

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

DAVID K. MCALPINE

Australian Museum, 6 College St, Sydney 2000

MCALPINE, D.K. (1999). Australian signal flies of the genus *Rhytidortalis* (Diptera: Platystomatidae). *Proceedings of the Linnean Society of New South Wales* **121**, 147–174.

The genus *Rhytidortalis* Hendel is characterised. The Australian species and the Oriental type species of *Rhytidortalis* are keyed and described. *Rhytidortalis acme*, *R. averni*, *R. browni*, *R. cteis*, *R. kelseyi*, and *R. perforata*, are new species. *Duomyia rugifrons* (Thomson) (from *Senopterina*, *Rhytidortalis*) and *Duomyia solocifemur* (Enderlein) (from *Pseudepicausta*, *Rhytidortalis*) are new combinations. Sexual dimorphism in these flies is discussed with reference to its possible biological significance, particularly with regard to pre-mating recognition signals, and compared with sexual dimorphism in other platystomatid flies, particularly species of *Euprosopia* Macquart.

Manuscript received 13 August 1999, accepted for publication 17 November 1999.

KEYWORDS: *Duomyia*, platystomatid, *Rhytidortalis*, sexual dimorphism, signal flies.

INTRODUCTION

The Platystomatidae form a major family of the superfamily Tephritoidea and are one of the five most species-rich families of acalyprate flies in the Australasian Region. There are about 483 valid described species in this Region (Evenhuis 1989; McAlpine 1994, 1995, this publication), and at least 235 additional species have been observed in collections (author's counts). The present paper treats the small Australian genus *Rhytidortalis* Hendel, which occurs also in the Oriental Region.

The species of *Rhytidortalis*, in common with other small, inconspicuous flies, have not been well collected in many parts of Australia. The apparently endemic Western Australian species *R. acme* and *R. kelseyi* have been collected only once, and no species are known from Victoria. From these facts it can be inferred that additional species are likely to be discovered, and that the known range of the described species is likely to be extended with future collecting.

The term 'signal flies' has recently been used as a family-level common name for platystomatids, in reference to the many and diverse morphological and behavioural devices utilised in communication between conspecifics in many genera (see Whittington 1998; McAlpine 1998). One common form of signalling, found also in some other families, consists of the continuous waving of conspicuously marked wings while walking or while stationary. This behaviour is very noticeable in *Cleitamia astrolabei* (Macquart), *Pogonortalis doclea* (Walker), *Lamprogaster* spp., *Lenophila* spp., *Rivellia* spp. etc., and must affect the way the fly is perceived by potential predators, as well as conspecifics. Despite the significance of this family in Old World tropical faunas, no common name is in use for Platystomatidae, perhaps because before about 1950 the family was often merged with the Otitidae (Ulidiidae or picture-winged flies), and because the rarely used name broad-mouthed flies has not been deemed generally applicable.

METHODS

The morphological terms used here are those previously employed by me for platystomatids (McAlpine 1973a), and most are also explained by Harrison (1959) and Crosskey (1973). In addition, the cell-4 index is the ratio of the length of the antepenultimate section of vein 4 to the full length of the discal cell on vein 4. The stigmal index is the ratio of the length of costa on the subcostal (stigmal) cell to the length of costa on the marginal cell. Lengths of sections of veins do not include the thickness of those veins bounding measured sections, except that, for practical reasons, length of costa on marginal cell is taken from the distal extremity of the subcostal cell to the distal extremity of the marginal cell. The nomenclature of the thoracic bristles is shown in Fig. 6 below.

In listing material, the following collectors' names are abbreviated to the initials: C.J. Burwell, I.F. Common, E.C. Dahms, A. Daniels, G. Daniels, B.J. Day, G.A. Holloway, S. Johnson, L.P. Kelsey, R. de Keyzer, D.K. McAlpine, M.A. Schneider, M.S. Upton, D.K. Yeates.

The following abbreviations refer to institutions housing specimens:

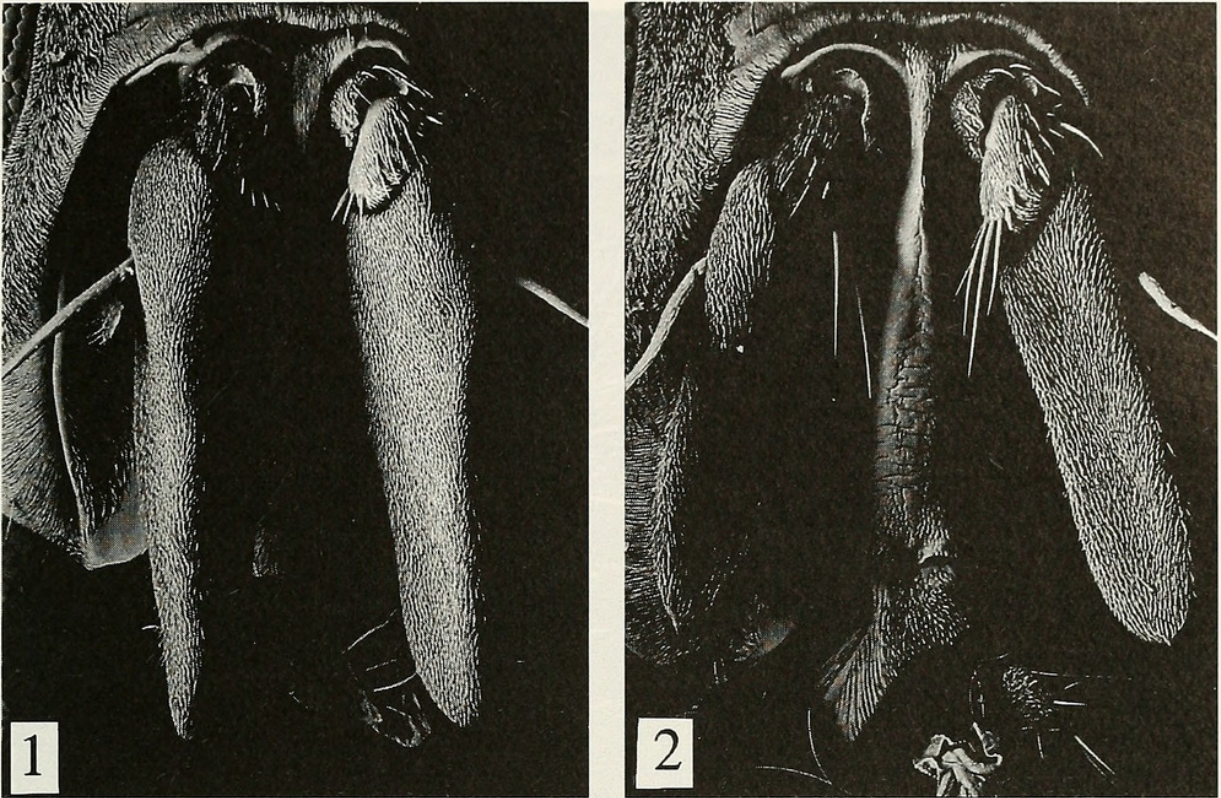
AM	Australian Museum, Sydney
ANIC	Division of Entomology, CSIRO, Canberra
AWA	Department of Agriculture, Western Australia, South Perth
BM	The Natural History Museum, London
MNB	Museum of Natural Science at Humboldt University, Berlin
MNM	Hungarian Natural History Museum, Budapest
NRS	Naturhistoriska Riksmuseet, Stockholm
QM	Queensland Museum, Brisbane
UQ	University of Queensland Insect Collection, Brisbane
USNM	National Museum of Natural History, Washington
WM	Natural History Museum, Vienna
ZMC	Zoological Museum, Copenhagen

ECOLOGY AND HABITS

Material of *Rhytidortalis* spp. that I have collected has been found in sandy habitats near the sea shore, and label data on most other material appear to support the generally coastal distribution of the genus. *R. averni*, the best known species, is often found at the edge of dune scrub, but this species and *R. perforata* were taken 'at light' in the rain forest at Iluka, which borders on sandy coastal scrub. On Nullica Beach, near Eden NSW in November 1997, *R. averni* was found to be abundant on the grass *Spinifex hirsutus* (Poaceae), but was apparently absent on the nearby low (almost prostrate) *Acacia* shrubs to the landward side of the *Spinifex* habitat. These coastal dune habitats are shared with some other platystomatids, including species of *Microepicausta* Hendel, *Rivellia* Robineau-Desvoidy, and some little known species of *Duomyia* Walker. At Buffalo Creek, Darwin, specimens of *R. browni* were collected in a clearing bordering sandy scrub and mangrove. The records of *R. browni* from several inland districts in Queensland indicate that the species is not restricted to coastal habitats.

Many specimens of *Rhytidortalis* spp. have been collected 'at light'. This indicates at least some nocturnal activity.

In *Rhytidortalis* spp. the wings are folded roof-wise along the abdomen as in cicadas, with their posterior margins uppermost and almost meeting above the median line of the abdomen, when the insect is at rest (McAlpine 1973a and author's observations). Similar carriage of the wings occurs in *Duomyia*, *Microepicausta*, and some other platystomatids, and aids group identification of these flies in the field, but comparison of



Figures 1, 2. Antennae of *Rhytidortalis averni*: 1, male; 2, female.

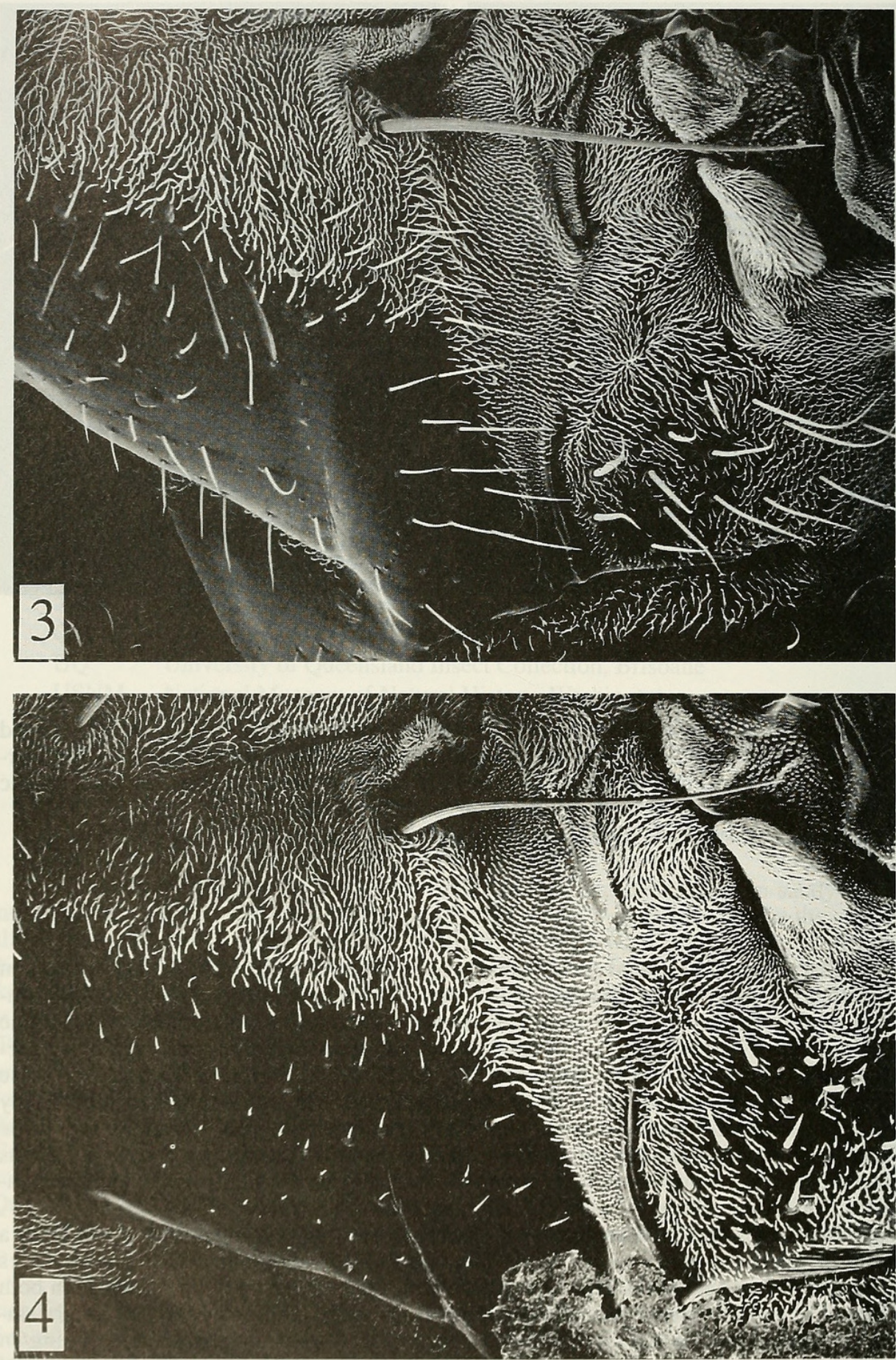
numerous living examples of *R. averni* and *Microepicausta* sp. at Nullica Beach showed that, in the former, the wings are less steeply sloped and slightly more spread. Wing carriage in *R. cteis* is similar to that of *R. averni*. None of the wing-waving, so characteristic of *Rivellia* and *Pogonortalis* spp., was observed in these taxa.

The larval stages of *Rhytidortalis* are unknown.

SEXUAL DIMORPHISM

Platystomatid flies of many genera are noted for their sexual dimorphism in numerous external features in addition to that in structures directly concerned with copulation and oviposition. I have described some of these dimorphic features (McAlpine 1973a, 1982, 1994; McAlpine and Kim 1977), and commented on their relation to specific behaviour patterns (McAlpine 1973b, 1975, 1979). Variation in many of these dimorphic structures provides some of the sharpest visible distinctions between closely related species, perhaps because they are often concerned with the signals by which the flies recognize their own species in nature. I have therefore classed some such features as potentially components of specific mating mechanisms, as distinct from isolating mechanisms (McAlpine 1988).

