–26). Epandrium broad, bearing sparse setae on posterior surface, few of them long and strong, in particular on dorsal surface and on posteromarginal part of distal half; cercus of normal size, pubescent, covered with microscopic hairs and with long setae dorsally; anterior surstylus arising from lower part of epandrium, distinctly larger than posterior surstylus, vaguely subtriangular, with external angles broadly rounded, its transverse axis almost perpendicular to longitudinal axis of epandrium, bearing patch of close microtrichia forming triangular area on outer surface, and with numerous, stout tubercles on posterior inner side; posterior surstylus simple, elongated, broadly rounded apically, bearing several stout tubercles on inner side; aedeagal apodeme long, bisinuate proximally; ejaculatory apodeme with broad distal fan; phallus (Fig. 26) relatively short; distiphallus with basal half distinctly sclerotized, bearing many spine-like papillae, distal half bearing strongly diaphanous membranous lobe, and with unusual, partly sclerotized folding zone dividing phallus in two halves.

**Female**. Similar to male, except for very slight sexual dimorphism. *Female terminalia*. Cerci slender, narrow, bearing setulae dorsally and apically; spermathecae spherical, smooth.

**Distribution**. Australia (NSW, NT).

**Remarks**. The two specimens from Buffalo Creek (Northern Territory) are smaller than the other paratypes from New South Wales. However, the male terminalia are similar and I regard the specimens from both areas as conspecific.

**Etymology**. From the ancient Greek *phaios* meaning dusky or brown. The specific epithet refers to the dark brown colour of the new species.

#### *Sigaloethina* sp. near *phaia* n.sp.

**Material examined**. Australia, Queensland: Gladstone, mangroves, 19.xii.1961, D.K. McAlpine, 1 ♀ [AM].

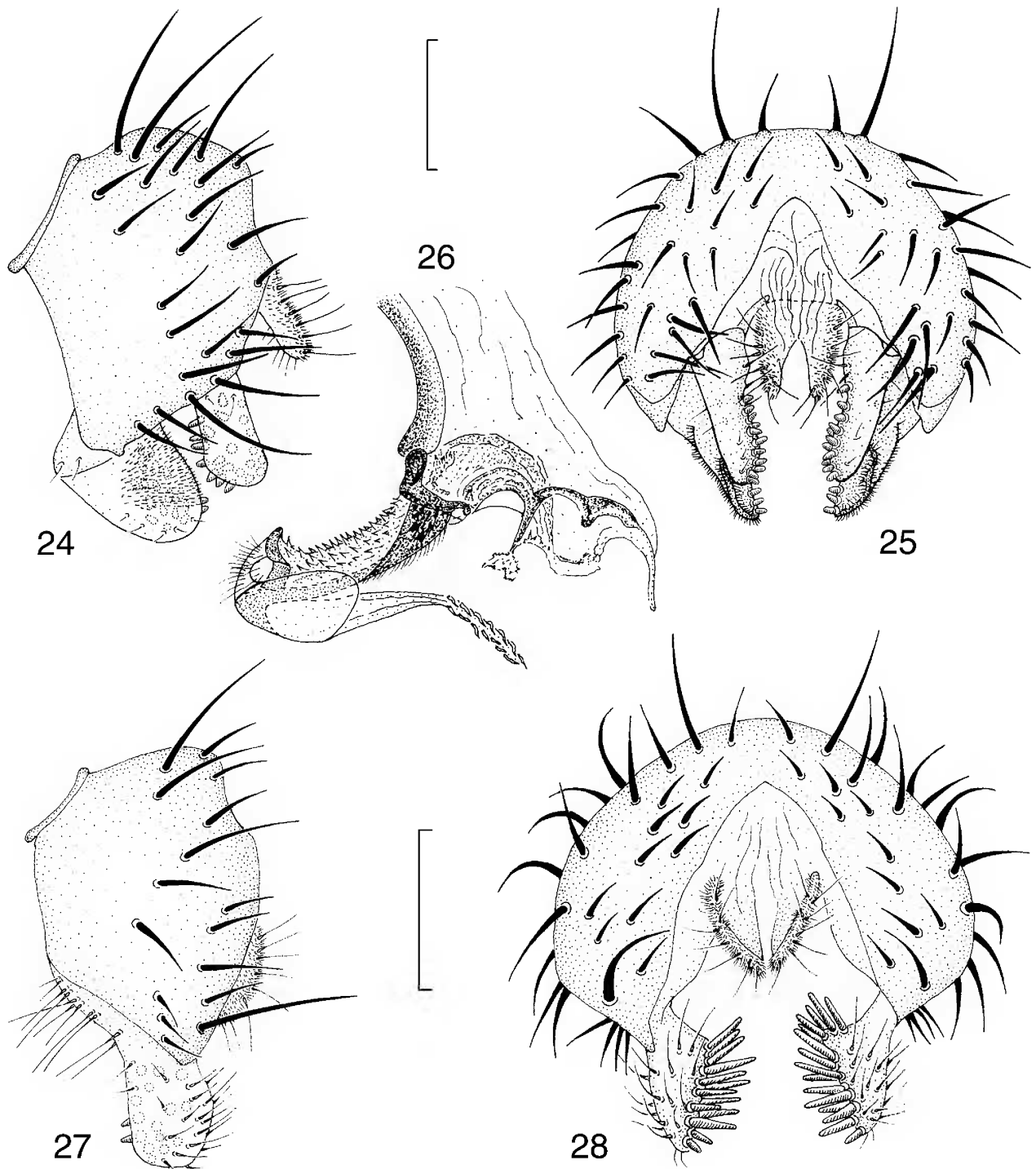
**Remarks**. The female specimen from Gladstone (QLD) shows a peculiar, dense microtomentum on the thorax and abdomen, resembling the characteristic pruinescence covering the peel of a plum. This specimen, labelled with the abbreviation “cf.”, might be an undescribed species.

