

A REVISION OF THE GENUS *ANILICUS* CANDEZE, WITH NOTES ON RELATED GENERA (COLEOPTERA: ELATERIDAE)

By PENELOPE J. GULLAN

Department of Zoology, Monash University, Clayton, Victoria

Abstract

A taxonomic revision of the genus *Anilicus* Candèze is presented. Five species are included in the genus, two of which are new (*A. rectilineatus* and *A. parvus*), and four species are placed in other genera.

The genus *Augenotus* is established to accommodate *Anilicus quadriguttatus* (Erichson) and *Melanoxanthus australis* Candèze; one new species—*aurantius*— is described.

Anilicus haemorrhoidalis Candèze is transferred to the genus *Anilicoides* Candèze.

Anilicus flavipennis Candèze is synonymized with *Acroniopus rufipennis* (Macleay, W. J.) and *Anilicus nigroterminatus* (Macleay, W.S.) is synonymized with *Melanoxanthus melanocephalus* (Fabricius).

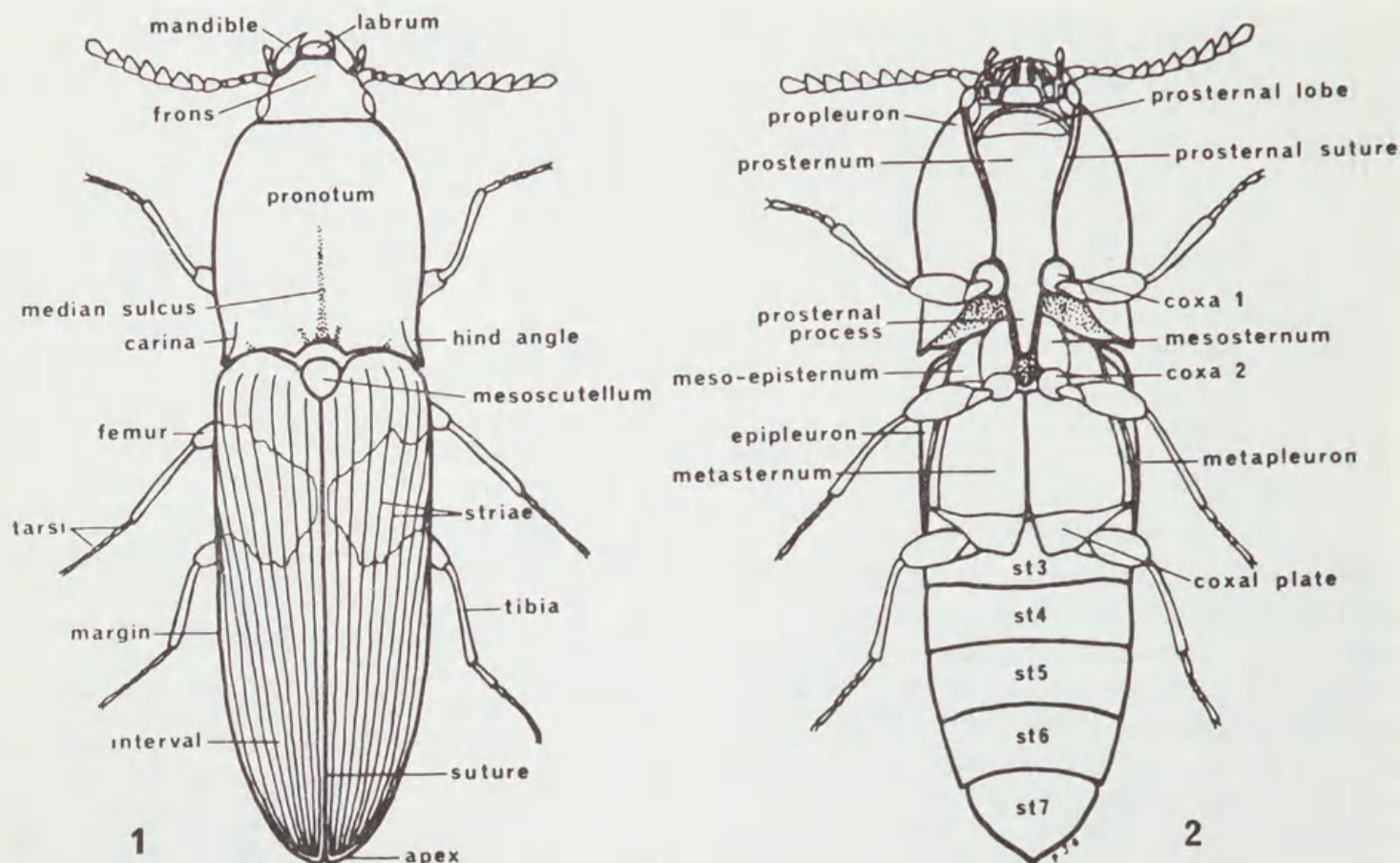
Introduction

The genus *Anilicus* was erected by Candèze in 1863 to accommodate four Australian species: *A. attenuatus* Candèze, *A. loricatus* Candèze, *A. semiflavus* (Germar) and *A. quadriguttatus* (Erichson). Candèze (1878, 1889, 1891) subsequently added three more species: *A. flavipennis* Candèze, *A. nigroterminatus* (Macleay, W. S.) and *A. haemorrhoidalis* Candèze. Since the original descriptions were published, the genus has received only scanty mention in the literature (Froggatt, 1907; Goudie, 1923; Tillyard, 1926) and from study of available material it was evident that the species grouping was in need of revision.

Of the morphological characters employed in this study, particular attention was directed to the genitalia as these have been found to be especially useful for separation at the specific level in other Coleoptera, including the Elateridae (Sharp and Muir, 1912; Becker, 1956; Neboiss, 1957; Brooks, 1960), and there is an extensive literature on their structure and function (e.g. Snodgrass, 1935; Zacharuk, 1958; Crowson, 1967; Tuxen, 1970). The terminology associated with the genitalia has been adopted from Neboiss (1957), while Figures 1 and 2 illustrate other morphological features that will be discussed in the text.