In females of *Rhytidortalis averni*, *R. cteis*, and *R. kelseyi* antennal segment 2 has a comb of relatively long bristles on its inner surface, while the males of these species (male unknown in *R. kelseyi*) have only the usual short setulae on this segment as in both sexes of other known species of *Rhytidortalis* (Figs. 1, 2). The frequently observed damage to setulae and bristles on antennal segment 2 is perhaps caused by probing in attempts to escape from collecting containers. I have no evidence as to any biological significance of the dimorphism.



Figures. 3, 4. Left mesopleural region of *Rhytidortalis averni*: 3, male; 4, female.

In those species of *Rhytidortalis* for which both sexes are known, antennal segment 3 is larger in males than in females. In these males the paired antennal grooves are more capacious than in the females, as an obvious adaptation to accommodate the antennae. The enlargement of the groove is generally associated with a narrowing of the facial carina and parafacial which flank the groove.

Similar sexual dimorphism in the size of antennal segment 3 occurs in a number of taxa of Platystomatinae, including some species of *Duomyia* Walker, *Euprosopia* Macquart, and *Microepicausta* Hendel. The biological significance of the dimorphism is not established. It may be that the enlarged male antenna has increased olfactory ability which could be of importance in finding females, if they produce a sex pheromone. There could thus be a parallel with saturniid and other moths, which have an elaborate male antenna whereby the pheromone-producing female is detected at a distance (summary in Common 1990). Antennal segment 3 in *Euprosopia anostigma* McAlpine has a very complex array of sensilla on its surface (McAlpine 1973a, figs 109, 110) some of which are likely to be olfactory as in *Drosophila* spp. (Begg and Hogben 1946).

Greater size or complexity (the latter increasing the surface area) of antennal segment 3 in males of schizophoran flies, as compared with females, occurs in taxa of several families. It is particularly notable in some taxa of Tachinidae (Wood 1987) and in the Axiniidae (Colless 1994). Wood indicates that tachinid species in which males do not rely on vision to find females (species having no sexual dimorphism in eye size) have the third antennal segment (not 'third flagellomere' — Wood's lapsus) of the male longer or more complex than that of the female. He infers that, in these species, males use their antennae rather than their eyes in recognizing a potential mate.

In *Rhytidortalis averni* and related species most major bristles on the thorax are significantly longer in males than in females. *R. averni* has the hairing on the humeral callus longer in the male than the female, and there is a smaller degree of difference in length in some other species of *Rhytidortalis*. The mesopleuron and pteropleuron of male *R. averni* have fine to moderately fine pale hairs of moderate length (Fig. 3). In the female most of the mesopleural hairs are extremely short so that the basal sockets are often as conspicuous as the hairs (Fig. 4). The pteropleural hairs of the female are mostly converted into short, stout, black setulae.

In *Rhytidortalis cteis*, the female shows similar shortening of the humeral hairs to that sex of *R. averni*, but the macrotrichia of the mesopleuron and most of those of the pteropleuron are stout, moderately short, and black. The male is essentially similar to that of *R. averni* and most other *Rhytidortalis* species in these features, and only the female shows these modifications that are characteristic of this species.

Previously (McAlpine 1973a) I have recorded sexual dimorphism of thoracic vestiture in certain species of *Euprosopia*, which resembles to a certain extent that here recorded for *Rhytidortalis* spp. The particular modifications of the female thorax recorded include, inter alia, reduction of the humeral bristle and hairing, reduction or other modification of the notopleural bristles, reduction of mesopleural hairs to minute stumps, and reduction of bristling on the fore femur. As in some *Rhytidortalis*, the precise manifestation of the female modification can provide very decisive criteria for specific identification in this sex.

The wing of *R. cteis* shows sexual dimorphism in length of vein 6 and in microtrichiation, as described under that species. Similar sexual dimorphism does not appear to be recorded in other platystomatids.

The female of *R. cribrata* has a pleural sclerite of variable size on each side of abdominal segment 4 (see Fig. 24 below), but there is no such sclerite in the male of this species or in either sex of any other known *Rhytidortalis* species. Abdominal pleural sclerites are present in a few very specialised flies (e.g. the family Braulidae) but are absent in most families of Schizophora. Among platystomatid flies, the female of an undescribed species of *Duomyia* ('sp. 19' in AM) has a large pleural sclerite in the vicin-

ity of segments 3 and 4 (probably absent in the unknown male), and, in females only of some species of the taxonomically unelucidated group of species near *Euprosopia impingens* (Walker), there is a sclerite or subsclerotised zone in the region of segment 4.

Remarkable differences in the position of the female preabdominal spiracles (particularly those of segments 3 to 5) exist between the six species of *Rhytidortalis* for which the female is known (see Figs 17, 18, 21, 22, and 26 below), with the exception of the pair *R. cteis* and *R. kelseyi*, which are remarkably similar in this respect. There is also some specific difference in the shape of tergites 3 to 5 round which or on which the spiracles are situated. Diversity of a similar kind to that in *Rhytidortalis* occurs among species of the platystomatine genera *Microepicausta* Hendel, *Plagiostenopterina* Hendel, *Rivellia* Robineau-Desvoidy, *Senopterina* Macquart, and *Euprosopia* Macquart, and is particularly great in the last (McAlpine 1973a and further unpublished examples). In the males of these taxa, the spiracles appear to be consistently in the presumed plesiomorphic position in the pleural membrane below the lateral margins of their respective tergites. However, in both sexes the abdominal spiracles are often undetectable in dried specimens because of shrinkage and infolding of the cuticle, so that relevant data are still incomplete for many species.

In seeking a reason for similar patterns of variation in placement of female abdominal spiracles in different platystomatine genera, I incline towards the hypothesis of their functioning as specific recognition marks during courtship (elements of specific mating mechanisms). The possibility that males of *Rhytidortalis* and other genera are, through their antennal development, adapted to detect female pheromones, has already been mentioned. The abdominal spiracles of females would often appear appropriate for exhalation of gaseous pheromones, particularly when located on or near the dorsal surface, as is the case in so many platystomatine species. The marked specific differences in position of the spiracles could themselves contribute to specific recognition by the males at close range.

Courtship behaviour in *Rhytidortalis* is unrecorded. In both *Euprosopia tenuicornis* Macquart and *E. anostigma* McAlpine there is tapping or probing on the female abdomen by the male before mounting (McAlpine 1973b), but this is performed with the male fore tarsi or proboscis, not the antenna, according to the recorded observations. In both these *Euprosopia* species there is significant difference between the sexes in size of antennal segment 3, but the difference is less than in *Rhytidortalis* species. Females of *E. tenuicornis* and *E. anostigma* have the spiracles of segments 4 and 5 more or less dorsal in position (readily accessible from above).

In *Euprosopia subula* McAlpine antennal segment 3 is of similar size in both sexes, but the male has the palpus significantly larger. The female has the spiracles of segments 4 and 5 conspicuously dorsal in position. While under observation, this species (McAlpine 1973b) showed no premating probing of the female abdomen by the male, though there was contact between the sexes for up to 30 minutes before mounting. However, the male mounted the female from behind.

The above observations indicate that the connection between sexual dimorphism and behaviour in platystomatids should be a fertile field for future research.

Conventional cladistic reasoning, with its heavy reliance on parsimony, might treat as plesiomorphic the condition of the female spiracles present in *Rhytidortalis perforata* (see Fig. 21 below), which is most like that of *Rhytidortalis* males, and which must also resemble that of the female of early ancestral platystomatids. On the other hand interspecific variability in position of female abdominal spiracles occurs in numerous other genera of Platystomatidae as indicated above. Therefore it is probable that this kind of variation is a quite ancient feature of platystomatid evolution, and that present diversity (for instance in *Rhytidortalis* spp.) is the result of numerous sequential diversification processes. Hence there is no assurance that the male-like arrangement of female abdominal spiracles is the plesiomorphic state within any modern group of species, as the occur-

rence of numbers of cycles of diversification is likely to have involved numbers of reversals of character polarity. A similar argument applied to other secondary sexual modifications and to variation in male genitalia suggests that restraint should be observed in using these characters for reconstructing phylogenies.

SYSTEMATIC TREATMENT

Genus *Rhytidortalis* Hendel

Rhytidortalis Hendel 1914a: 14, 66–68. Type species *R. cribrata* Hendel (original designation).

Description

Head compact, slightly wider than high, usually obliquely squarish in lateral aspect, and usually angular in profile at junction of postfrons and face; postfrons almost smooth to coarsely rugose-pitted; cheek region with strongly raised but not sharp oblique ridge; lateral arm of ptilinal fissure long; parafacial with fine hairs (socket-based macrotrichia) near middle, in addition to pruinescence (microtrichia); median facial carina strongly raised, but not sharply margined, face thus usually very broadly visible in front of antennal groove in profile; the following bristles present: inner and outer verticals, divergent postvertical, usually 2 pairs of small fronto-orbitals, small ocellar, sometimes a lateral occipital and a small postgenal. Antenna: segment 1 very short; segment 2 short, dorsally cleft, not convexly cap-shaped; segment 3 long, usually potentially reaching to or beyond median point of lower margin of face, generally larger in male; arista apparently bare under moderate magnification, but sometimes with very minute decumbent pubescence on basal swelling of segment 6. Prelabrum reduced, not prominent, not joined medially to lower margin of face by a well developed shining quadrate sclerite (rudimentary such sclerite visible in *R. acme*); palpus of moderate size, compressed.

Thorax elongate (compared with typical *Rivellia* spp.), almost parallel-sided, with largely blackish ground colour; mesoscutum about 1.2 to 1.3 times as long as wide, extensively pale grey-pruinescent, with numerous bare black dots, each of which surrounds the base of a hair, without long, dense hairing-bristling in prescutellar area; scutellum rounded, longer than a semicircle, thinly grey pruinescent, without setulae; sternopleuron with pale-pruinescent ventral zone, or more extensively pruinescent; suprasquamal ridge with short pubescence/pruinescence and no longer hairs or setulae; prosternum trapezoid, setulose, isolated from propleura; metathoracic postcoxal bridge absent; the following thoracic bristles present (see Fig. 6): humeral, 1+1 notopleurals, 1+1 or 1+0 or 0+0 supra-alars (i.e. there is a supra-alar close behind transverse suture, unless supra-alars are altogether absent), postalar (on postalar callus), intra-alar, sometimes a variably developed bristle approximating in position to a presutural, dorsocentral, prescutellar acrostichal, usually 3 pairs of scutellars, all long and inserted near margin (only 2 pairs in *R. acme*), well developed mesopleural; scapular and sternopleural bristles absent. Legs moderately short; fore coxa rather short and broad; femora not remarkably thickened; fore femur with long posteroventral bristles and shorter dorsal bristles, at least in males; mid femur with long posterior hairs/bristles, more distal ones becoming more bristle-like and uniseriate; hind femur sometimes with distinct seriate anteroventral bristles; mid tibia with one large apical ventral spur; tarsi entirely yellow to tawny orange, or with one or more segments partly browned; hind tarsus somewhat depressed and often slightly broadened. Wing moderately elongate, with predominantly yellow veins and often yellow subcostal cell, usually without other markings (apical brown spot present in submarginal cell in *R. cribrata*); membrane entirely or predominantly microtrichose (least so in *R. averni*); section of costa on subcostal cell shorter than that on marginal

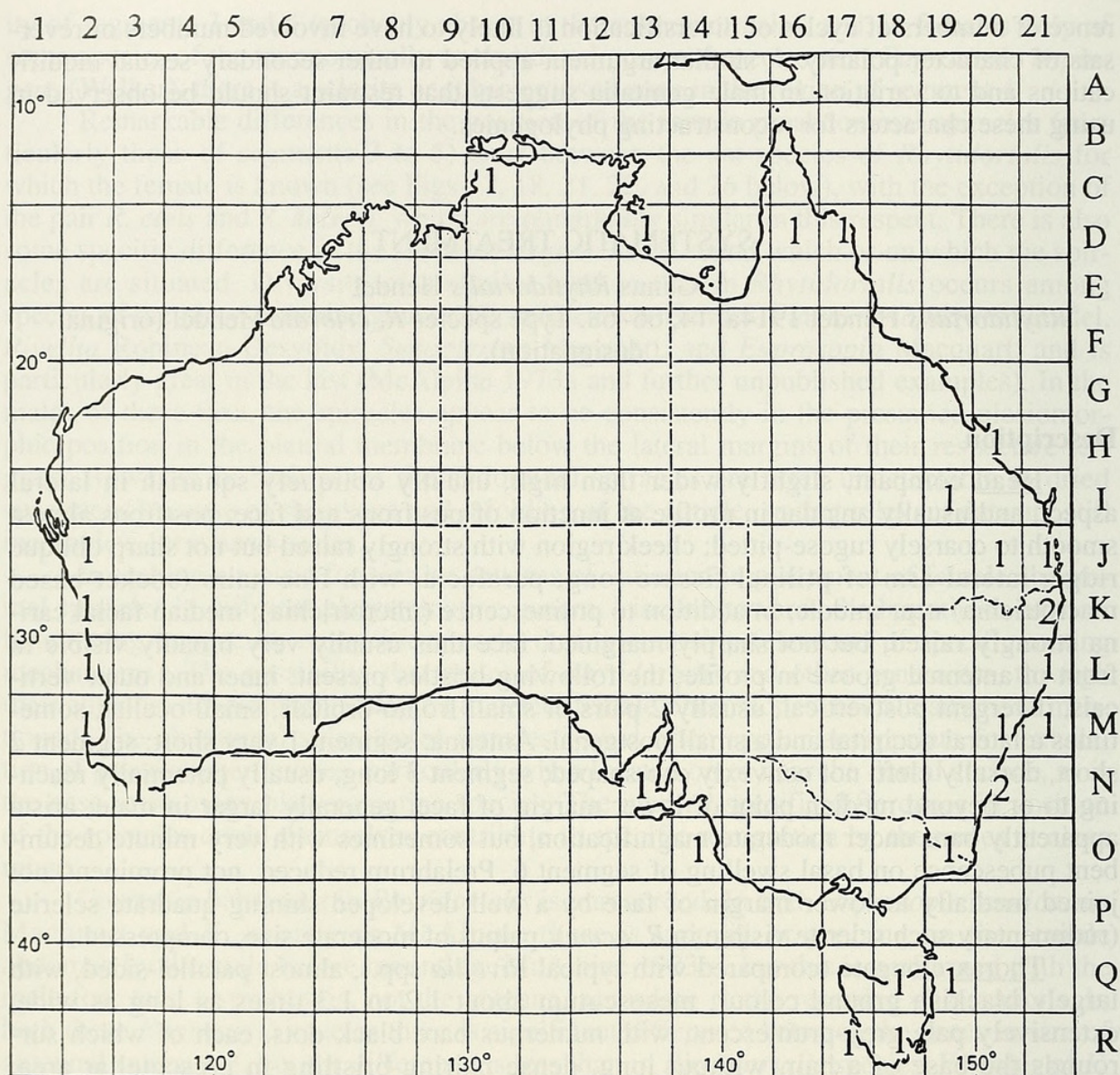


Figure 5. Distribution map of *Rhytidortalis* spp. in Australia, showing number of species recorded for each grid rectangle (2° long. x 2° lat.), reference notation used in 'Distribution' under each species.

cell; vein 2 nearly straight; veins 3 and 4 slightly divergent to almost parallel apically; second section of vein 4 with slightly concave curvature, dipping into discal cell, its third (penultimate) section longer than discal crossvein; anal cell distinctly broader than second costal cell, less than half as long as discal cell; squama forming a small, distinct lobe, no larger than axillary lobe. Capitellum of halter pale yellowish.