#### *Tethina nigriseta* Malloch, 1924

Figs. 27–28

Mathis & Sasakawa, 1989: 668; Colless & D.K. McAlpine, 1991: 779; Mathis & Munari, 1996: 17.

**Material examined**. Australia, New South Wales: Booti-Booti Nat. Park, The Ruins, Forster District, shoreline rocks, 9.x.2000, D.K. McAlpine, 4 ♂♂ 1 ♀; Broken Head, near Byron Bay, shoreline rocks, 7–8.xi.2000, D.K.M., 3 ♂♂ 1 ♀; Bulli, adults emerged from kelp, 11.iii.1991, D.K.M., 2 ♂♂ 2 ♀♀; Bundagen, via Repton, 15.i.1971, D.K.M. & A. Hughes, 2 ♂♂ 19 ♀♀; Bundeena, near Sydney, on seashore rocks, 10.xii.1966, D.K.M., 1 ♂ 1 ♀; Careel Bay, 15.xii.1957, D.J.J. Lee, (SPHTM Coll.), 1 ♂; *ibidem*, 28.xii.1957, D.J.J. Lee, (SPHTM Coll.), 1 ♀; Collaroy, 20.i.1924, [no collector], (SPHTM Coll.), 1 ♀; Dee Why, near Sydney, sand hills, 31.iii.1962, D.K.M., 1 ♀; *ibidem*, sand dunes, 4.xi.1971, D.K.M. & G.A. Holloway, 30 ♂♂ 7 ♀♀; Iluka rain forest, Clarence River, MV lamp, 22.ii.1965, D.K.M., 1 ♀; *ibidem*, MV lamp, 24–25.xi.1970, D.K.M., 1 ♂ 2 ♀♀; Kurnell, on beach, 23.ii.1957,



Figs. 24–28. Terminalia of male. *Sigaloethina phaia* n.gen. and n.sp.: (24) lateral view, (25) posterior view, (26) phallus. *Tethina nigriseta* Malloch, 1924: (27) lateral view, (28) posterior view. Scale bars: 0.1 mm.

D.K.M., [D.K.M. det.], 3 ♂♂ 1 ♀; *ibidem*, 1.iii.1962, D.K.M., 12 ♂♂ 9 ♀♀; Little Beach, near Terrigal, on beach, 29.i.1988, D.K.M. & B.J. Day, 23 ♂♂ 31 ♀♀; Maitland Bay, near Terrigal, on beach, 29.i.1988, D.K.M. & B.J. Day, 40 ♂♂ 33 ♀♀; McMasters Beach, near Terrigal, on kelp, 25.xi.1987, D.K.M., R. Blanche, and B.J. Day, 1 ♀; *ibidem*, 29.i.1988, D.K.M. & B.J. Day, 6 ♀♀; North Beach, Bellinger River, sand dunes, 15.i.1971, D.K.M., 35 ♂♂ 35 ♀♀; Putty Beach, near Terrigal, 25.xi.1987, D.K.M., R. Blanche, and B. Day, 2 ♂♂ 2 ♀♀; Red Rock, near Woolgoolga, dunes, 9.xi.2000, D.K.M., 1 ♀; Seal Rocks (headland), shoreline rocks, 9–10.x.2000, D.K.M., 6 ♂♂ 8 ♀♀; Sydney, Narrabeen, 21.i.1924, Health Dept., (SPHTM Coll.), [J.R. Malloch det.], 1 ♂; Sydney, Long Reef, on intertidal rocks, 28.i.1964, D.K.M., 2 ♀♀; *ibidem*, on

beach, 28.i.1964, D.K.M., 1 ♂; *ibidem*, on stranded kelp, 30.iii.1964, D.K.M., 4 ♂♂ 5 ♀♀; *ibidem*, on kelp, 26.iv.1984, D.K.M. & M. Dingley, 16 ♂♂ 40 ♀♀; Turimetta Beach, near Sydney, 2.v.1981, B.J. Day, 4 ♂♂ 1 ♀; Twofold Bay, Nullica Beach, stranded seaweed, 13.v.1988, D.K.M. & B.J. Day, 11 ♂♂ 7 ♀♀; Valla Beach, near Urunga, 23.ix.1981, D.K.M. & B.J. Day, 8 ♂♂ 3 ♀♀; Wairo Beach, near Durras, 11.iv.1986, D.K.M., 2 ♂♂ 1 ♀; Woody Head, near Iluka, 29.xii.1978, B.J. Day, 4 ♂♂ 8 ♀♀; Woolgoolga, shoreline rocks, 7.xi.2000, D.K.M., 1 ♂. **Australia, Victoria:** Mallacoota, Bastion Point, stranded seaweed, 13–14.v.1988, D.K.M. & B.J. Day, 1 ♂ 2 ♀♀; Walkerville, near Waratah Bay, on stranded seaweed, 6–7.iv.1986, D.K.M., 2 ♂♂ 1 ♀.

**Distribution.** Australia (NSW, QLD, VIC [new distribution]).

**Remarks.** This species is probably the most common tethinid fly inhabiting the shores of NSW and VIC.

*Tethina pallidiseta* Malloch, 1935

Mathis & Sasakawa, 1989: 668; Mathis & Munari, 1996: 17–18; Munari, 2000: 247.