Collections from which data were obtained or specimens examined are listed below, together with the abbreviations used in the text. Museums housing type specimens are also included in this list.

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, CSIRO, Canberra
BM	British Museum (Natural History), London
CALIF	Californian Academy of Sciences, Golden Gate Park, San Francisco
DGB	Private collection of Mr D. G. Black, Melbourne
ETS	Private collection of Mr E. T. Smith, Melbourne
FH	Private collection of Mr F. Hallgarten, Melbourne
FTF	Private collection of Mr F. T. Fricke, Sydney
GA	Private collection of Mr G. Anderson, Yaaapeet, Vic.
HOWITT	Howitt collection, National Museum of Victoria, Melbourne
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium
JB	Private collection of Mr J. Balderston, Canberra
JGB	Private collection of (late) Mr J. G. Brooks, Cairns
KBL	Kamerunga Biological Laboratories, Cairns
MACL	Macleay Museum, University of Sydney, Sydney
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Mass.



Figures 1-2—*Anilicus loricatus* Cand.—1, dorsal view; 2, ventral view.

- | | | | |
|-------|---|------|---|
| MGF | Museum G. Frey, Tutzing bei München, Germany | UNE | University of New England, Armidale, N.S.W. |
| MJF | Private collection of Mr M. J. Fletcher, Sydney | UT | University of Tasmania, Hobart |
| NMV | National Museum of Victoria, Melbourne | WADA | Western Australian Department of Agriculture, Perth |
| NSWDA | New South Wales Department of Agriculture, Sydney | WAM | Western Australian Museum, Perth |
| PARIS | Musée Nationale d'Histoire Naturelle, Paris, France | ZM | Zoologisches Museum, Humboldt University, Berlin, Germany |
| PM | Private collection of Mr P. Meyer, Melbourne | | |
| PW | Private collection of Mr P. Williams, Melbourne | | |
| QM | Queensland Museum, Brisbane | | |
| QU | Queensland University, Brisbane | | |
| SAM | South Australian Museum, Adelaide | | |
| TDA | Tasmanian Department of Agriculture, Hobart | | |
| TM | Tasmanian Museum, Hobart | | |

All data and descriptions were prepared from specimens belonging to the above institutions and collections, and although actual types (with two exceptions) were not seen, descriptions were produced with the aid of type comparisons made by Arturs Neboiss, Curator of Insects, National Museum of Victoria.