Abdomen ovoid, not attenuated anteriorly; tergites 4 and 5 as large as tergite 3 or almost so in both sexes. Male postabdomen: surstyli rather short, distal section of outer one short and rounded, without notable modifications; preglans of aedeagus forming short, convex, well defined sclerite, separated from stipe by a membranous collar; glans stoutly ovoid; paired terminal filaments fused basally, not or only slightly longer than glans; cerci moderately large, joined to proctiger for most of their length. Female postabdomen: spiracles of segment 5 situated near posterolateral angles of tergite 5 (which may be rounded), or (in *R. averni*) approximated dorsomedially within posterior margin of tergite 5; tergite 6 very small, usually concealed below tergite 5; tergosternite 7 (ovipositor sheath) not noticeably longer than tergite 3; aculeus slender distally, obtuse, not compressed.

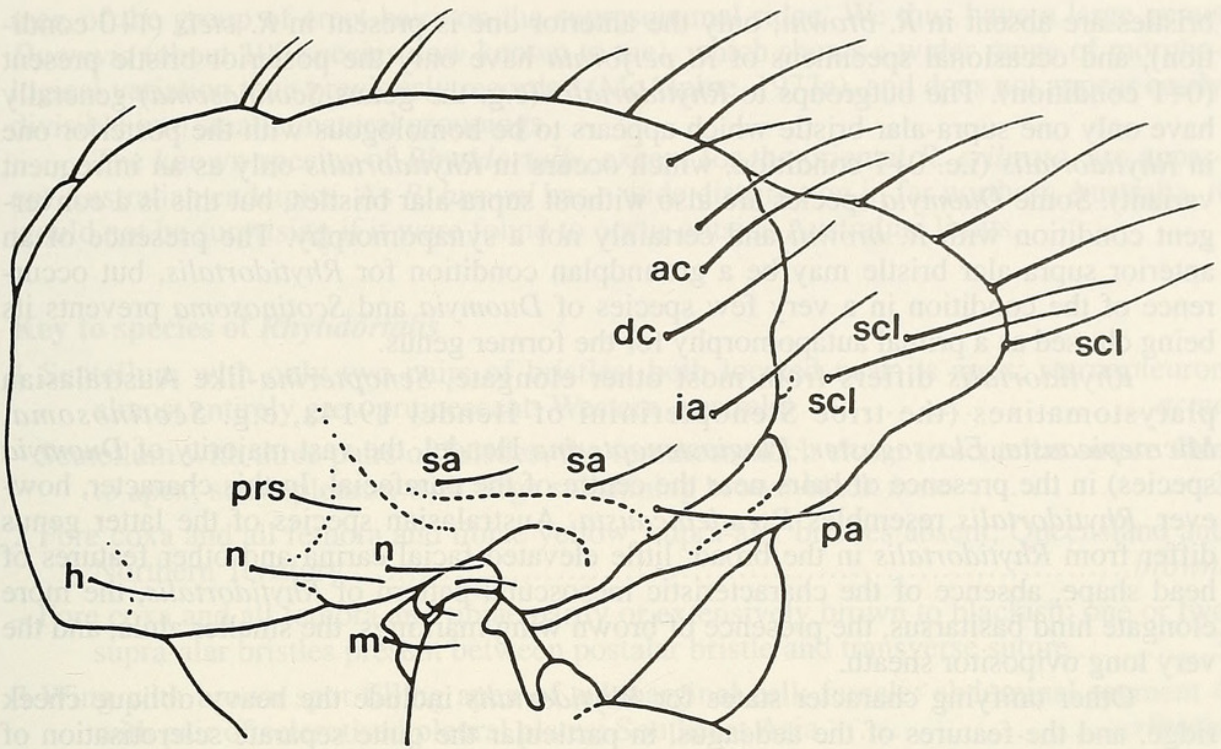


Figure 6. *Rhytidortalis averni*, female, dorsolateral view of thorax showing nomenclature of bristles. ac, prescutellar acrostichal. dc, dorsocentral. h, humeral. ia, intra-alar. m, mesopleural. n, notopleural (2 pairs). pa, postalar. prs, presutural. sa, supra-alar (2 pairs). scl, scutellar (3 pairs).

Notes

As here defined *Rhytidortalis* includes seven easily recognised species: the type species *R. cribrata* Hendel from Southeast Asia and six newly described Australian species. There is also evidence of an additional species, 'sp. 7', inadequately known for formal description. Distribution of these species is shown in Fig. 5.

Evenhuis (1989) listed the following three species of *Rhytidortalis* for the Australasian region: *R. conformis* (Walker), *R. rugifrons* (Thomson), and *R. solocifemur* (Enderlein). The two latter are here placed in *Duomyia* Walker (see below). The species originally described as *Ortalis conformis* Walker, 1853, was referred with doubt to *Rhytidortalis* by Hendel (1914a,b) on the basis of the original description. This description of a damaged specimen from Van Dieman's Land (Tasmania) is too brief to indicate the taxonomic position of the species, though it could refer to a platystomatid. Walker does not mention the mesoscutal colour pattern, which is diagnostic in *Rhytidortalis*, but gives the wing veins as black, which is in disagreement with this genus. I treat *Ortalis conformis* as a nomen dubium, as I have not found the type. Designation of a neotype is not permissible under Article 75 of ICZN, as the name is not in current use for a recognised species.

Rhytidortalis belongs in the subfamily Platystomatinae as defined by McAlpine (1973a). Within the subfamily, it most resembles the genera *Scotinosoma* Loew and, to some extent, *Pseudepicausta* Hendel and *Duomyia*. The species of *Rhytidortalis* have a consistent condition not found in these other genera, viz. the extensive grey pruinescence on the mesoscutum penetrated by a black dot at the base of each hair. This is apparently a synapomorphy for these species and could be an indicator of monophyly, if there is no other taxon derived from within the genus which has lost the condition.

Another unusual condition of *Rhytidortalis* species is the presence of two pairs of supra-alar bristles — an anterior and a posterior bristle on each side, the 1+1 condition (Fig. 6, sa). This condition is not absolutely consistent in *Rhytidortalis*, as supra-alar

bristles are absent in *R. browni*, only the anterior one is present in *R. cteis* (1+0 condition), and occasional specimens of *R. perforata* have only the posterior bristle present (0+1 condition). The outgroups to *Rhytidortalis* (e.g. the genus *Scotinosoma*) generally have only one supra-alar bristle which appears to be homologous with the posterior one in *Rhytidortalis* (i.e. 0+1 condition, which occurs in *Rhytidortalis* only as an infrequent variant). Some *Duomyia* species are also without supra-alar bristles, but this is a convergent condition with *R. browni* and certainly not a synapomorphy. The presence of an anterior supra-alar bristle may be a groundplan condition for *Rhytidortalis*, but occurrence of the condition in a very few species of *Duomyia* and *Scotinosoma* prevents its being classed as a primal autapomorphy for the former genus.

Rhytidortalis differs from most other elongate, *Senopterina*-like Australasian platystomatines (the tribe Stenopterini of Hendel 1914a, e.g. *Scotinosoma*, *Microepicausta*, *Elassogaster*, *Plagiostenopterina* Hendel, the vast majority of *Duomyia* species) in the presence of hairs near the centre of the parafacial. In this character, however, *Rhytidortalis* resembles *Pseudepicausta*. Australasian species of the latter genus differ from *Rhytidortalis* in the broad, little elevated facial carina and other features of head shape, absence of the characteristic mesoscutal pattern of *Rhytidortalis*, the more elongate hind basitarsus, the presence of brown wing markings, the smaller alula, and the very long ovipositor sheath.

Other unifying character states for *Rhytidortalis* include the heavy oblique cheek ridge, and the features of the aedeagus, in particular the quite separate sclerotisation of the preglans from the stipe, the small, compact glans, and remarkably short terminal filaments. It is difficult to determine to what extent these characters involve autapomorphies for the genus.

The southern African genus *Sphenoprosopa* Loew has a superficial resemblance to *Rhytidortalis* which is enhanced by the black spotting on grey-pruinose cuticle, though this coloration is not restricted to the mesoscutum in the former. In both genera the prelabrum is much reduced. *Sphenoprosopa* differs from *Rhytidortalis* in having the anterior and discal crossveins approximated, the anal cell narrower, and the wing with heavy dark markings. Hendel (1914a) thought that *Sphenoprosopa* was related to *Platystoma*, because of its habitus, while Enderlein (1922) placed it in the tribe Plastotephritinae. The latter opinion is certainly erroneous, but my own brief study of material (at MNB in 1973) led me to think that relationship with *Rhytidortalis* is more probable.

Two species recently referred to *Rhytidortalis* (e.g. in McAlpine 1973a; Evenhuis 1989) are *Duomyia rugifrons* (Thomson) and *Duomyia solocifemur* (Enderlein) n. combs., both from New South Wales. These lack the significant diagnostic features of *Rhytidortalis* discussed above, and I have given careful consideration as to whether they and two or more undescribed species from south-western Australia should constitute a small new genus, perhaps closely related to *Rhytidortalis* and *Scotinosoma*. *D. rugifrons* and *D. solocifemur* differ from more typical *Duomyia* spp. in having the squama relatively small, the suprasquamal ridge without a group of somewhat elongate erect hairs, the facial carina rounded and not prominently margined, a shining quadrate sclerite present between face and prelabrum, the mesopleural bristle usually distinct, the mid femur without distinct posterior bristles distally (though it has relatively long posterior hairs), the distal section of vein 4 apically not curved forward nor converging with vein 3. However, the southwestern species of the *D. rugifrons* alliance are not consistent in some of these characters, and *D. solocifemur* has the squama about as large as that of a few species previously included in *Duomyia* s.str. (e.g. *D. capitalis* McAlpine). Several species accepted as *Duomyia*, e.g. *D. capitalis* McAlpine, *D. parallela* McAlpine, and *D. adalaidae* McAlpine, show various combinations of characters resembling those of the *D. rugifrons* alliance, but appear to be related to other species, e.g. *D. iris* McAlpine, which are reasonably typical *Duomyia* spp. Perhaps the only consistent feature in which the *Duomyia rugifrons* group differs from the rest of the genus is the absence, in the for-

mer, of the group of erect hairs on the suprasquamal ridge. We thus have a large genus *Duomyia* (about 100 species now known to me), which shows a wider range of morphological variation than previously recorded (McAlpine, 1973a), and does not appear easily divisible into smaller natural groupings.

The known species of *Rhytidortalis*, except for the oriental *R. cribrata*, are apparent Australian endemics. As *R. browni* has a wide distribution in far northern Australia, it would not be surprising if it were found to occur outside Australian limits.