**Material examined.** Australia, New South Wales: Careel Bay, 18.i.1958, D.J. Lee, (SPHTM Coll.), 2♂♂; Dee Why, near Sydney, 28.i.1957, W.W. Wirth, 1♂; *ibidem*, lagoon and sand hills, 31.iii.1962, D.K. McAlpine, 5♂♂ 8♀♀; *ibidem*, sand dunes, 4.xi.1971, D.K. McAlpine & G.A. Holloway, 4♂♂ 6♀♀; Iluka rain forest, Clarence River, MV lamp, 22.ii.1965, D.K. McAlpine, 1♀; *ibidem*, MV lamp, 24.xi.1970, D.K. McAlpine, 1♀; Kurnell, on beach, 23.ii.1957, D.K. McAlpine, 1♂; Long Reef, on beach, 28.i.1964, D.K. McAlpine, 2♂♂ 1♀; *ibidem*, on stranded kelp, 30.iii.1964, D.K. McAlpine, 1♀; Merimbula, Ocean Beach, 12.ii.1963, D.K. McAlpine, 1♀; North Beach, Bellinger River, 16.xi.1964, D.K. McAlpine, 2♀♀; *ibidem*, on beach, river side, 21.ii.1965, D.K. McAlpine, 1♀; *ibidem*, sand dunes, 15.i.1971, D.K. McAlpine, 3♂♂ 5♀♀; North Cronulla, sand dunes near sea, 3.iv.1962, D.K. McAlpine, 18♂♂ 5♀♀; Red Rock, near Woolgoolga, dunes, 9.xi.2000, D.K. McAlpine, 8♂♂ 9♀♀; Turimetta Beach, near Sydney, 2.v.1981, B.J. Day, 2♂♂ 1♀. Australia, Lord Howe Island, Old settlement Beach, 20.ii.1971, D.K. McAlpine, 18♂♂ 7♀♀; *ibidem*, Blinky Beach, 25.ii.1971, D.K. McAlpine, 1♂ 4♀♀. Australia, Tasmania: Bruny I., The Neck, 8.xii.1987, D.K. McAlpine, 2♀♀; Spring Beach, near Orford, 6–7.xii.1987, D.K. McAlpine, 2♀♀. Australia, Victoria: Venus Bay via Lower Tarwin, 8–9.iv.1986, D.K. McAlpine, 1♂ 3♀♀.

**Distribution.** Australia (NSW, TAS [new distribution], VIC [new distribution], WA) (see Munari [2000] for WA record).

**Remarks.** This species is very easily recognizable by its white setae and setulae.

*Thitena* n.gen.

**Type species.** *Thitena cadaverina* n.sp. (Fig. 29).

**Diagnosis.** Robust, yellowish brown flies with legs bearing strong setae and long and thick villosity which is particularly developed in male; head roundish; face depressed, bearing shining, foldlike tubercle above vibrissal angle; cephalic chaetotaxy typical of subfamily; frons without discernible golden patch on both sides of ocellar triangle, only with slight infuscation; arista microscopically pubescent; eye roundish, with few, sparse interfacetal setulae; longest diameter of eye over 3.5× as long as genal height. Thorax very slightly flattened dorsally, with chaetotaxy typical of subfamily; disc of scutellum pubescent (Fig. 30); all thoracic setae distinctly thinner than those in all other Tethininae. Legs very robust, strongly villose, particularly forelegs in male (an apomorphic character state with respect to the ground plan of the Tethinidae); tarsi of male stumpy, with tarsomeres noticeably short (in particular basitarsomeres), setulose, and flattened; true ctenidium absent; tibiae with rows of strong setae. Wing typical of subfamily; halter pale yellow. Abdomen rather robust, with tergites and sternites well sclerotized; male terminalia (Figs. 31–32) with very