Genus *Anilicus* Candèze

Anilicus Candèze, 1863: 328; 1878: 192; 1889: 120; 1891: 192; Schwarz, 1907: 264; Neboiss, 1956: 57; 1961: 27.

Type species: *Anilicus attenuatus* Candèze (original designation).

Of the seven species placed in this genus by Candèze three are retained, and one of these, *A. semiflavus*, becomes *A. xanthomus* (Macleay, W. S.) since it was described under the name *Elater xanthomus* by W. S. Macleay prior to Germar's publication. Two new *Anilicus* species are described, bringing the total number of species in this genus to five. *Anilicus quadriguttatus* was found to be closely related to *Melanoxanthus australis*, a species whose characters are not those of the genus *Melanoxanthus*, and a new species, closely allied to the above two, is described. The genus *Augenotus* has been established to accommodate these three species. *Anilicus haemorrhoidalis* has been transferred to the genus *Anilicoides* due to its morphological similarity to *Anilicoides depressus* Candèze. Two species, *Anilicus nigroterminatus* and *Anilicus flavipennis* were found to be synonymous with *Melanoxanthus melanocephalus* and *Acroniopus rufipennis* respectively.

Members of the genus *Anilicus* are moderately small to medium sized, measuring 5 to 16 mm in length. All species exhibit a quite distinct bicolourous pattern on the elytra, of black and an orange or yellowish-brown. The head, prothorax and abdomen are black to brownish-black. Sexual dimorphism is apparent in some species, with the seventh abdominal sternite of the male being more cuspidate than that of the female. In some species body size reflects sexual differences.

Head small, inclined downward, punctate, covered with coarse, short pubescence; frons slightly convex with indistinct median depression, weakly raised antennary ridge on antero-lateral margin, and straight anterior margin. Mandibles broad at base, curved, attenuate and cuspidate. Terminal segment of maxillary palps dolabriform, widest at distal end. Labrum only slightly wider than long. Antennae blackish, pubescent, of moderate length; 1st segment thickened, 2nd very short and rounded, 3rd elongate, 4th to 10th segments subequal and triangular, 11th (terminal) segment irregularly hexagonal.

Pronotum densely punctate, covered with coarse hairs; median sulcus distinct, extending

to, or almost to, the anterior margin; hind angles strongly carinate. Prosternal lobe arcuate anteriorly; prosternal groove for the reception of the antennae present at anterior end of suture; prosternal process with central ridge, flattening out posteriorly.

Mesoscutellum black, triangular, slightly convex, sloping towards the smooth margins, punctate and pubescent. Elytra elongate, depressed, punctate-striate, covered with short, coarse hairs, the intervals slightly convex, the apex divaricate and more or less acuminate depending upon the species.

Underside of body black to reddish-brown and pubescent. The 7th (last visible) abdominal sternite generally acuminate and mucronate. The shape of the 8th abdominal tergite of the female is of some use in separation of the species.

Legs pubescent, black to brownish-black; tibia bearing two ventral spines at distal end; tarsi simple, filiform, the segments gradually decreasing in length from the 1st to the 4th, with the 5th equal to, or longer than, the 1st; two equal claws.

Lateral lobes of aedeagus slender, of approximately equal width over entire length, two or three setae present on each apex, apical hooks absent. Median lobe slender; furca long and narrow. The shape of the apices of the lateral lobes, the relative lengths of the lateral and median lobes, and the shape of the basal piece are important characters for separation at the specific level. External genitalia of female similar in all species. Chitinous spines, which are useful for distinguishing species, are present at the entrance of the bursa copulatrix of the female in some species, absent in others.

Larvae are unknown.

KEY TO SPECIES OF *ANILICUS*

- 1—Some black at base of elytra; black extending from apex to more than half length of elytra *A. loricatus* Cand.
- Basal region of elytra yellow ochre to burnt sienna colour; black generally extending less than half length of elytra 2

- 2—Pronotum with narrow hind angle, length about three times width

A. rectilineatus sp. nov.

- Pronotum with variable shaped hind angle, length less than three times width

3

- 3—Total body length greater than 10 mm; elytra tapering almost rectilinearly from base to apex *A. attenuatus* Cand.