Key to species of *Rhytidortalis*

- 1 Scutellum with only two pairs of bristles, both located near its apex; sternopleuron almost entirely grey-pruinose; Western Australia *acme*
- Scutellum with three pairs of bristles, the foremost much closer to scutellar suture than to apex; sternopleuron with large subshining brown-black zone 2
- 2 Fore coxa and all femora and tibiae yellow; supra-alar bristles absent; Queensland and Northern Territory *browni*
- Fore coxa and all femora and tibiae partly or extensively brown to blackish; one or two supra-alar bristles present between postalar bristle and transverse suture 3
- 3 Wing with brown spot filling apex of submarginal cell; female: abdominal segment 4 with pair of sclerotised pleural plates; Southeast Asia *cribrata*
- Wing without apical spot; female: segment 4 without pleural plates; Australia 4
- 4 Wing margin without distinct incision at end of vein 5; black markings of mesoscutum consisting mainly of minute dots at bases of hairs; ♀: setulae on medial surface of antennal segment 2 not enlarged, all much shorter than segment 2; setulae on mesopleuron nearly all pale, only moderately short; New South Wales, southern Queensland *perforata*
- Wing margin with distinct incision at end of vein 5; black markings of mesoscutum consisting of many larger spots, sometimes merging, the diameter of each mostly greater than distance between spots (except in *R. kelseyi*); ♀ (unknown in *R. sp.7*): antennal segment 2 with some enlarged setulae on medial surface as long as segment (Fig. 2); setulae on mesopleuron variable, but generally not as above 5
- 5 Males (unknown in *R. kelseyi*) 6
- Females (unknown in *sp.7*) 8
- 6 Anal cell bare, except at base; fore tarsus tawny, with at most faint brown suffusion; New South Wales, Tasmania, South Australia *averni*
- Anal cell microtrichose, at least on extensive anterior zone; fore tarsus variably pigmented 7
- 7 Fore tarsus brown, except for paler basal part of segment 1; fore femur with all posteroventral bristles black; anal cell bare on central zone; South Australia, Western Australia *cteis*
- Fore tarsus entirely fulvous; fore femur with mixed pale and dark posteroventral bristles; anal cell microtrichose on whole width; Western Australia *sp. 7*
- 8 Fore femur with several long posteroventral bristles; anal cell largely bare; setulae on mesopleuron pale, minute (Fig. 4); spiracles of abdominal segment 5 located within posterior margin of tergite, thus readily visible in dorsal view (see Fig. 13 below); New South Wales, Tasmania, South Australia *averni*
- Fore femur with posteroventral bristles short or vestigial; anal cell entirely microtrichose; setulae on mesopleuron coarse, black; spiracles of segment 5 located at margin of tergite or in membrane, usually concealed in dried specimens 9

- 9 Distal section of vein 6 traceable almost to margin, though gradually weakened distally; thickened basal section of costa with fine black setulae and a ventral brush of longer whitish setulae; fore femur without posterior and posteroventral bristles, with only few minute hairs in their place; tergite 5 with all setulae quite small; Western Australia *kelseyi*
- Distal section of vein 6 abruptly discontinued about halfway to margin; thickened basal section of costa with short rather coarse black setulae only; fore femur with few short, spinescent posteroventral bristles and numerous spinescent posterior bristles; tergite 5 with group of enlarged black setulae on each side; South Australia, Western Australia *cteis*

Rhytidortalis acme n.sp.
(Figs 7–9)

Material examined

Holotype. ♂ (unique), Western Australia: Mount Claremont, Perth, 10.iv.1968, I.F.C., M.S.U. (ANIC).

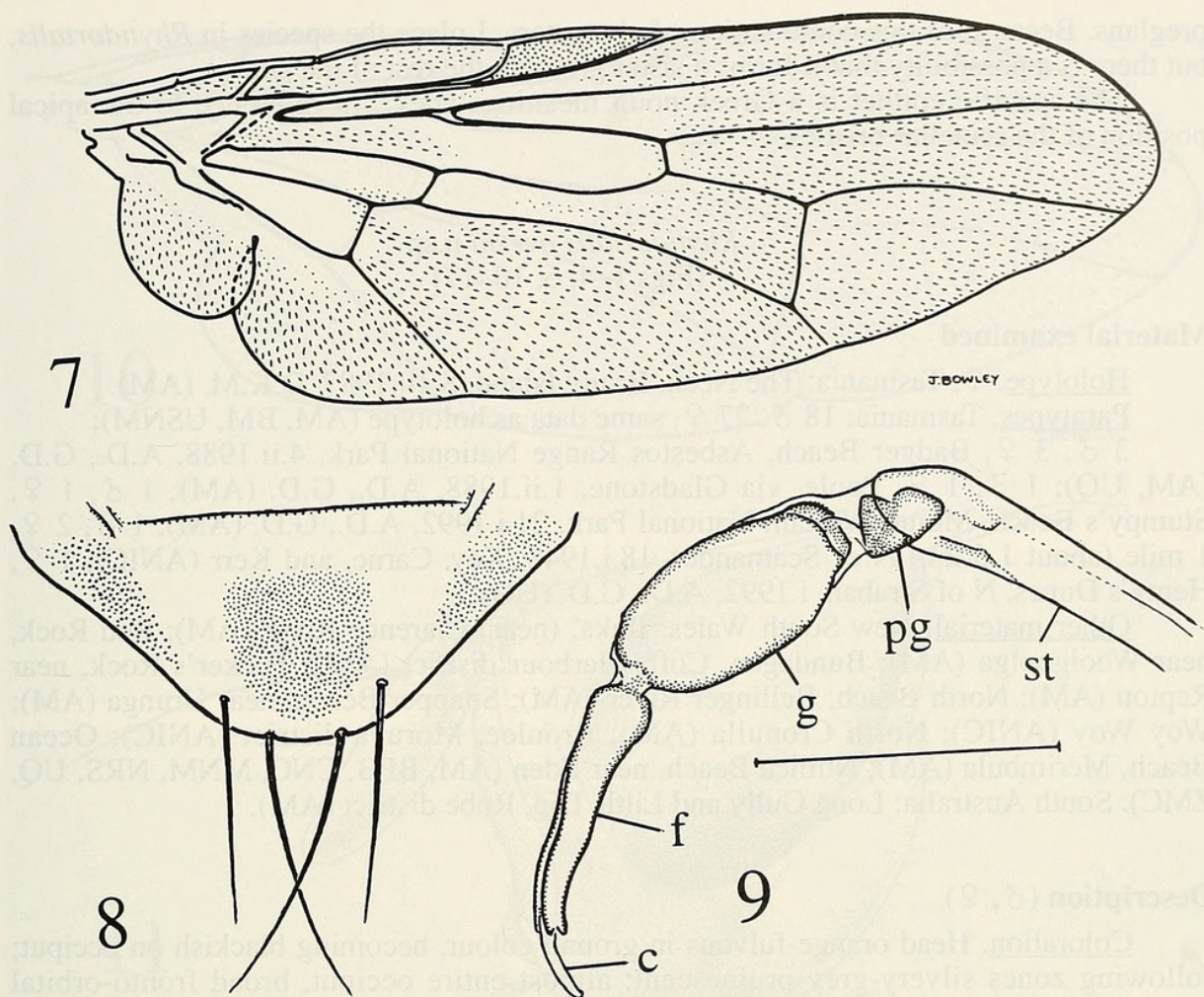
Description (♂; ♀ unknown)

Agreeing with that of *R. averni*, except as indicated below.

Coloration. Ground colour of head much less extensively darkened on occiput than in *R. averni*, but this region similarly covered with grey pruinescence. Prelabrum brown to tawny. Thorax with slightly bronze-tinted reflections; scutellum with round smooth shining black mid-dorsal zone; pale grey pruinescence on mesoscutum thick and extensive, extending almost to pronotum, but less evenly distributed than in *R. averni* and similar species, the black spots relatively small, more crowded on pair of paramedian longitudinal bands, but not coalescing in linear series; pleura almost uniformly grey-pruinescent except as follows: narrow shining blackish vertical mark and bronzy subshining posterior zone on mesopleuron, subshining dark bronzy mark on sternopleuron just below sternopleural suture. Fore coxa fulvous-yellow, with the usual shining pruinescence; fore basitarsus fulvous basally, brown on about apical fifth, other segments suffused with brown; posterior hairs and bristles on mid femur nearly all yellow. Wing: veins yellowish brown, i.e. distinctly darker than in *R. averni* and most other species. Halter pale yellow. All preabdominal tergites extensively but not completely grey-pruinescent; many hairs on tergites 4 and 5 with dark dot at base.

Head in profile not angular at junction of postfrons and face; vertex more rounded off than in other species; postfrons coarsely rugose-pitted; facial carina less elevated than in other species, less attenuated between antennal sockets, somewhat depressed slightly above epistomal margin, with shallow median sulcus near middle; outer vertical bristle not more than half as long as inner vertical; anterior fronto-orbital bristle very small. Antennal segment 2 with setulae on inner surface numerous, quite short.

Thorax. Presutural bristle absent; other thoracic bristles, including both supra-alars, quite large; scutellum with only two pairs of bristles, apical pair and a slightly shorter subapical pair placed well behind mid-length of scutellum; humeral callus and mesopleuron with numerous fairly long whitish hairs; pteropleuron with long hairs — white ones posteriorly and black ones anteriorly. Wing: veins 3 and 4 more strongly divergent apically than in other species; second section of vein 4 (before anterior crossvein) more strongly curved than in other species; basal crossvein oblique, making posterobasal angle of discal cell remarkably acute; anal crossvein straight, almost transverse; bases of submarginal and discal cells, about distal two thirds of first basal cell, and almost whole of second basal and anal cells bare.



Figures 7–9. *Rhytidortalis acme*: 7, wing; 8, scutellum; 9, distal part of aedeagus, scale = 0.4 mm. c, membranous caecum. f, terminal filament (paired). g, glans. pg, preglans. st, stipe.

Abdomen. Tergite 5 with posterior marginal series of bristles; epandrium with dorsal hairs; surstyli not examined; glans without distinct distal lobe; each terminal filament about 1.0 times as long as glans; a slender membranous caecum arising between filaments.

Dimensions. Total length 3.8 mm; length of thorax 2.6 mm; length of wing 5.8 mm; length of glans of aedeagus 0.32 mm.

Distribution

Western Australia — near Perth. Map reference 2L (Fig. 5).

Notes

R. acme is morphologically the least typical species of *Rhytidortalis*. In addition to the characters given in the key, it has the head much less angular and the facial carina less broadly visible in profile than in other species, the contour of the second section of vein 4 is distinctive, and the terminal filament of the aedeagus is as long as the glans. On the other hand, the carina on the cheek is very oblique, the mesopleural bristle is large, there are two supra-alar bristles, the mesoscutum is extensively spotted, the anal cell is rather broad distally, the squama is scarcely larger than the axillary lobe, and the aedeagus has the glans small and ovoid and has a distinct convex sclerite distad of the

preglans. Because of this combination of characters, I place the species in *Rhytidortalis*, but there is a possibility that it forms a sister group to the rest of the genus.

The specific epithet is a Greek noun meaning 'apex', in reference to the apical position of the scutellar bristles.

Rhytidortalis averni n.sp.
(Figs 1–4, 6, 10–17)

Material examined

Holotype. ♀, Tasmania: The Neck, Bruny Island, 8.xii.1987, D.K.M. (AM).

Paratypes. Tasmania: 18 ♂, 27 ♀, same data as holotype (AM, BM, USNM);

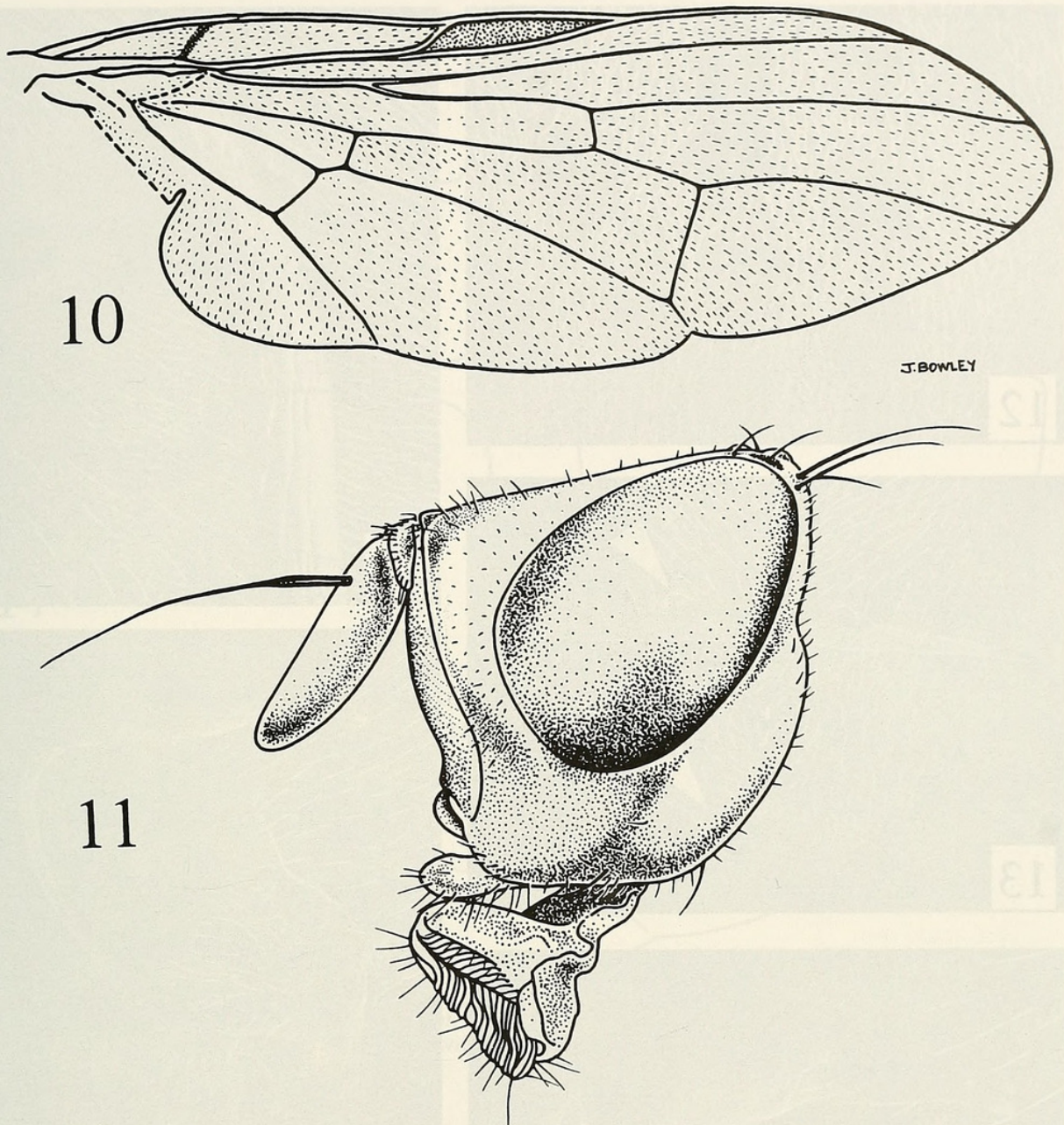
3 ♂, 3 ♀, Badger Beach, Asbestos Range National Park, 4.ii.1988, A.D., G.D. (AM, UQ); 1 ♂, 1 ♀, Poole, via Gladstone, 1.ii.1988, A.D., G.D. (AM); 1 ♂, 1 ♀, Stumpy's Beach, Mount William National Park, 21.i.1992, A.D., G.D. (AM); 1 ♂, 2 ♀, 1 mile (about 1.6 km) N of Scamander, 18.i.1948, Key, Carne, and Kerr (ANIC); 1 ♀, Henty's Dunes, N of Strahan, i.1992, A.D., G.D. (UQ).