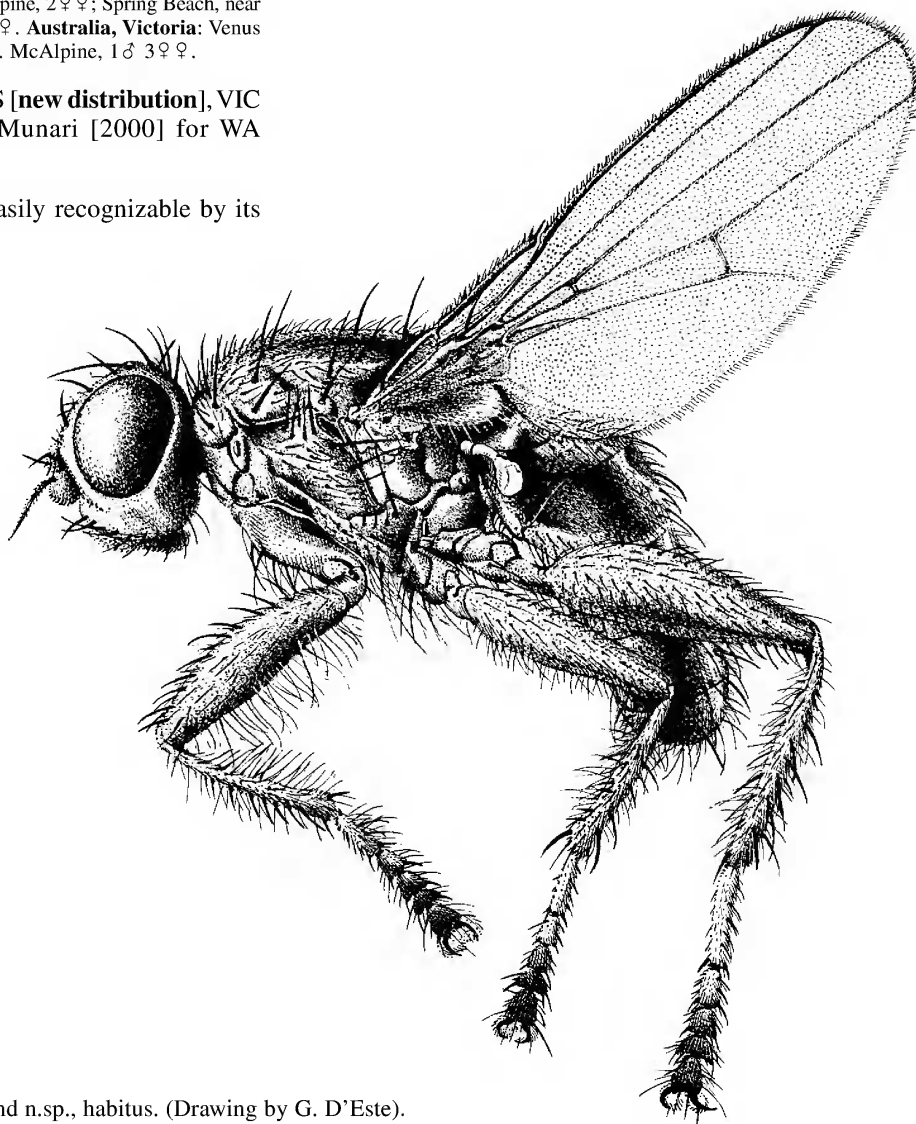


Fig. 29. *Thitena cadaverina* n.gen. and n.sp., habitus. (Drawing by G. D'Este).

long and slender anterior surstylus, and large posterior surstylus externally covered with dense microtrichia; both surstyli subequal in length and reciprocally parallel. Spermathecae of female spherical, smooth.

**Remarks.** For some morphological and chaetotactic traits as well as for the general habitus, the new genus would seem to be related to *Pseudorhinoessa*, differing from it particularly for the following characters besides those given in the key: larger size; body and legs distinctly more robust and setulose; frons with numerous additional setulae; thoracic setae distinctly thinner; true ctenidium of fore femur absent; fore tibia with row of strong setae; mid and hind tibiae with different chaetotactic pattern; tarsi of male stumpy, with tarsomeres noticeably short (in particular basitarsomeres), setulose, and flattened; crossvein *dm-cu* longer, about as long as half of last section of CuA<sub>1</sub>; abdomen with sternites well sclerotized; male terminalia with anterior and posterior surstyli subequal in length and reciprocally parallel.

**Etymology.** The generic epithet derives from an anagram of the generic name *Tethina*. Gender feminine.

***Thitena cadaverina* n.sp.**

Figs. 29–32

**Type material.** HOLOTYPE ♂ **Australia, Western Australia** “Barrow Island / W. Australia / 12.ii.1977 H. H. 75 / H. Heatwole / W.H. Butler // On dead turnstone / 12 Feb. 1977 / Beach / Barrow Is. W.A. / H. H. 75. // HOLOTYPUS / *Thitena cadaverina* / gen. n., sp. n. ♂ / L. Munari des.” AM K186744. The specimen is in fairly good condition (many setae missing, posterior edge of both the wings a little damaged), and is double mounted (glued on the tip of a triangular card label); abdomen, including terminalia, *in situ*. PARATYPES **Australia, Western Australia**: same data as holotype, 4♂♂ 7♀♀. The holotype and most of the paratypes are deposited in AM, a couple of paratypes is preserved in MCV.

**Description.** *Size.* Body length 4.1 mm (3.3–4.1), wing length 2.7 mm (2.2–2.7), wing width 1.0 mm (0.8–1.0). *Habitus* (Fig. 29). Robust, yellowish brown species with legs bearing strong setae and long and thick villosity. Wings brownish yellow. *Head.* Frons brownish yellow to brown, with very narrow, whitish orbital vittae; ocellar triangle and posteranial surface covered with dark grey microtomentum; antenna yellow, distinctly infuscated; face, parafacial, and gena pale yellowish, latter homogeneously microtomentose; frons without golden patch lateral to ocellar triangle, only with slight infuscation; paraverticilar setae strongly developed, cruciate at apex; inner vertical seta inclinate, strong, about as long as laterocline outer vertical seta; postocular and postgenal setae arranged in several irregular rows; 2 upper postgenal setae inclinate towards paraverticals, external seta distinctly longer; ocellar triangle bearing pair of well-developed pseudopostocellar setae, distinctly longer than half of strong ocellars; a few very short setulae between ocellars and pseudopostocellars, and behind latter setae; 3 strong, laterocline orbital setae; several additional setulae between orbitals and frontals, distinctly more numerous between two anterior orbitals and