- Body generally less than 10 mm in length, but if greater then with elytral margins almost parallel for 2/3rds of length

4

- 4—Total body length from 6 mm to 12 mm; elytral margins almost parallel for 2/3rds of length; elytral base usually of a burnt sienna colour; lateral lobes of aedeagus of ♂ expanded apically; bursa copulatrix of ♀ without chitinous spines

A. xanthomus (MacL., W. S.)

- Total body length less than 8 mm; ♂ ♂ smaller than ♀ ♀ and with very tapering elytra; elytral base generally of a yellow ochre colour; lateral lobes of aedeagus of ♂ tapering curvilinearly to apex; bursa copulatrix of ♀ with chitinous spines

A. parvus sp. nov.

Distribution: Queensland, New South Wales, Victoria, southern South Australia and south-western Western Australia (Fig. 3).

Plant associations: *Anilicus* does not appear to have a specific host plant. Adults are probably nectar and pollen feeders, having been found in association with the following plants:

A. attenuatus Candèze: *Bursaria spinosa* Cav. (Fern-tree Gully, Vic.).

A. loricatus Candèze: *Nuystia floribunda* Brown (Wannamal, W.A.), *Xanthorrhoea* sp. (Denmark, W.A.).

A. xanthomus (Macleay, W. S.): *Angophora cordifolia* Cav. blossom (Ku-Ring-Gai Chase Nat. Park, N.S.W.), *Bursaria spinosa* Cav. flowers (Alligator Gorge, Flinders Ranges, S.A.; Banksia Park, Shannon Rise, S.A.; Dimboola, Vic.), *Callitris* sp. (Pinery, S.A.), *Eucalyptus* sp. blossom (Barron Falls, Kuranda, Q'ld), under bark of *Eucalyptus camaldulensis* Dehnh. (Kulkyne Forest, Vic.), *Kunzea* sp. (Endrick River, near Nerriga, N.S.W.), *Leptospermum* sp. (Cordeaux Reservoir, N.S.W.; Eildon Reservoir, Vic.; Nadgee Faunal Reserve, near Merrica

River, N.S.W.), *Leptospermum* sp. flowers (Glenbrook, Blue Mountains, N.S.W.; Narrabeen Plateau, N.S.W.), *Leptospermum juniperinum* Sm. (Mallacoota, Vic.), *Nuystia floribunda* Brown (Muclea, W.A.), *Prostanthera lasianthos* Labill. (Warburton, Vic.).

Anilicus attenuatus Candèze

(Figures 4-5; Plate 4, figure 1)

Anilicus attenuatus Candèze, 1863: 330; Neboiss, 1956: 57.

Candèze described this species from several specimens found by M. Bakewell in the vicinity of Melbourne, Victoria. He considered it a distinctive member of *Anilicus* due to its greater stature, compared with other *Anilicus* species, the attenuation of the elytra and the arrangement of the yellow colour. The Latin trivial name *attenuatus* means 'tapered' and apparently refers to the elytra.

The basal half of the elytra is a yellow ochre to a burnt sienna colour; the apical half, the pronotum and the head are black. The black of the elytra forms a W-shape at its junction with the orange, the black extending anteriorly for a greater distance along the lateral margin than along the suture. Sexual dimorphism not apparent.

Antennae black, or black with a reddish-brown tinge, the outer margins of the 4th to 10th segments convex. Mandibles with one small incisor cusp on inner margin.