Other material. New South Wales: Iluka, (near) Clarence River (AM); Red Rock, near Woolgoolga (AM); Bundagen, Coffs Harbour district (AM); Tucker's Rock, near Repton (AM); North Beach, Bellinger River (AM); Snapper Beach, near Urunga (AM); Woy Woy (ANIC); North Cronulla (AM); Broulee, Moruya district (ANIC); Ocean Beach, Merimbula (AM); Nullica Beach, near Eden (AM, BPB, CNC, MNM, NRS, UQ, ZMC). South Australia: Long Gully and Little Dip, Robe district (AM).

Description (♂, ♀)

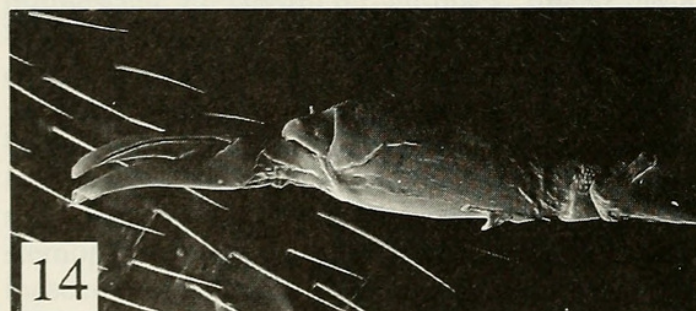
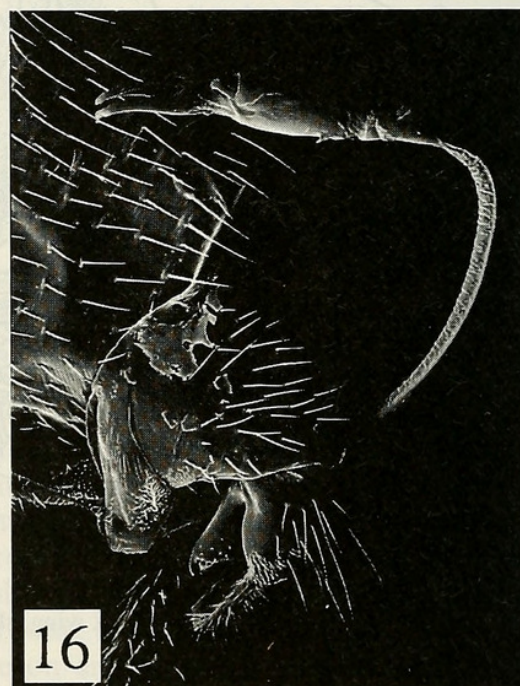
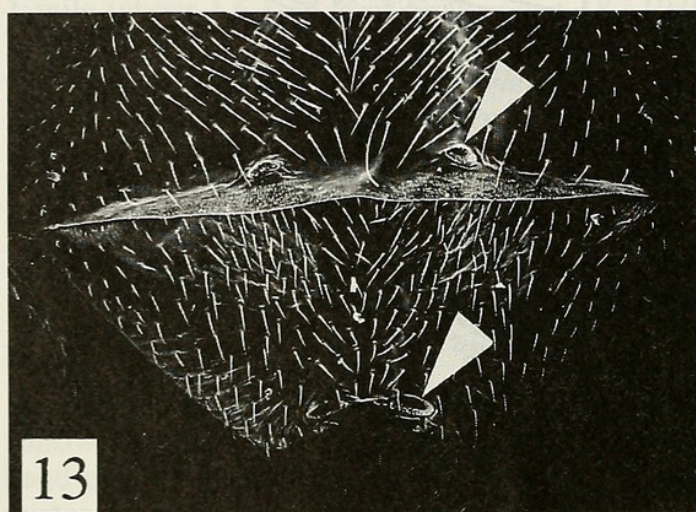
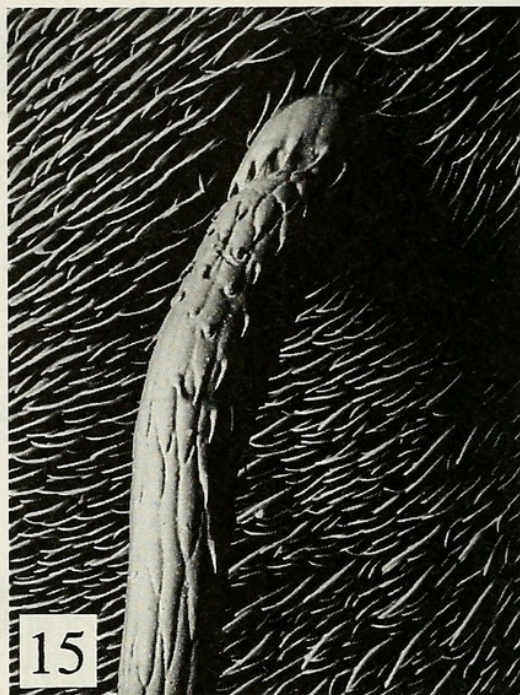
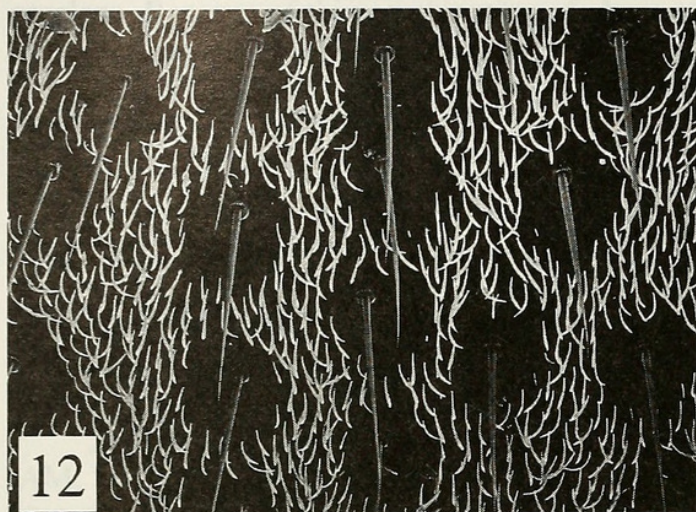
Coloration. Head orange-fulvous in ground colour, becoming blackish on occiput; following zones silvery-grey pruinescent: almost entire occiput, broad fronto-orbital band extending on to upper and posterior part of parafacial, lining of antennal groove, postgenal region. Antennal segments 1 and 2 orange-fulvous; segment 3 brownish-grey pruinescent. Prelabrum brown-black; palpus orange-fulvous. Thorax with almost entirely black to brown-black ground colour with green to yellow-green tinted reflections where cuticle is exposed; humeral callus, notopleuron, scutellum, and most of mesoscutum pale grey pruinescent, most of latter with pattern of numerous black spots, each surrounding base of hair, spots on dorsocentral line and a few intradorsocentral spots tending to coalesce into longitudinal black lines; much of propleuron, less than upper half of mesopleuron, much of pteropleuron, pleurotergite, and hypopleuron, and lower paramedian part of sternopleuron grey-pruinescent. Coxae fulvous with some brown suffusion and grey pruinescence; fore coxa with dense pale pruinescence on anterior surface, giving silvery sheen in anterior aspect; femora brown-black, narrowly fulvous apically; tibiae brown black, usually narrowly fulvous at each end; tarsi fulvous-yellow, usually with little or no brownish suffusion. Wing without dark markings. Halter tawny to yellowish. Abdomen largely black and non-pruinescent; tergites largely shining, with yellow-green tinted reflections; tergite 1 and part of tergite 2 with thin grey pruinescence; tergites 3 to 5 not grey-pruinescent on lateral margins.

Head squarish in profile, outline of face meeting that of postfrons approximately at a right angle; facial carina narrow, especially so above, in male with median sulcus for most of length, in female rugose on lower part, with less developed median sulcus; outer vertical bristle nearly as long as inner vertical; usually two short fronto-orbital bristles present. Antennal segment 2 in male with only quite short setulae, in female with several enlarged setulae on inner part of distal margin some of which are usually about as long as segment 2; segment 3 almost as long as antennal groove in female, fully as long as groove in male, though the groove itself is longer in male.



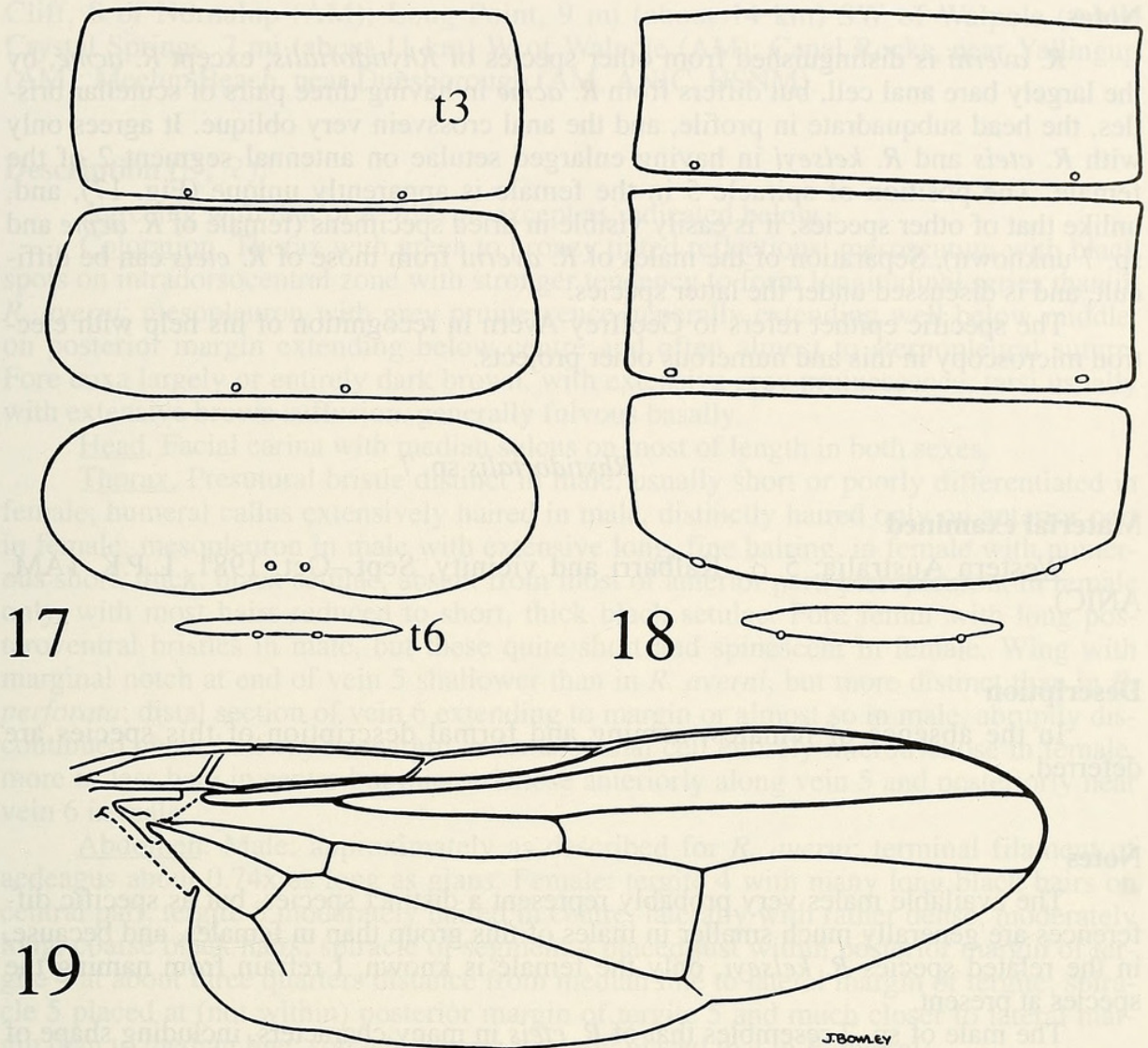
Figures 10–11. *Rhytidortalis averni*: 10, wing, showing distribution of microtrichia; 11, head of female.

Thorax. Major bristles generally longer in male than in female; presutural bristle ranging from large to vestigial in both sexes; both anterior and posterior supra-alar bristles present; humeral callus in male with numerous fine pale hairs of moderate length, in female with hairs relatively short and inconspicuous; mesopleuron in male with numerous moderately long, fine, rather pale hairs, in female with hairs minute and often less conspicuous than their basal sockets; pteropleuron in male with moderately long and fine hairs, some yellowish and some black, in female with short thick black setulae and few fine, pale hairs. Fore femur with a series of long posteroventral bristles in both sexes. Wing: margin strongly incised at end of vein 5; anal cell wider near its distal end than second basal cell; anal crossvein oblique, but curved through most of its length; vein 6 in both sexes traceable to margin, but unpigmented distally; all of anal cell, except for small basal zone, and much of distal part of first basal cell bare; rest of wing membrane almost entirely microtrichose.