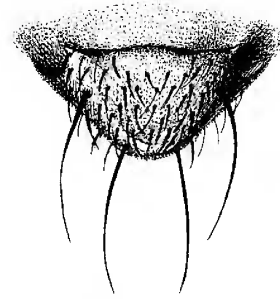
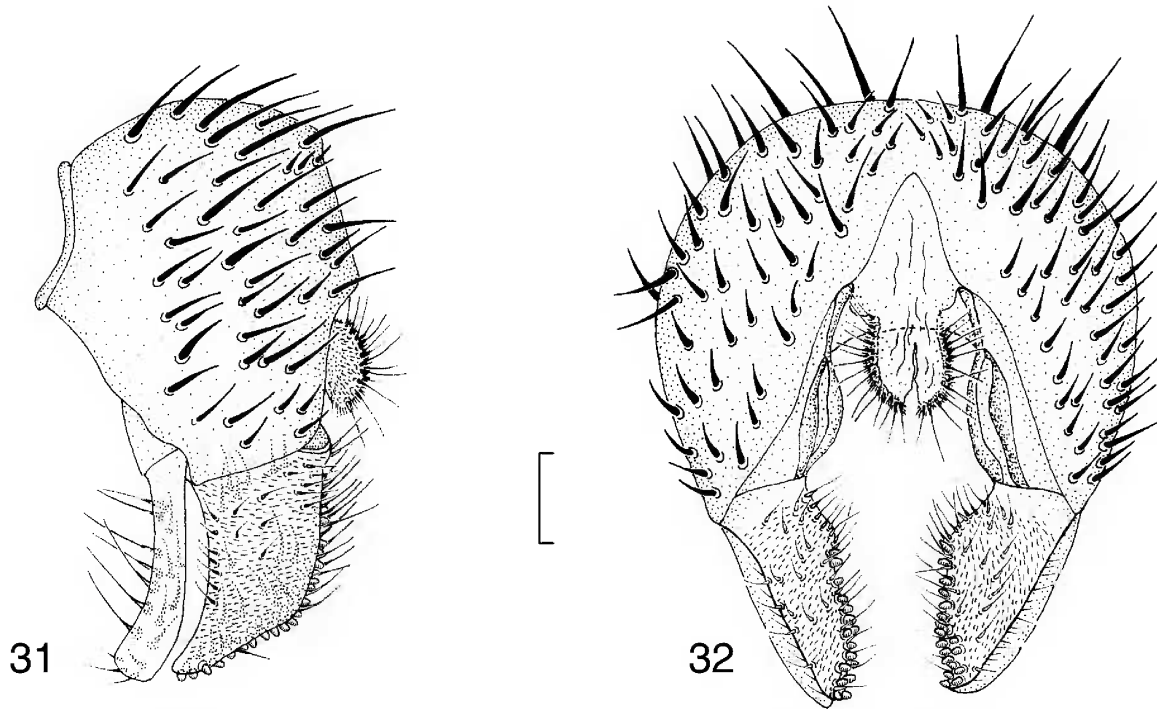


Fig. 30. *Thitena cadaverina* n.gen. and n.sp., scutellum dorsal view. (Drawing by G. D'Este).

anterior pairs of frontal setae; 3–4 pairs of strong, frontal setae intercalated with 3 pairs of shorter and weaker setae, all setae and setulae inclinate; antenna with postpedicel bearing microscopically pubescent arista; eye roundish, with strongly impoverished micropubescence formed by very few, sparse interfacetal setulae; longest diameter of eye 2.8–3.3× as long as genal height; 7 strong peristomal setae (including vibrissa) decreasing in length posteriorly; very narrow, glossy stripe along peristomal edge, between this one and peristomal setae, ending above vibrissal angle to form foldlike, shining facial tubercle; face depressed, without median carina; mouth parts yellow, with labellum shorter than length of buccal cavity, and palpus long, slender, slightly clavate, bearing scattered, golden brown setulae. *Thorax.* Brownish, covered with dark grey microtomentum; postpronotal lobe yellowish, faintly shining, distinctly contrasting with rest of brown thoracic surface; setae of mesonotum brownish to black, noticeably thinner than those in all other Tethininae species; 1+3 dorsocentral setae; 8–9 rows of acrostichal setulae on anterior half of scutum, otherwise arranged in 6 rows; prescutellar acrostichals long; postpronotal lobe bearing 3 setae, each with different inclination, posterior seta very long, anterior setae shorter, remaining surface with numerous strong setulae; 1 presutural seta; 2 notopleurals subequal in length; 1 supraalar, below it 1 shorter seta; 2 postalars, external one slightly, even though distinctly, longer; scutellum with 4 long marginal setae and many additional setulae on discal surface (Fig. 30); proepisternal and proepimeral setae subequal in length and strength; anepisternum with pubescence almost fully covering entire surface, bearing 3 long, posteriorly directed, posteromarginal setae, mid one long and strong, and 1–2 erect, thin setae at posterodorsal margin; katepisternum very poorly pubescent on mid and upper parts, but with dense and very long brown villosity on lower surface, bearing long, erect seta on posterodorsal margin; anepimeron, katatergite, and meron without setae and setulae. *Legs.* Ventral and posteroventral sides of all legs, in particular of forelegs, strongly shaggy in male and with rows of long and robust setae present in both sexes; foreleg having yellow coxa bearing several, long, black setae; ventral and posteroventral surfaces of both fore femur and tibia of male covered with thick, very long and rather ruffled, golden villosity; fore tibia with row of posterodorsal black setae; fore femur bearing few setae dorsally and row of several, long, posteroventral setae; ctenidium absent, only short row of long, thin, golden setae in its place; mid leg



Figs. 31–32. Terminalia of male. *Thitena cadaverina* n.gen. and n.sp.: (31) lateral view, (32) posterior view. Scale bar: 0.1 mm.