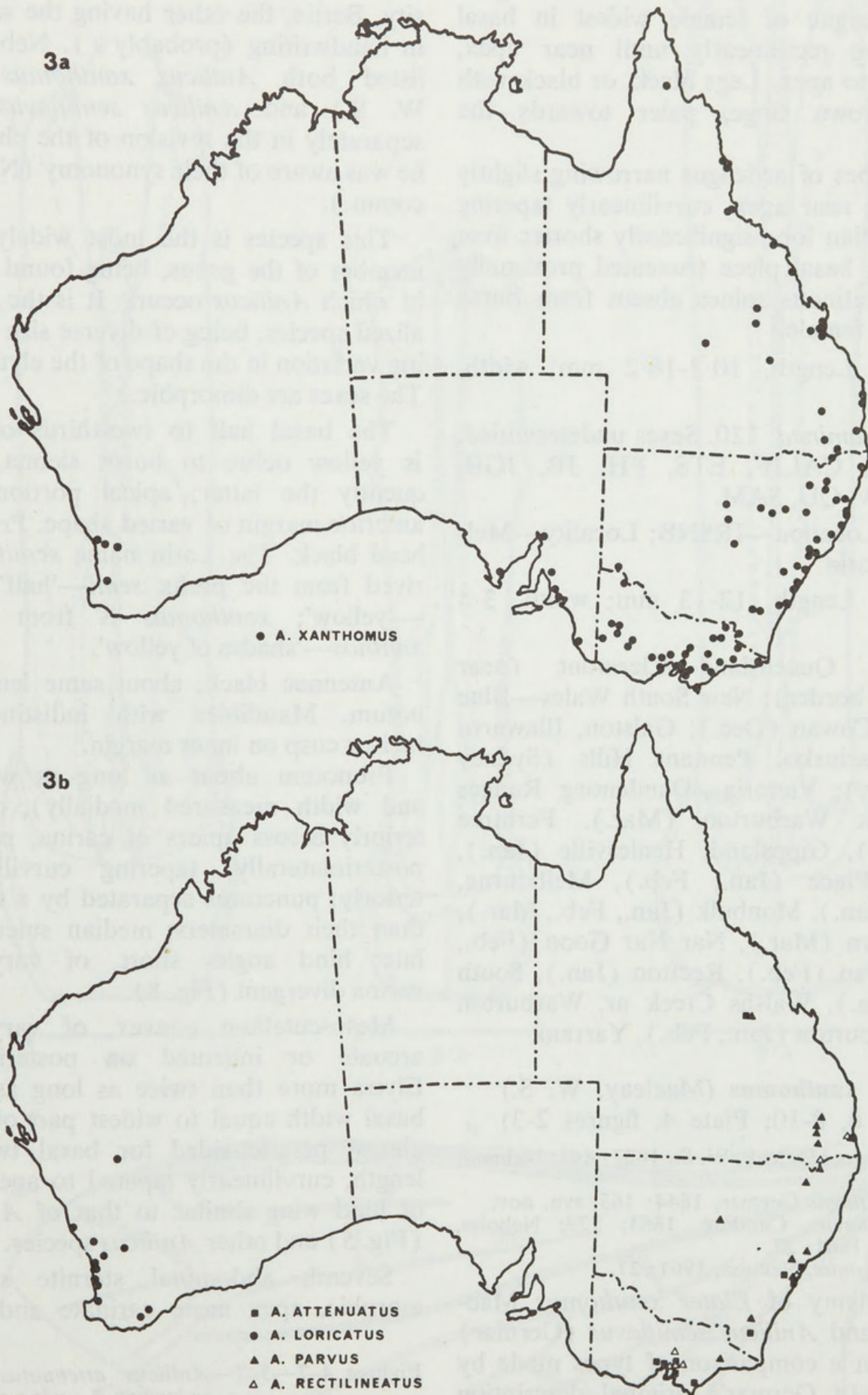
Pronotum slightly longer than wide (length and width measured medially), widest posteriorly, curvilinearly tapering anteriorly, convex; punctures small, separated by a distance equal to their diameters; median sulcus distinct throughout length of pronotum, more deeply furrowed posteriorly.

Mesoscutellum with narrow central ridge devoid of punctures. Elytra more than twice as long as the pronotum, basal width equal to pronotal width as measured across apices of hind angles, tapering almost rectilinearly from base to apex, divaricate and separately acuminate, with conspicuous striae.

Figure 3—Recorded distribution of the genus *Anilicus* in Australia.

a—distribution of *A. xanthomus*.

b—distribution of *A. attenuatus*, *A. loricatus*, *A. parvus* and *A. rectilineatus*.



Seventh abdominal sternite of both sexes extremely carinate and mucronate. Eighth abdominal tergite of female widest in basal half, tapering rectilinearly until near apex, curvilinearly to apex. Legs black, or black with a reddish-brown tinge, paler towards the extremities.