Figures 12–16. *Rhytidortalis averni*: 12, surface of mesoscutum showing zones devoid of pruinescence (visually black spots) x 176; 13, dorsal view of female tergites 4 and 5, spiracles indicated x 55; 14, distal part of aedeagus x 108; 15, base of arista x 510; 16, male genital complex from left x 58.

Abdomen. Male: tergites 3 to 5 with mostly moderately short hairs, not forming specialised groups; spiracles 1–3 and 5 in pleural membrane below lateral margins of tergites; spiracle 4 placed on posterior margin of tergite 4 just above posterolateral angle; epandrium with dorsal setulae, some nearly as long as epandrium; outer surstylus as long as epandrium, broad, obtuse, its apex only slightly exceeding that of inner surstylus; glans of aedeagus with very small distal lobe; terminal filament about 0.85 as long as glans. Female: tergites 4 and 5 with moderately short hairs on central parts, giving way to very short, rather fine, not remarkably crowded hairs on lateral parts, without stouter or more crowded lateral



Figures. 17–19. Diagrams of tergites 3 to 6 of female abdomen spread flat to show associated spiracles: 17, *Rhytidortalis averni*; 18, *R. cteis*; 19, *R. cteis*, wing, the almost uniform microtrichiation omitted.

setulae; pleural sclerites absent; spiracles 1 and 2 in pleural membrane below lateral margins of their tergites; spiracle 3 on posterior margin of tergite 3, closer to lateral margin of tergite than to median line (Fig. 17); spiracle 4 just within posterior margin of tergite 4, much closer to median line than to lateral margin; spiracles 5 closely approximated mid-dorsally within posterior margin of tergite 5 (thus generally easily visible in dried specimens); spiracles of segment 6 moderately approximated on posterior margin of tergite 6.

Dimensions. Total length, ♂ 4.0–4.8 mm, ♀ 4.2–5.5 mm; length of thorax, ♂ 1.6–2.1 mm, ♀ 1.9–2.6 mm; length of wing, ♂ 4.0–4.4 mm, ♀ 4.4–5.8 mm; length of glans of aedeagus 0.25–0.27 mm.

Distribution

New South Wales — widely distributed in coastal districts; Tasmania — coasts generally; South Australia — south-east coast. The absence of records from Victoria probably indicates a gap in collecting effort. Map reference 14O, 17R, 18Q, 18R, 19O, 19Q, 20M, 20N (Fig. 5).

Notes

R. averni is distinguished from other species of *Rhytidortalis*, except *R. acme*, by the largely bare anal cell, but differs from *R. acme* in having three pairs of scutellar bristles, the head subquadrate in profile, and the anal crossvein very oblique. It agrees only with *R. cteis* and *R. kelseyi* in having enlarged setulae on antennal segment 2 of the female. The position of spiracle 5 in the female is apparently unique (Fig. 17), and, unlike that of other species, it is easily visible in dried specimens (female of *R. acme* and sp. 7 unknown). Separation of the males of *R. averni* from those of *R. cteis* can be difficult, and is discussed under the latter species.

The specific epithet refers to Geoffrey Avern in recognition of his help with electron microscopy in this and numerous other projects.

Rhytidortalis sp. 7

Material examined

Western Australia: 5 ♂, Kalbarri and vicinity, Sept.–Oct. 1981, L.P.K. (AM, ANIC).

Description

In the absence of females, naming and formal description of this species are deferred.

Notes

The available males very probably represent a distinct species, but as specific differences are generally much smaller in males of this group than in females, and because, in the related species *R. kelseyi*, only the female is known, I refrain from naming the species at present.

The male of sp. 7 resembles that of *R. cteis* in many characters, including shape of head and markings on the mesoscutum. It differs in the entirely fulvous foretarsus, in having some or most of the posteroventral bristles of the fore femur pale (yellowish brown to whitish), and in having the anal cell microtrichose on its entire width. It differs from the male of *R. averni* in having some of the posteroventral bristles on fore femur pale, in the entirely microtrichose anal cell, and in having the anal crossvein much less oblique and more curved. I do not think these males represent the other sex of *R. kelseyi* (known only from the female), because the pattern on the mesoscutum is different, and the head is not much prolonged in front of the eye or rostrate as in that species. Also, the genoparafacial region of sp. 7 has an oblique rounded ridge, as in *R. averni* and *R. cteis*, whereas in *R. kelseyi* this region is anteriorly almost planate, and the postgenal region is simply convex.

Rhytidortalis cteis n.sp. (Figs. 18, 19)

Material examined

Holotype. ♀, South Australia: Snake Lagoon, Flinders Chase, Kangaroo Island, 3.xii.1977, M.A.S., D.K.M. (AM).

Paratypes. South Australia: 1 ♂, 1 ♀, same data as holotype (AM, ANIC).

Other material: Western Australia: 187 km E of Esperance (AWA); Conspicuous

Cliff, S of Nornalup (AM); Long Point, 9 mi (about 14 km) SW of Walpole (AM); Crystal Springs, 7 mi (about 11 km) W of Walpole (AM); Canal Rocks, near Yallingup (AM); Meelup Beach, near Dunsborough (AM, ANIC, USNM).

Description (♂, ♀)

Agreeing with that of *R. averni*, except as indicated below.

Coloration. Thorax with green to bronzy tinted reflections; mesoscutum with black spots on intradorsocentral zone with stronger tendency to form longitudinal series than in *R. averni*; mesopleuron with grey pruinescence generally extending well below middle, on posterior margin extending below centre and often almost to sternopleural suture. Fore coxa largely or entirely dark brown, with extensive grey pruinescence; tarsi usually with extensive brown suffusion, generally fulvous basally.

Head. Facial carina with median sulcus on most of length in both sexes.

Thorax. Presutural bristle distinct in male, usually short or poorly differentiated in female; humeral callus extensively haired in male, distinctly haired only on anterior part in female; mesopleuron in male with extensive long, fine hairing, in female with numerous short, thick, black setulae, absent from most of anterior part; pteropleuron, in female only, with most hairs reduced to short, thick black setulae. Fore femur with long posteroventral bristles in male, but these quite short and spinescent in female. Wing with marginal notch at end of vein 5 shallower than in *R. averni*, but more distinct than in *R. perforata*; distal section of vein 6 extending to margin or almost so in male, abruptly discontinued about halfway to margin in female; anal cell entirely microtrichose in female, more or less bare in centre but microtrichose anteriorly along vein 5 and posteriorly near vein 6 in male.

Abdomen. Male: approximately as described for *R. averni*; terminal filament of aedeagus about 0.74x as long as glans. Female: tergite 4 with many long black hairs on central part; tergite 5 moderately haired in centre, laterally with rather dense, moderately long, coarse black hairs; spiracle of segment 4 placed just within posterior margin of tergite 4 at about three quarters distance from median line to lateral margin of tergite; spiracle 5 placed at (not within) posterior margin of tergite 5 and much closer to lateral margin than to median line; spiracle 6 more laterally placed than in *R. averni*.

Dimensions. Total length, ♂ 3.8 mm, ♀ 3.7–5.1 mm; length of thorax, ♂ 1.9 mm, ♀ 1.6–2.4 mm; length of wing, ♂ 4.0 mm, ♀ 3.8–5.1 mm; length of glans of aedeagus 0.31 mm (range for specimens from Western Australia 0.26–0.30 mm).

Distribution

South Australia — Kangaroo Island; Western Australia — southern coasts, as far north as Geographe Bay. Map reference 2M, 6M, 3N, 13N (Fig. 5).

Notes

Females of *R. cteis* are easily distinguished from those of other species of *Rhytidortalis* by the shortened vein 6 and from species other than *R. kelseyi* by the black spinescent setulae on the mesopleuron. They share with *R. averni* the same, unusual modification of the antenna, but have the posteroventral bristles of the fore femur quite short, the anal cell entirely microtrichose, and abdominal spiracle 5 differently situated. None of the above characters is available for determination of males, because of an unusual degree of sexual dimorphism in *R. cteis*.

The most reliable character for distinguishing males of *R. cteis* from those of *R. averni* is the extent of microtrichiation in the anal cell. In *R. cteis* there is a broad tract of microtrichia along the full length of the anterior margin of the anal cell near vein 5 as well

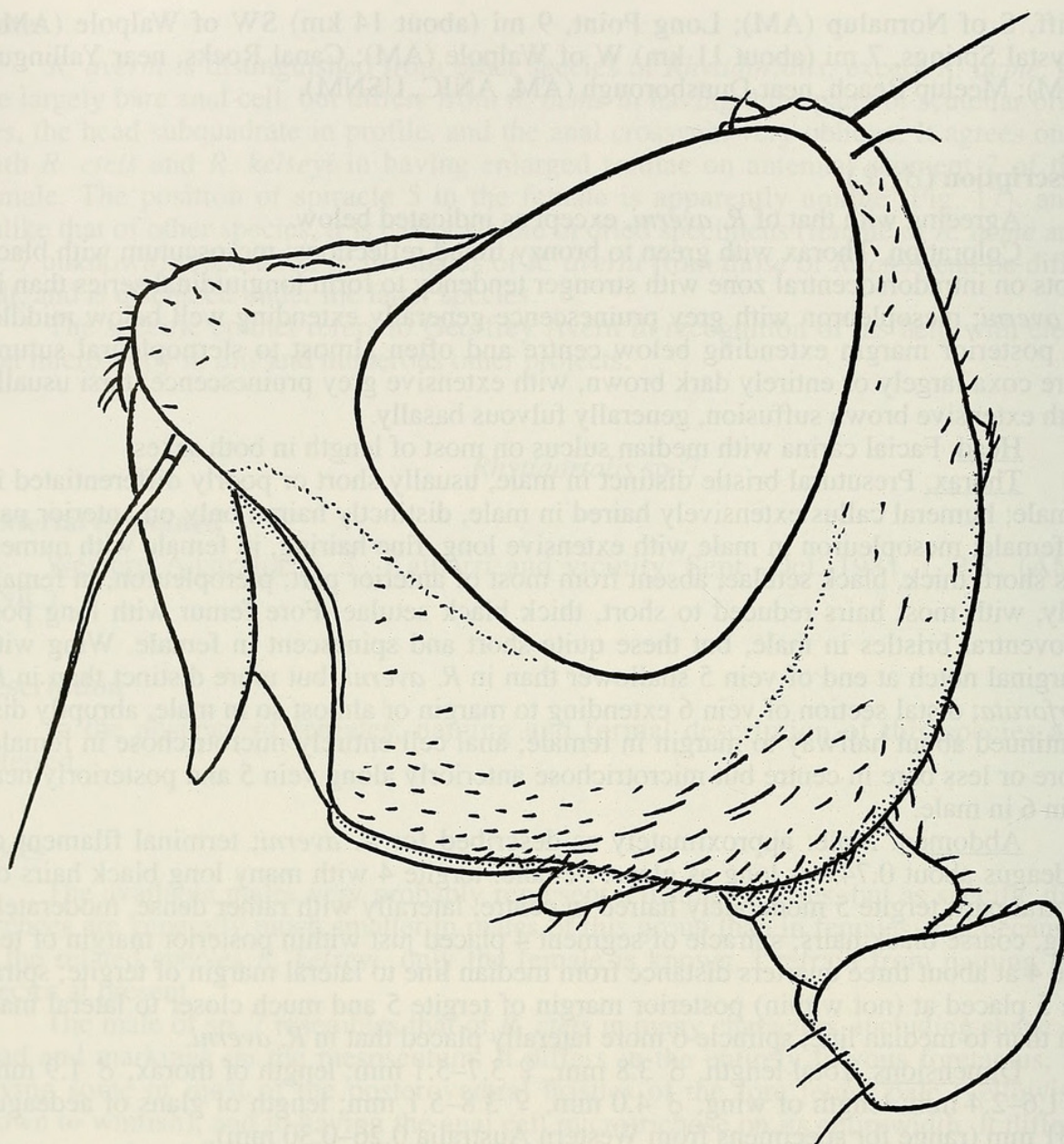


Figure 20. *Rhytidortalis kelseyi*, head of female.

as a variable tract near or behind the middle of this cell. In males of *R. averni* microtrichia are restricted to the base of the anal cell. Also, the extent of the pale pruinescence on the mesopleuron of *R. cteis* is greater than in *R. averni*, as described above, but the pruinescence is sometimes abraded in carelessly handled specimens. The tarsi of *R. cteis* are generally darker than those of *R. averni*, except at their bases.

Differences in the aedeagi of the two species are slight. Also males of *R. cteis* show a stronger tendency for the thoracic intradorsocentral black spots to be arranged in longitudinal series, have usually a slightly narrower scutellum, and average a greater extent of microtrichiation in the distal part of the first basal cell than in *R. averni*. However, these differences are not sufficiently constant for reliable determination.

The available data suggest an east-west separation in the distributions of *R. averni* and *R. cteis* at about 138° E longitude.

The specific epithet is a Greek noun meaning a comb, in reference to the armature of antennal segment 2 in the female.

Rhytidortalis kelseyi n. sp.
(Fig. 20)

Material examined

Holotype. ♀ (unique), Western Australia; Arrowsmith River, 20 km N of Eneabba, on heath, 13.x.1981, L.P.K. (ANIC).