with more or less bristly femur, and with tibia bearing antero- and posterodorsal rows of strong and long setae on distal two thirds of its length; hind leg with femur distinctly swollen in male, and with tibia bearing anteroventral and antero- and posterodorsal rows of long and strong setae (in variable number) on distal two thirds of its length; tarsi of male stumpy, with tarsomeres noticeably short (in particular basitarsomeres), setulose, and flattened; all legs brownish, with last tarsomeres darker. *Wing*. Veins light brownish to yellowish, membrane brownish yellow; alula with fringe formed by several, erect, golden brown setae; costal vein reaching end of  $M_1$ , with apex of first section, just above subcostal break, bearing long and strong spine-like seta; dorsal and ventral surfaces of costal vein with hardly discernible, microscopic setulae;  $R_{2+3}$  almost straight to perceptibly bisinuate, slightly, even though distinctly, diverging from  $R_{4+5}$  distally;  $R_{4+5}$  and  $M_1$  parallel; crossvein *r-m* ending before middle of cell *dm*; crossvein *dm-cu* about as long as half of last section of  $CuA_1$ ; halter pale yellow. *Abdomen*. In male, with tergites and sternites well sclerotized, former rather broad, with narrow, yellowish, marginal stripes, and covered with several brownish to black setulae as well as with moderately long, golden brown, marginal setae which are longer on postabdominal segments; epandrium of male terminalia distinctly exposed. *Male terminalia* (Figs. 31–32). Entire surface of epandrium bearing numerous, short setae; cercus tiny, dorsally covered with microscopic hairs and with long setae; anterior surstylus very long and slender, about as long as posterior surstylus, narrow, slightly bent forwards, bearing very long,

spaced, thin setae on inner side; posterior surstylus large, bent forwards, distinctly tapered and pointed apically (in lateral view), externally covered with dense microtrichia, bearing several thin setae and short, stout tubercles on inner side of posterior margin; aedeagal apodeme relatively short, sinuated medially; ejaculatory apodeme with distal fan poorly developed, having regular, subtriangular, unindented margin; distiphallus stumpy, short, ribbon-like, covered with dense micropubesence.

**Female**. All legs distinctly setulose, but without remarkable long villosity; for the rest, external morphology and chaetotaxy similar to male, except for slight sexual dimorphism; abdominal sternites well developed and distinctly sclerotized; 6th tergite and sternite large, latter with roundish margin; both tergites and sternites brown, bearing several marginal setae and setulae. *Female terminalia*. Cerci small, relatively short, setulose; spermathecae spherical, smooth.

**Distribution**. Australia (WA).

**Remarks**. More material of this interesting species is desirable as most of the type series is damaged. Many specimens have a collapsed thorax and many setae and setulae are missing.

**Etymology**. From the Latin *cadaverinus* meaning of dead body, corpse, carcass. The specific epithet refers to the substrate upon which the new species was collected: a dead Turnstone (a migratory shorebird of the genus *Arenaria*) possibly washed up on the beach.



## A catalogue of the Tethininae of Australia and Papua New Guinea

Genus *Dasyrhicnoessa* Hendel

*Dasyrhicnoessa* Hendel, 1934: 38. Type species: *Rhicnoessa fulva* Hendel, by original designation.

***atripes* n.sp.** Distribution: Australia (NSW).

*Dasyrhicnoessa atripes* n.sp. (described in the present work) [New South Wales: Wategos, Cape Byron, beach; HT ♂, AM K186735; figures of ♂ terminalia].

***ciliata* n.sp.** Distribution: Australia (NT).

*Dasyrhicnoessa ciliata* n.sp. (described in the present work) [Northern Territory: Buffalo Ck, Darwin; HT ♂, AM K186736; figures of antenna and ♂ terminalia].

***ferruginea*** (Lamb). Distribution, see text.

*Rhicnoessa ferruginea* Lamb, 1914: 367 [Seychelles: Mahé; LT ♂ (designated by Munari, 1988: 48), BMNH].

*Tethina ferruginea*.—Cogan, 1980: 693 [generic combination, Afrotropical catalog].

*Dasyrhicnoessa ferruginea*.—Munari, 1988: 48 [generic combination, lectotype designation].

***fulvescens*** Malloch. Distribution, see text.

*Dasyrhicnoessa fulvescens* Malloch, 1935: 93 [Australia: Queensland, Townsville; HT ♀, AM].—Mathis & Sasakawa, 1989: 667 [Australasian/Oceanian catalog].—Munari, 2002: 550 [citation, world list].

***humilis* n.sp.** Distribution: Australia (NSW, QLD).

*Dasyrhicnoessa humilis* n.sp. (described in the present work) [New South Wales: Careel Bay, Avalon; HT ♂, AM K186737; figures of ♂ terminalia].

***insularis*** (Aldrich). Distribution, see text.

*Tethina insularis* Aldrich, 1931: 395 [(USA) Wake Island; HT ♀, USNM (41629)].

*Rhicnoessa insularis*.—Hendel, 1934: 44 [key], 48 [generic combination, citation].

*Dasyrhicnoessa insularis*.—Hardy & Delfinado, 1980: 371–373 [generic combination, citation, figures of head, wing, ♂ and ♀ terminalia].—Munari & Evenhuis, 2000: 145–147 [revision, world distribution, citations].

*Tethina lasiophthalma* Malloch, 1933: 17 [Marquesas: Hivaoa, Tahauku; HT ♂, BPBM].

*Dasyrhicnoessa lasiophthalma*.—Sasakawa, 1974: 2 [generic combination].—Munari & Evenhuis, 2000: 145 [synonymy].

*Dasyrhicnoessa ferruginea* of authors, not Lamb, 1914 [misidentification].

*Dasyrhicnoessa freidbergi* Munari, 1994: 20 [Cameroon: Kribi (beach, Rt. N7); HT ♂, TAU].—Munari & Evenhuis, 2000: 145 [synonymy].

***longisetosa* n.sp.** Distribution: Australia (QLD), Papua New Guinea.

*Dasyrhicnoessa longisetosa* n.sp. (described in the present work) [Papua New Guinea: Port Moresby, mangroves; HT ♂, AM K186738; figures of ♂ terminalia].