Lateral lobes of aedeagus narrowing slightly from base to near apex, curvilinearly tapering to apex; median lobe significantly shorter than lateral lobes; basal piece truncated proximally (Fig. 4). Chitinous spines absent from bursa copulatrix of female.

Dimensions: Length, 10.2-16.2 mm; width, 2.8-4.6 mm.

Specimens examined: 120. Sexes undetermined. AM, ANIC, CALIF, ETS, FH, JB, JGB, NSWDA, PW, QU, SAM.

Type data: Location—IRSNB; Locality—Melbourne, Victoria.

Dimensions: Length, 12-13 mm; width, 3.5 mm.

Distribution: Queensland—Clermont (near N.S.W.-Q'ld border); New South Wales—Blue Mountains, Cowan (Dec.), Galston, Illawarra (Feb.), Kosciusko, Pennant Hills (Sydney suburb, Nov.); Victoria—Dandenong Ranges (Jan.), East Warburton (Mar.), Ferntree Gully (Feb.), Gippsland, Healesville (Jan.), Launching Place (Jan., Feb.), Melbourne, Millgrove (Jan.), Monbulk (Jan., Feb., Mar.), Mount Evelyn (Mar.), Nar Nar Goon (Feb., Mar.), Parwan (Feb.), Reefton (Jan.), South Wandin (Jan.), Walshs Creek nr. Warburton (Jan.), Warburton (Jan., Feb.), Yarram.

***Anilicus xanthomus* (Macleay, W. S.)**
(Figures 6, 8-10; Plate 4, figures 2-3)

Elater xanthomus Macleay, W. S., 1827: 441; Neboiss, 1956: 36.

Ampedus semiflavus Germar, 1844: 163, syn. nov.

Anilicus semiflavus, Candèze, 1863: 329; Neboiss, 1956: 58; 1961: 27.

Anilicus xanthomus, Neboiss, 1961: 27.

The synonymy of *Elater xanthomus* Macleay, W. S. and *Anilicus semiflavus* (Germar) was based on a comparison of types made by A. Neboiss. In Germar's original description of *Ampedus semiflavus* no single specimen was designated as a holotype. Neboiss selected a

lectotype (♂ with printed number '43510') from two specimens in the Humboldt University, Berlin, the other having the same number in handwriting (probably ♀). Neboiss (1961) listed both *Anilicus xanthomus* (Macleay, W. S.) and *Anilicus semiflavus* (Germar) separately in the revision of the check list, but he was aware of their synonymy (Neboiss, pers. comm.).

This species is the most widely distributed member of the genus, being found in all states in which *Anilicus* occurs. It is the most generalized species, being of diverse size and exhibiting variation in the shape of the elytral marking. The sexes are dimorphic.

The basal half to two-thirds of the elytra is yellow ochre to burnt sienna, more frequently the latter; apical portion black, its anterior margin of varied shape. Pronotum and head black. The Latin name *semiflavus* is derived from the prefix *semi*—'half' and *flavus*—'yellow'; *xanthomus* is from the Greek *xanthos*—'shades of yellow'.