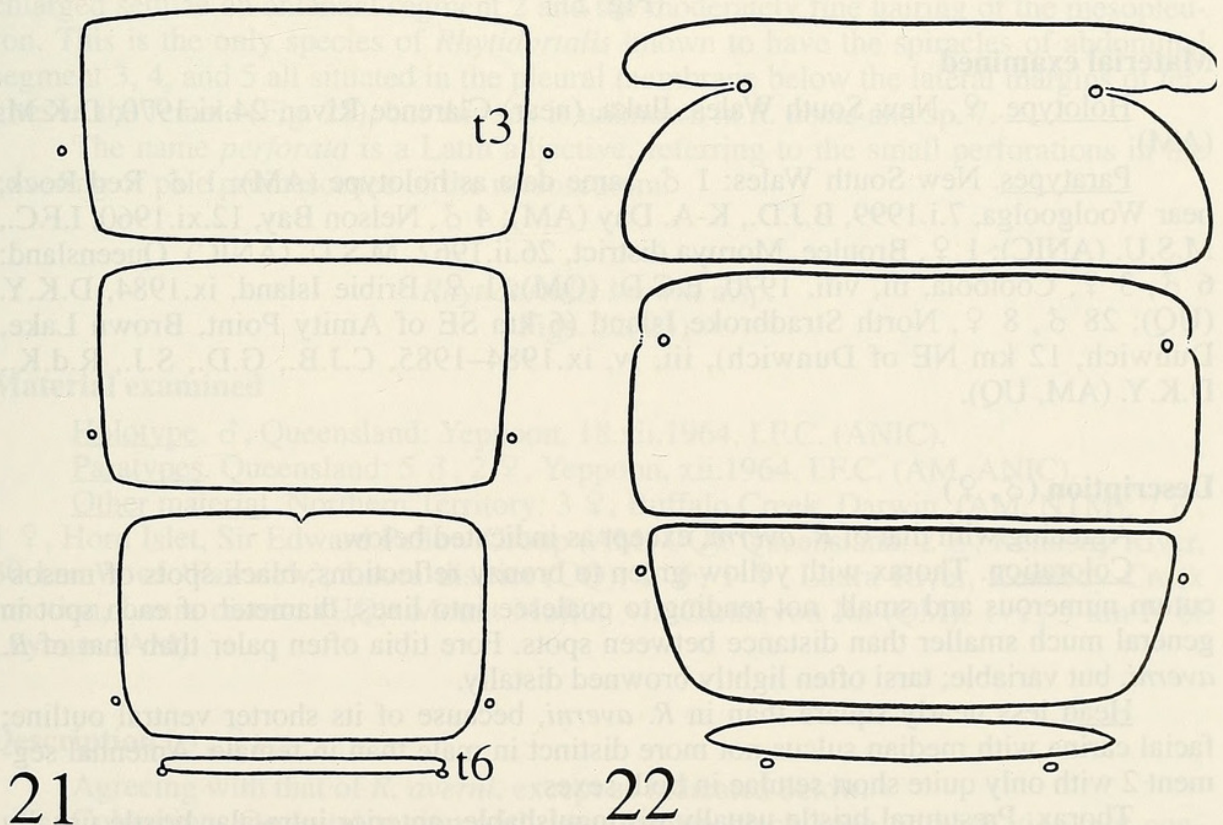
Description (♂; ♀ unknown)

Agreeing with that of *R. averni*, except as indicated below.

Coloration. Palpus fulvous, lightly browned distally. Mesoscutum with numerous black non-pruinescent spots which are mostly much smaller than in *R. averni* and *R. cteis*, only very few of them coalescing, not tending to form longitudinal lines, those near centre of mesoscutum largest. Tarsi fulvous basally, lightly browned on distal segments, not as dark as in *R. cteis*. Halter tawny.

Head. More elongate and produced at bases of antennae than in *R. averni* and *R. cteis*; facial carina with narrow median sulcus, not rugose; outer vertical bristle about as long as inner vertical; eye markedly higher than long. Antennal segment 2 with two enlarged setulae on medial surface.

Thorax. Mesoscutal setulae markedly smaller than in female of *R. cteis*, more as in *R. averni*; dorsocentral and prescutellar acrostichal bristles smaller than in female of *R. cteis*, at least as small as in female of *R. averni*; humeral bristle vestigial; presutural and anterior supra-alar bristles absent; mesopleuron and pteropleuron with all setulae moderately short, thick and black, approximately as in *R. cteis*. Fore femur with no bristles, and with setulae reduced to minute hairs, all except a few dorsal ones much smaller than



Figures. 21, 22. Diagrams of tergites 3 to 6 of female abdomen spread flat to show associated spiracles: 21, *Rhytidortalis perforata*; 22, *R. browni*.

setulae on fore tibia. Wing: thickened basal section of costa with fine black setulae and a ventral brush of longer, whitish setulae; anal crossvein curved, less oblique than in *R. averni*; vein 6 traceable approximately to margin; marginal, submarginal, and second basal cells with bare basal zones; first basal cell with extensive bare zones; anal cell almost entirely microtrichose, with small bare zone near base.

Abdomen. Tergites 4 and 5 with almost uniformly short fine hairs, the latter tergite considerably shorter; positions of spiracles 3, 4, and 5 approximately as in *R. cteis* (see Fig. 18).

Dimensions. total length 5.0 mm; length of thorax 2.2 mm; length of wing 4.6 mm.

Distribution

Western Australia – temperate west coast. Map reference 2K (Fig. 5).

Notes

Although it is desirable that the male be made known, the unique female type provides good evidence of the distinction of this species. The head is more prolonged in front of the eyes (as viewed in profile) than in other species (except the shallow-eyed *R. browni*), and the greatly reduced armature of the fore femur is unique in the genus. Judging from sexual dimorphism in *R. cteis*, I think the latter character is unlikely to be available for distinguishing males, as are the other characters used in my key.

The specific epithet refers to L.P. Kelsey, who collected the holotype and much other interesting material now in ANIC.

Rhytidortalis perforata n.sp. (Fig. 21)

Material examined

Holotype. ♀, New South Wales: Iluka, (near) Clarence River, 24.xi.1970, D.K.M. (AM).

Paratypes. New South Wales: 1 ♂, same data as holotype (AM); 1 ♂, Red Rock, near Woolgoolga, 7.i.1999, B.J.D., K-A. Day (AM); 4 ♂, Nelson Bay, 12.xi.1960, I.F.C., M.S.U. (ANIC); 1 ♀, Broulee, Moruya district, 26.ii.1962, M.S.U. (ANIC). Queensland: 6 ♂, 3 ♀, Cooloola, iii, viii. 1970, E.C.D. (QM); 1 ♀, Bribie Island, ix.1984, D.K.Y. (UQ); 28 ♂, 8 ♀, North Stradbroke Island (6 km SE of Amity Point, Brown Lake, Dunwich, 12 km NE of Dunwich), iii, iv, ix.1984–1985, C.J.B., G.D., S.J., R.d.K., D.K.Y. (AM, UQ).

Description (♂, ♀)

Agreeing with that of *R. averni*, except as indicated below.

Coloration. Thorax with yellow-green to bronzy reflections; black spots of mesoscutum numerous and small, not tending to coalesce into lines, diameter of each spot in general much smaller than distance between spots. Fore tibia often paler than that of *R. averni*, but variable; tarsi often lightly browned distally.

Head less nearly square than in *R. averni*, because of its shorter ventral outline; facial carina with median sulcus not more distinct in male than in female. Antennal segment 2 with only quite short setulae in both sexes.

Thorax. Presutural bristle usually distinguishable; anterior intra-alar bristle usually present, sometimes reduced; posterior intra-alar consistently present; humeral callus with hairing about as well developed in female as in male, usually including a number of black

hairs; mesopleuron on central part less smooth and glossy than in *R. averni*, with minute sculpturing and/or dark pruinescence; in male fine, pale mesopleural hairs much as in *R. averni*, in female hairs similar to but slightly shorter than those of male; pteropleuron in male with moderately long, fine mostly pale hairs, in female with mostly shorter mixed black and pale hairs. Wing: margin not incised at end of vein 5; anal crossvein curved, usually less oblique than in *R. averni*; first basal and anal cells entirely microtrichose.

Abdomen. Male: preabdomen resembling that of *R. averni*; epandrium with somewhat shorter dorsal setulae than that of *R. averni*; outer surstylus gibbous anterobasally; glans with prominent distal lobe; length of terminal filament about 0.8 of length of glans. Female: hairs on tergites 4 and 5 not becoming remarkably short, thickened, or crowded on lateral parts, a few of those near posterolateral angle of tergite 5 longer and bristle-like; spiracles 3, 4 and 5 all situated in pleural membrane below posterior part of lateral margins of tergites; spiracle 6 situated at posterior side of lateral extremity of tergite.

Dimensions. Total length, ♂ 4.4–5.1 mm, ♀ 4.5–4.9 mm; length of thorax, ♂ 1.8–2.1 mm, ♀ 2.1 mm; length of wing, ♂ 3.7–4.5 mm, ♀ 4.5–4.7 mm; length of glans (without distal lobe), 0.22 mm.

Distribution.

Queensland — southern coast, Bribie and Stradbroke Islands; New South Wales — coastal districts. Map reference 20N, 21J, 21K, 21M (Fig. 5).

Notes

R. perforata differs from the other species of *Rhytidortalis* in the much smaller black spotting on the mesoscutum. It differs from *R. averni* in its microtrichose anal cell. The female also differs from those of *R. averni*, *R. kelseyi* and *R. cteis* in the absence of enlarged setulae on antennal segment 2 and the moderately fine hairing of the mesopleuron. This is the only species of *Rhytidortalis* known to have the spiracles of abdominal segment 3, 4, and 5 all situated in the pleural membrane below the lateral margins of tergites in the female (Fig. 21), but this sex is unknown in *R. acme* and sp. 7.

The name *perforata* is a Latin adjective, referring to the small perforations in the covering of pale pruinescence of the mesoscutum.

Rhytidortalis browni n.sp.
(Figs. 22, 23)

Material examined

Holotype. ♂, Queensland: Yeppoon, 18.xii.1964, I.F.C. (ANIC).

Paratypes. Queensland: 5 ♂, 2 ♀, Yeppoon, xii.1964, I.F.C. (AM, ANIC).

Other material. Northern Territory: 3 ♀, Buffalo Creek, Darwin, (AM, NTM); 7 ♂, 1 ♀, Horn Islet, Sir Edward Pellew Group (AM, UQ). Queensland: 2 ♂, Kennedy River, 30 km W of 'Fairview', Laura district (UQ); 2 ♂, 1 ♀, Laura River, Kennedy Creek junction, Laura district (UQ); Mount Moffat, via Carnarvon Ra (QM); 1 ♀, 5 km N of Leyburn (AM).

Description (♂, ♀)

Agreeing with that of *R. averni*, except as indicated below.

Coloration. Occipital region with large brown-black zone on each side, not concealed by pale pruinescence. Prelabrum usually orange-fulvous. Mesoscutum with black spots smaller than in *R. averni*, some coalescing on dorsocentral lines; only upper part of

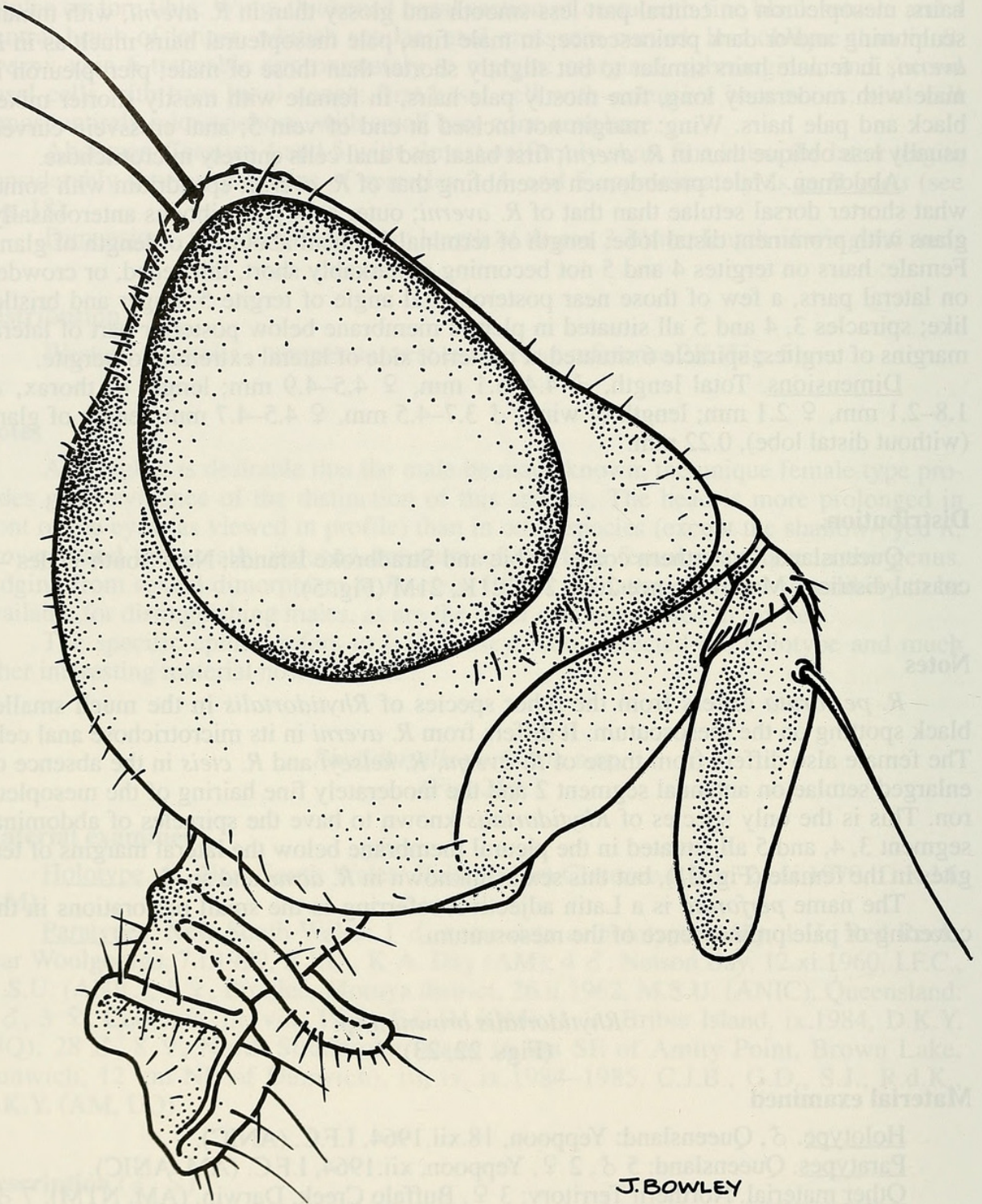
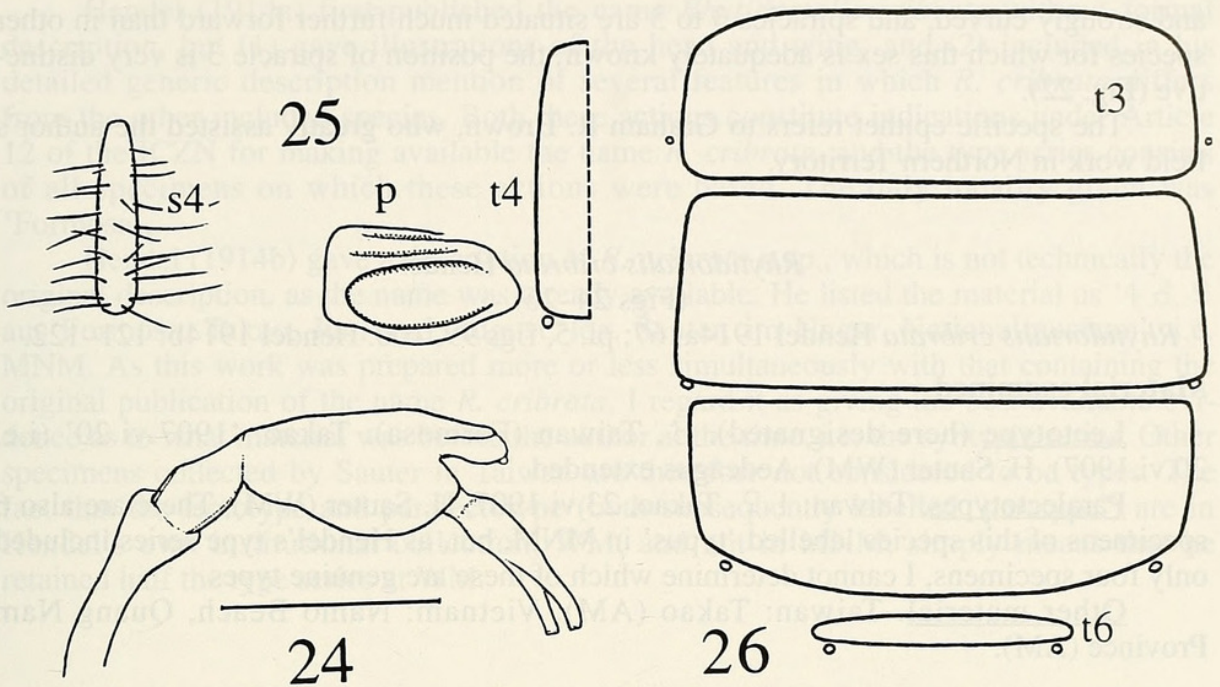