***macalpinei* n.sp.** Distribution: Australia (NT).

*Dasyrhicnoessa macalpinei* n.sp. (described in the present work) [Northern Territory: Buffalo Ck, Darwin; HT ♂, AM K186739; figures of ♂ terminalia].

***ostentatrix* n.sp.** Distribution: Australia (NSW, VIC).

*Dasyrhicnoessa ostentatrix* n.sp. (described in the present work) [New South Wales: Careel Bay, Avalon, swept sea grass; HT ♂, AM K186740; figures of ♂ terminalia].

***pallida* n.sp.** Distribution: Australia (QLD).

*Dasyrhicnoessa pallida* n.sp. (described in the present work) [Queensland: Mackay, mangroves; HT ♂, AM K186741; figures of ♂ terminalia].

***priapus* n.sp.** Distribution: Australia (QLD).

*Dasyrhicnoessa priapus* n.sp. (described in the present work) [Queensland: Eurimbula, mangroves; HT ♂, AM K186742; figures of ♂ terminalia].

***serratula*** Malloch [sp. inq.]. Distribution, see text.

*Dasyrhicnoessa serratula* Malloch, 1935: 94 [Australia: Queensland, Townsville; HT ♀, AM].—Mathis & Sasakawa, 1989: 667 [Australasian/Oceanian catalog].—Munari, 2002: 550 [citation, world list].

***sexseriata*** (Hendel). Distribution, see text.

*Rhicnoessa sexseriata* Hendel, 1913: 110 [Taiwan: Anping; HT ♀, DEI].

*Tethina sexseriata*.—Steyskal & Sasakawa, 1977: 395 [generic combination, Oriental catalog].

*Dasyrhicnoessa sexseriata*.—Mathis & Munari, 1996: 12 [generic combination].

*Dasyrhicnoessa asymbasia* Sasakawa, 1995: 56 [Caroline Islands: Yap Islands, Rummang Island (at light); HT ♂, USNM; figures of ♂ terminalia].—Mathis & Munari, 1996: 12 [synonymy].

***tripunctata*** Sasakawa. Distribution, see text.

*Dasyrhicnoessa tripunctata* Sasakawa, 1974: 5 [Philippines: Palawan, Tinabog (3 km NE); HT ♂, BPBM (10355)].

*Dasyrhicnoessa phyllodes* Sasakawa, 1995: 64 [Caroline Islands: Palau Islands, Babelthuap Island, Almongui (Ngaramlungui); HT ♂, USNM; figures of ♂ terminalia].—Munari, 1996: 10 [synonymy].

**vockerothi** Hardy & Delfinado. Distribution, see text.

*Dasyrhicnoessa vockerothi* Hardy & Delfinado, 1980: 373 [Hawaii: Kauai, Haena (collected on beach); HT ♂, BPBM].

*Dasyrhicnoessa occidentalis* Munari, 1986: 47 [Seychelles: Mahé, Mahé Beach (10 km N); HT ♂, MCV]; Munari, 1990: 53 [synonymy].

### Genus *Plesiotethina* Munari

*Plesiotethina* Munari, 2000: 238. Type species: *Plesiotethina australis* Munari, by original designation. *australis* Munari. Distribution: Australasian/Oceanian: Australia (WA).

*Plesiotethina australis* Munari, 2000: 240 [Australia: southwest Australia, south of Shoal Bay (6 km S Albany; salt meadow); HT ♂, ZSM; figures of head and ♂ terminalia].

### Genus *Pseudorhichnoessa* Malloch

*Pseudorhichnoessa* Malloch, 1914: 306. Type species: *Pseudorhichnoessa spinipes* Malloch, by original designation.

*Macrotethina* Malloch, 1935: 91 (as a subgenus of *Tethina*). Type species: *Tethina (Macrotethina) tibiseta* Malloch, by original designation.

*spinipes* Malloch. Distribution, see text.

*Pseudorhichnoessa spinipes* Malloch, 1914: 307 [Taiwan: Takao; HT ♀, USNM].—Munari, 2002: 549, 550 [citation, Malaysia, Philippines, Australia (QLD), discussion].

*Tethina (Macrotethina) tibiseta* Malloch, 1935: 91 [Australia: Queensland, Townsville; HT ♂, AM].

*Pseudorhichnoessa tibiseta*.—Mathis & Sasakawa, 1989: 667 [generic combination, Australasian/Oceanian catalog].—Munari, 2002: 549 [synonymy].

### Genus *Sigaloethina* n.gen.

***Sigaloethina* n.gen.** (described in the present work). Type species: *Sigaloethina phaia* n.sp.

***phaia* n.sp.** Distribution: Australia (NSW, NT).

*Sigaloethina phaia* n.sp. (described in the present work) [New South Wales: Careel Bay, Avalon, mangroves; HT ♂, AM K186743; figures of habitus and ♂ terminalia].

### Genus *Tethina* Haliday

*Tethina* Haliday, in Curtis, 1837: 293 (as a subgenus of *Opomyza*; published in synonymy; first made available by use in Haliday, 1838: 188). Type species: *Opomyza (Tethina) illota* Haliday, 1838, by subsequent monotypy (Haliday, 1838: 188).

*hirsuta* Munari. Distribution: Australasian/Oceanian: Australia (WA).

*Tethina hirsuta* Munari, 2000: 244 [Australia: southwest Australia, Hopetoun (southern coast); HT ♂, ZSM; figures of head, legs, abdomen, ♂ terminalia, spermathecae].