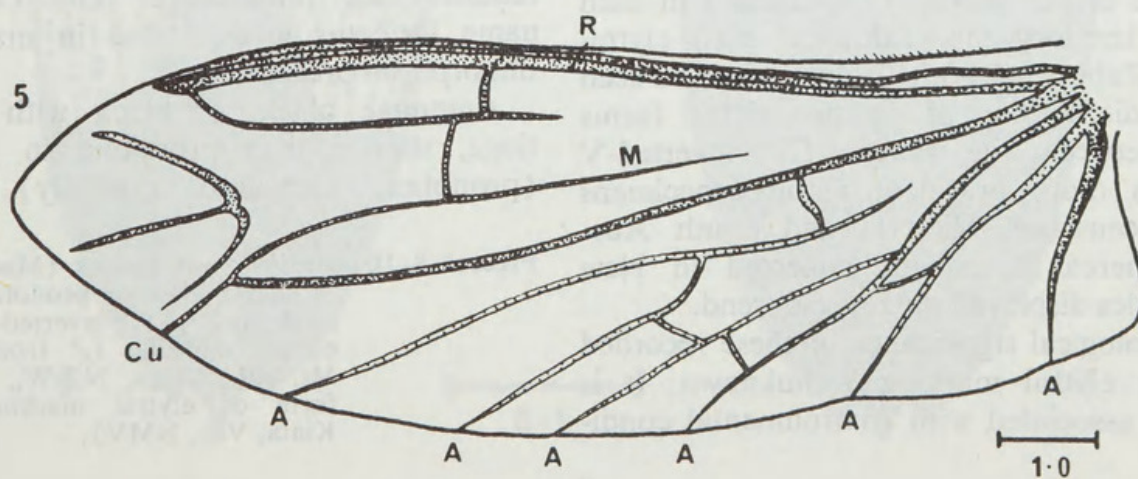
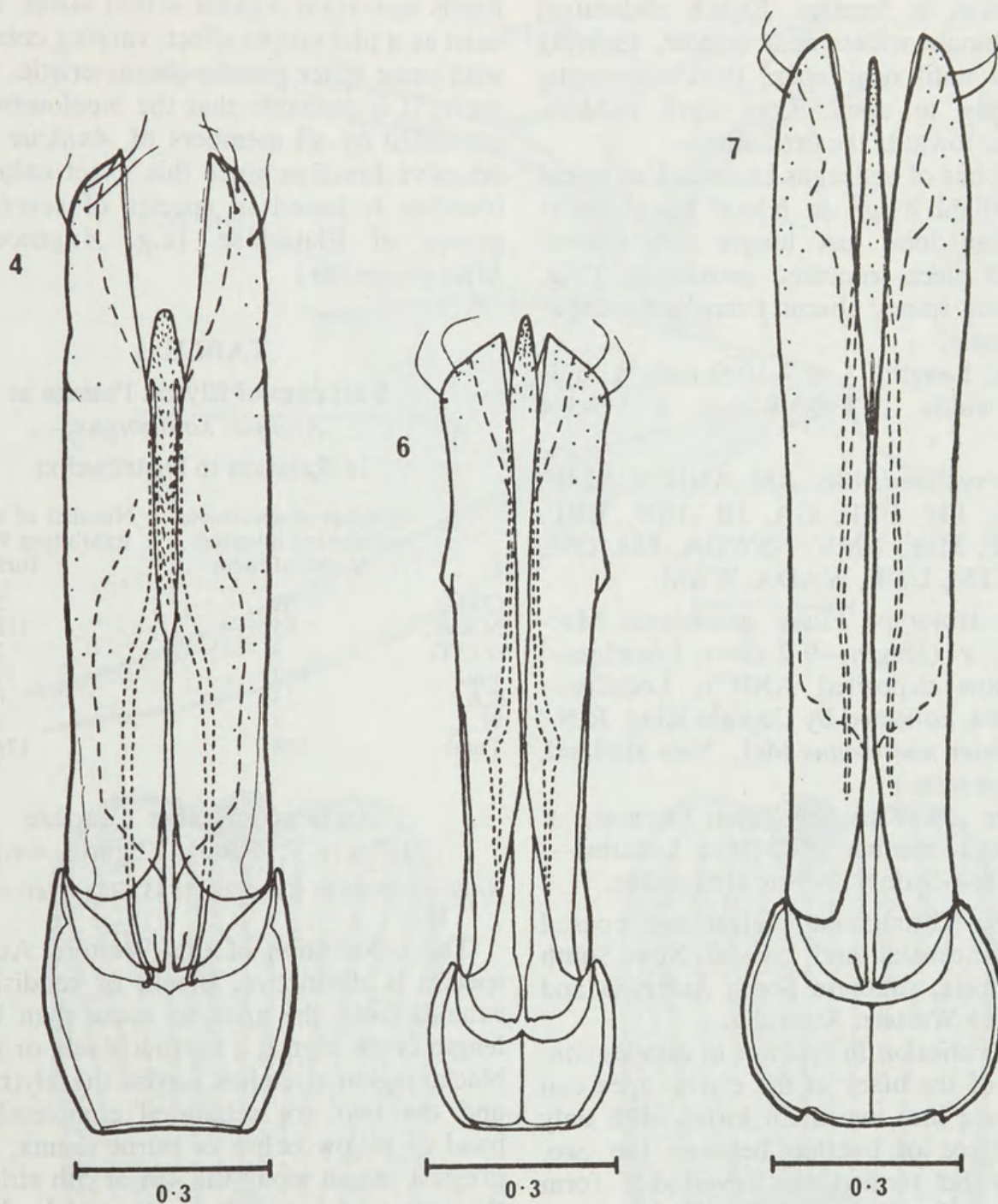
Antennae black, about same length as pronotum. Mandibles with indistinct, or no, incisor cusp on inner margin.