Figure 23. *Rhytidortalis browni*, head of male.

humeral callus grey-pruinescent, about lower half shining to subshining brown-black; posterior notopleural callus fulvous to brown, pruinescent; mesopleuron with small grey-pruinescent zone on upper margin only. Legs entirely fulvous-yellow; fore coxa with very slight silvery sheen. Abdominal tergites 3–5 without grey pruinescent markings.

Head less nearly square in profile than in *R. averni* because of its more rounded ventral outline; facial carina with median sulcus in both sexes; fronto-orbital and postvertical bristles minute. Antennal segment 2 with setulae on medial surface all small in both sexes.



Figures 24–26. *Rhytidortalis cribrata*: 24, distal part of aedeagus of lectotype (scale = 0.25 mm); 25, left lateral parts of segment 4 of female, including median sternite 4; 26, diagram of segments 3 to 6 of female abdomen. p, pleural sclerite. s4, sternite 4. t3, t6, tergites 3 and 6. t4, margin of tergite 4.

Thorax. Presutural and supra-alar bristles absent; humeral callus with few hairs in male, with shorter hairs in female; in female posterior sternopleural longer than anterior one and strongly curved; mesopleuron with hairs only slightly shorter in female than in male; pteropleuron with relatively few short, fine yellow hairs in both sexes. Wing: anal crossvein strongly curved, its general direction less oblique than in *R. averni*; first basal and anal cells entirely microtrichose.

Abdomen. Male: tergite 5 with posterior marginal series of bristles; outer surstylus somewhat gibbous basally; glans with prominent distal lobe; length of terminal filament about 0.85 of that of glans. Female: tergites 4 and 5 with numerous moderately short hairs not becoming shorter on sides; tergite 5 with hairs not denser laterally, but with several posterior marginal bristles; spiracle of segment 3 placed at summit of deep lateral incision in tergite 3; spiracle of segment 4 placed well within anterior part of lateral margin of tergite 4; spiracle 5 placed in pleural membrane below anterior part of lateral margin of tergite 5; spiracle 6 near posterior margin of tergite 6, well removed from median line.

Dimensions. Total length, ♂ 4.1–4.9 mm, ♀ 3.8–4.3 mm; length of thorax, ♂ 1.6–2.0 mm, ♀ 1.7–1.8 mm, length of wing, ♂ 3.4–3.9 mm, ♀ 3.5–3.7 mm; length of glans of aedeagus (without distal lobe) 0.23–0.24 mm.

Distribution

Queensland — northern and southern districts, inland ranges and coast; Northern Territory — Darwin district and Sir Edward Pellew Group. This is the only species of *Rhytidortalis* known from the Australian tropics. Map reference 10C, 13D, 16D, 17D, 19I, 20H, 20J (Fig. 5).

Notes

R. browni differs from other species of *Rhytidortalis* in the absence of supra-alar bristles and the entirely pale legs. In the female, the posterior notopleural bristle is longer

and strongly curved, and spiracles 3 to 5 are situated much further forward than in other species for which this sex is adequately known; the position of spiracle 3 is very distinctive (Fig. 22).

The specific epithet refers to Graham R. Brown, who greatly assisted the author's field work in Northern Territory.

Rhytidortalis cribrata Hendel

(Figs 24–26)

Rhytidortalis cribrata Hendel 1914a: 67; pl. 5, figs 99, 100. Hendel 1914b: 121–122.

Material examined

Lectotype (here designated). ♂, Taiwan (Formosa): Takao, '1907.vi.20' (i.e. 20.vi.1907), H. Sauter (WM). Aedeagus extended.

Paralectotypes. Taiwan: 1 ♀, Takao, 23.vi.1907, H. Sauter (WM). There are also 6 specimens of this species labelled 'typus' in MNM, but, as Hendel's type series included only four specimens, I cannot determine which of these are genuine types.

Other material. Taiwan: Takao (AM). Vietnam: Namo Beach, Quang Nam Province (AM).

Description (♂, ♀)

The following notes supplement the description of Hendel (1914b).

Coloration generally resembling that of *R. averni*. Wing: apical dark brown spot in submarginal cell extending slightly over veins 2 and 3.

Head. Chaetotaxy as in *R. averni*. Antennal segment 2 without specially enlarged setulae in female.

Thorax. Chaetotaxy generally as in *R. averni*; presutural bristle similarly variable; hairs or setulae on humeral callus moderately developed in both sexes; mesopleuron with numerous moderately long, mainly dark hairs in both sexes; pteropleuron with moderately long, mainly dark hairs, apparently not showing much sexual dimorphism. Wing: anal crossvein strongly curved, its general direction only slightly oblique; first basal, second basal, and anal cells entirely microtrichose.

Abdomen. Male: spiracles not observed; postabdominal parts resembling those of *R. averni*; glans with large distal lobe. Female: tergites 4 and 5 normally haired, hairs not particularly shortened on sides; segment 4 with rather variable transversely grooved sclerite on each side; spiracle 3 in pleural membrane below anterior part of lateral margin of tergite 3; spiracle 4 immediately behind posterolateral angle of tergite 4; spiracle 5 similarly situated in relation to tergite 5, but a little more removed from posterolateral angle; spiracle 6 behind lateral part of tergite 6.

Dimensions. Length of glans of aedeagus (lectotype) 0.25 mm.

Distribution

Taiwan. Vietnam: coast of Quang Nam Province.

Notes

This Oriental species is the only species of *Rhytidortalis* yet known from outside Australia. Its morphology generally resembles that of Australian species, the most outstanding differences being the possession of an apical wing-spot and, in the female, of a pleural sclerite on abdominal segment 4. The size of the pleural sclerite and number of grooves are remarkably variable, but, as this variation is apparent even among the female topotypes, it does not seem to indicate specific heterogeneity, and may be age-related.

Hendel (1914a) first published the name *Rhytidortalis cribrata* without formal description, but (1) gave illustrations of the head and wing, and (2) included in his detailed generic description mention of several features in which *R. cribrata* differs from the other included species. Both these actions constitute indications under Article 12 of the ICZN for making available the name *R. cribrata*, and the type series consists of all specimens on which these actions were based. The only locality given was 'Formosa'.

Hendel (1914b) gave a description of *R. cribrata* n.sp., which is not technically the original description, as the name was already available. He listed the material as '4 ♂ ♀ aus Formosa, Takao, Juni und August, leg. Sauter, im Ungar. Nationalmuseum', i.e. MNM. As this work was prepared more or less simultaneously with that containing the original publication of the name *R. cribrata*, I regard it as giving the best available evidence as to what material was before the author at the time, i.e. the syntypic series. Other specimens collected by Sauter in Taiwan are therefore not considered to be types. The fact that the lectotype and paralectotype (both subsequently labelled 'paratype') are in Hendel's own institutional collection, WM, and not in MNM, simply means that he retained half the type series at WM.

ACKNOWLEDGEMENTS

I am indebted to G. Avern for electron microscopy, and J. Bowley for assistance with artwork. Study material was provided by D.H. Colless and P.S. Cranston (ANIC), G. Daniels (UQ, and material previously donated to AM), C.J. Burwell (QM), the late Á. Soós (MNM), R. Contreras-Lichtenberg (WM), and A.R. Gillogly. G.R. Brown and B.J. Day assisted with field work. Once again, I have referred to many interesting Diptera collected by I.F. Common and M.S. Upton at their moth lights (ANIC). S. Cowan processed the words. D.J. Bickel read the manuscript.

REFERENCES

- Begg, M. and Hogben, L. (1946). Chemoreceptivity of *Drosophila melanogaster*. *Proceedings of the Royal Society (B)* **133**, 1–19.
- Colless, D.H. (1994). A new family of muscoid Diptera from Australasia, with sixteen new species in four new genera (Diptera: Axiniidae). *Invertebrate Taxonomy* **8**, 471–534.
- Common, I.F.B. (1990). 'Moths of Australia', 535 pp, 32 pll. (Melbourne University Press, Carlton).
- Crosskey, R.W. (1973). A conspectus of the Tachinidae (Diptera) of Australia, including keys to the supraspecific taxa and taxonomic and host catalogues. *Bulletin of the British Museum (Natural History) Entomology* suppl. 21, 221 pp.
- Enderlein, G. (1922). Die Platystominentribus Plastotephritini. *Stettiner Entomologische Zeitung* **83**, 3–16.
- Evenhuis, N.L. (1989) 64. Family Platystomatidae. In 'Catalog of the Diptera of the Australasian and Oceanian Regions' (Ed. N.L. Evenhuis), pp. 482–497. (Bishop Museum and E.J. Brill, Honolulu and Leiden).
- Harrison, R.A. (1959). Acalypterate Diptera of New Zealand. *New Zealand Department of Scientific and Industrial Research, Bulletin* **128**, vii+382 pp.
- Hendel, F. (1914a). Diptera, Fam. Muscaridae, Subfam. Platystominae. *Genera Insectorum* **157**, 179 pp., 15 pls.
- Hendel, F. (1914b). Die Arten der Platystomini. *Abhandlungen der K.K. Zool.-Botan. Gesellschaft in Wien* **8(1)**, 1–410, pls 1–4.
- International Trust for Zoological Nomenclature (1985). International Code of Zoological Nomenclature, 3rd edition. xx + 338 pp. (University of California Press, Berkeley and Los Angeles).
- McAlpine, D.K. (1973a). The Australian Platystomatidae (Diptera, Schizophora) with a revision of five genera. *The Australian Museum Memoir* **15**, 256 pp.
- McAlpine, D.K. (1973b). Observations on sexual behaviour in some Australian Platystomatidae (Diptera, Schizophora). *Records of the Australian Museum* **29**, 1–10.
- McAlpine, D.K. (1975). Combat between males of *Pogonortalis doclea* (Diptera, Platystomatidae) and its relation to structural modification. *Australian Entomological Magazine* **2**, 104–107.
- McAlpine, D.K. (1979). Agonistic behaviour in *Achias australis* (Diptera, Platystomatidae) and the significance of eye-stalks. In 'Sexual selection and reproductive competition in insects' (Ed. M.S. and N.A. Blum), pp. 221–230. (Academic Press, New York).
- McAlpine, D.K. (1982). The acalypterate Diptera with special reference to the Platystomatidae. In 'Biogeography and ecology of New Guinea' (Ed. J.L. Gressitt), pp. 659–673. (W. Junk, The Hague).



McAlpine, David K. 2000. "Australian Signal Flies of the Genus *Rhytidortalis* (Diptera: Platystomatidae)." *Proceedings of the Linnean Society of New South Wales* 121, 147–174.

View This Item Online: <https://www.biodiversitylibrary.org/item/108642>

Permalink: <https://www.biodiversitylibrary.org/partpdf/47541>

Holding Institution

MBLWHOI Library

Sponsored by

Boston Library Consortium Member Libraries

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.