*nigriseta* Malloch. Distribution, see text.

*Tethina nigriseta* Malloch, 1924: 337 [Australia: New South Wales, Woolgoolga; HT ♂, AM].—Mathis & Sasakawa, 1989: 668 [Australasian/Oceanian catalog].—Colless & D.K. McAlpine, 1991: 779 [figures of head and wing].

*Rhichnoessa nigriseta*.—Hendel, 1934: 43 [key], 47 [citation].

*Tethina (Tethina) nigriseta*.—Malloch, 1935: 92 [citation].

***ochracea*** (Hendel). Distribution: *Afrotropical*: Cape Verde Islands, Senegal, Seychelles (Aldabra), South Africa. *Australasian/Oceanian*: Australia (WA). *Oriental*: Taiwan. *Nearctic*: Bermuda, USA. *Neotropical*: Chile, Mexico. *Palaeartic*: Algeria, Azores, Bulgaria, Canary Islands, Egypt, France, Greece, Israel, Italy, Madeira, Malta, Spain (including Balearic Islands), Tunisia, Turkey.

*Rhichnoessa ochracea* Hendel, 1913: 109 [Taiwan. Anping; LT ♂ (designated by Munari, 1991: 166), NMW].

*Tethina ochracea*.—Steyskal & Sasakawa, 1977: 395 [generic combination, Oriental catalog].—Munari, 2000: 247 [citation, Australia (SW)].

*Rhichnoessa texana* Malloch, 1913: 148 [USA. Texas. Nueces: Corpus Christi; HT ♀, USNM (15807)].

*Tethina texana*.—Sturtevant, 1923: 7 [generic combination].—Munari & Evenhuis, 2000: 147 [synonymy].

*Tethina chilensis* Malloch, 1934: 455 [Chile: Antofagasta, Antofagasta; HT ♂, USNM (allotype on same pin)].—Munari & Evenhuis, 2000: 147 [synonymy].

*Tethina canzonerii* Munari, 1981: 142 [Turkey: Karatàs; HT ♂, MCV]; Munari, 1991: 165 [synonymy].

*pallidiseta* Malloch. Distribution, see text.

*Tethina (Tethina) pallidiseta* Malloch, 1935: 92 [Australia: New South Wales, Collaroy; HT ♂, AM].—Mathis & Sasakawa, 1989: 668 [Australasian/Oceanian catalog].—Munari, 2000: 247 [citation, Australia (WA), figure of ♂ terminalia].

### Genus *Thitena* n.gen.

*Thitena* n.gen. (described in the present work). Type species: *Thitena cadaverina* n.sp.

*cadaverina* n.sp. Distribution: Australia (WA).

*Thitena cadaverina* n.sp. (described in the present work) [Western Australia: Barrow Island, on dead Turnstone; HT ♂, AM K186744; figures of habitus, scutellum, and ♂ terminalia].

### Conclusions

Even though restricted to the subfamily Tethininae, I hope that this study, together with an earlier paper on the beach flies from the southwestern coast of Australia (Munari, 2000), lays the foundations for further research. This study suggests that *Tethina* is much less diverse in species than *Dasyrhicnoessa*. *Tethina* species mainly inhabit maritime sandy beaches, that are, in some localities, subject to anthropogenic effects related to leisure and industry. Conversely, *Dasyrhicnoessa* species mainly occur in inhospitable environments such as mangrove forests around lagoons and inland bodies of water, or impenetrable littoral belts. These two particular littoral ecosystems have produced in the past, differing speciation rates within these two genera. It appears that the genus *Tethina* is poorly represented in Australia whereas the pan-tropical *Dasyrhicnoessa* has many species awaiting discovery. A similar situation exists with the better known Afrotropical fauna where the endemic *Afrotethina* is far more numerous than *Tethina*.

The data on the beach flies of Papua New Guinea are too scant to allow a fair assessment of its fauna. Possibly the Tethinidae of Papua New Guinea are more similar to the fauna of Malaysia and Melanesia.

With regard to Australia, our knowledge contains a huge gap as little is known about the Tethinidae of Northern Territory, Western Australia and South Australia. An indication of this may be the fact that two new genera and three new species from Western Australia, including *Thitena cadaverina* described here, have been found from scanty material, fruit of quite occasional dipterological collections.

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### Appendix—Tethinidae from Pacific islands

In the material examined there were a few specimens from some Pacific Ocean islands; this material is cited below:

#### *Dasyrhicnoessa clandestina* Munari, 2002

(Munari, 2002: 543)

**Material examined.** Fiji Islands, Suva, xii.1929, K62562, H.R. Rabone, 1 ♂ [AM].

**Distribution.** Australasian/Oceanian: ?New Caledonia, Fiji.

#### *Dasyrhicnoessa insularis* (Aldrich, 1931)

(See citations in the main text)

**Material examined.** Fiji Islands, Suva, xii.1929, K62562, H.R. Rabone, 1 ♂ [AM].

**Remarks.** Five females captured in association with both the male specimens of this and the previous species (*D. clandestina*) have no consistent diagnostic character for separation, and are provisionally treated as "*Dasyrhicnoessa* cf. *clandestina/insularis*".

#### *Dasyrhicnoessa* cf. *insularis* (Aldrich, 1931)

**Material examined.** French Polynesia, Society Is., Moorea, viii.1928, A. Tonnoir, 1 ♀ [AM]

**Remarks.** After examining this female specimen, merely named on label "*Dasyrhicnoessa uniformis*, Type" by Malloch but neither described nor published as a new species, I feel it should be regarded, tentatively, as *Dasyrhicnoessa insularis* (Aldrich).