Pronotum about as long as wide (length and width measured medially), widest posteriorly across apices of carina, parallel-sided posteriolaterally, tapering curvilinearly anteriorly; punctures separated by a distance less than their diameters; median sulcus canaliculate; hind angles short, of varying width, carina divergent (Fig. 8).

Mesoscutellum convex, of varying shape, arcuate or indented on posterior margin. Elytra more than twice as long as pronotum, basal width equal to widest part of pronotum, almost parallel-sided for basal two-thirds of length, curvilinearly tapered to apex. Venation of hind wing similar to that of *A. attenuatus* (Fig. 5) and other *Anilicus* species.

Seventh abdominal sternite sexually dimorphic, apex more carinate and mucronate

Figures 4-7—5-7—*Anilicus attenuatus* Cand.—4—
aedeagus; 5—wing venation; *Ani-*
licus xanthomus (Macl. W. S.)
—6—aedeagus; *Anilicus loricatus*
Cand.—7—aedeagus.



in males than in females. Eighth abdominal tergite of female widest near middle, tapering rectilinearly until near apex, then converging more sharply to apex. Legs dark reddish-brown, paler towards the extremities.

Lateral lobes of aedeagus expanded at apical end, with slight bulge on lateral margin near apex; median lobe just longer than lateral lobes; basal piece truncated proximally (Fig. 6). Chitinous spines absent from bursa copulatrix of female.

Dimensions: Length, ♂ 6.4-10.9 mm, ♀ 6.3-12.3 mm; width, ♂ 1.8-3.0 mm, ♀ 1.8-3.4 mm.

Specimens examined: 486: AM, ANIC, CALIF, DGB, ETS, FH, FTF, GA, JB, JGB, KBL, MCZ, MGF, MJF, NMV, NSWDA, PM, QM, QU, SAM, TM, UNE, WADA, WAM.

Type data: Holotype *Elater xanthomus* Macleay, W. S., ♀ (length—9.2 mm); Location—MACL (now deposited ANIC); Locality—New Holland, collected by Captain King, R.N., labelled '*Elater xanthomus* McL. New Holland, King'. (Type seen.)

Lectotype *Ampedus semiflavus* Germar, ♂ (with printed number '43510'); Location—ZM; Locality—Sydney, Novae Hollandiae.

Distribution: Throughout central and coastal Queensland, central and coastal New South Wales, Victoria, southern South Australia and south-western Western Australia.

Phenotypic variation in relation to distribution: The shape of the black at the elytral apex can be partitioned into two main forms, with only a small degree of overlap between the two. These may be termed the inverted-V form (Fig. 9) and the W form (Fig. 10). A count was made of the number of specimens in each state or territory that exhibited each elytral pattern (Table 1). From Table 1 it can be seen that the distribution of the two elytral forms varied between the states. The inverted-V form was more prevalent among specimens from Queensland, Victoria and South Australia, whereas specimens collected in New South Wales displayed the reverse trend.

The biological significance of these recorded trends in elytral marking is unknown. It is probably associated with environmental condi-

tions in certain regions within states, and may exist as a pleiotropic effect, varying coincidentally with some other genetic characteristic. Furthermore, it is probable that the bicolourous elytra possessed by all members of *Anilicus* have an adaptive function since this exact colour combination is found in species of several other genera of Elateridae (e.g. *Augenotus* and *Melanoxanthus*).

TABLE 1
Variation of Elytral Pattern in
Anilicus xanthomus
in Relation to Distribution

	Number of specimens exhibiting inverted- V elytral form	Number of specimens exhibiting W elytral form
Q'ld	89	2
N.S.W.	65	118
A.C.T.	9	2
Vic.	117	53
S.A.	25	0
W.A.	3	3
Total	308	178

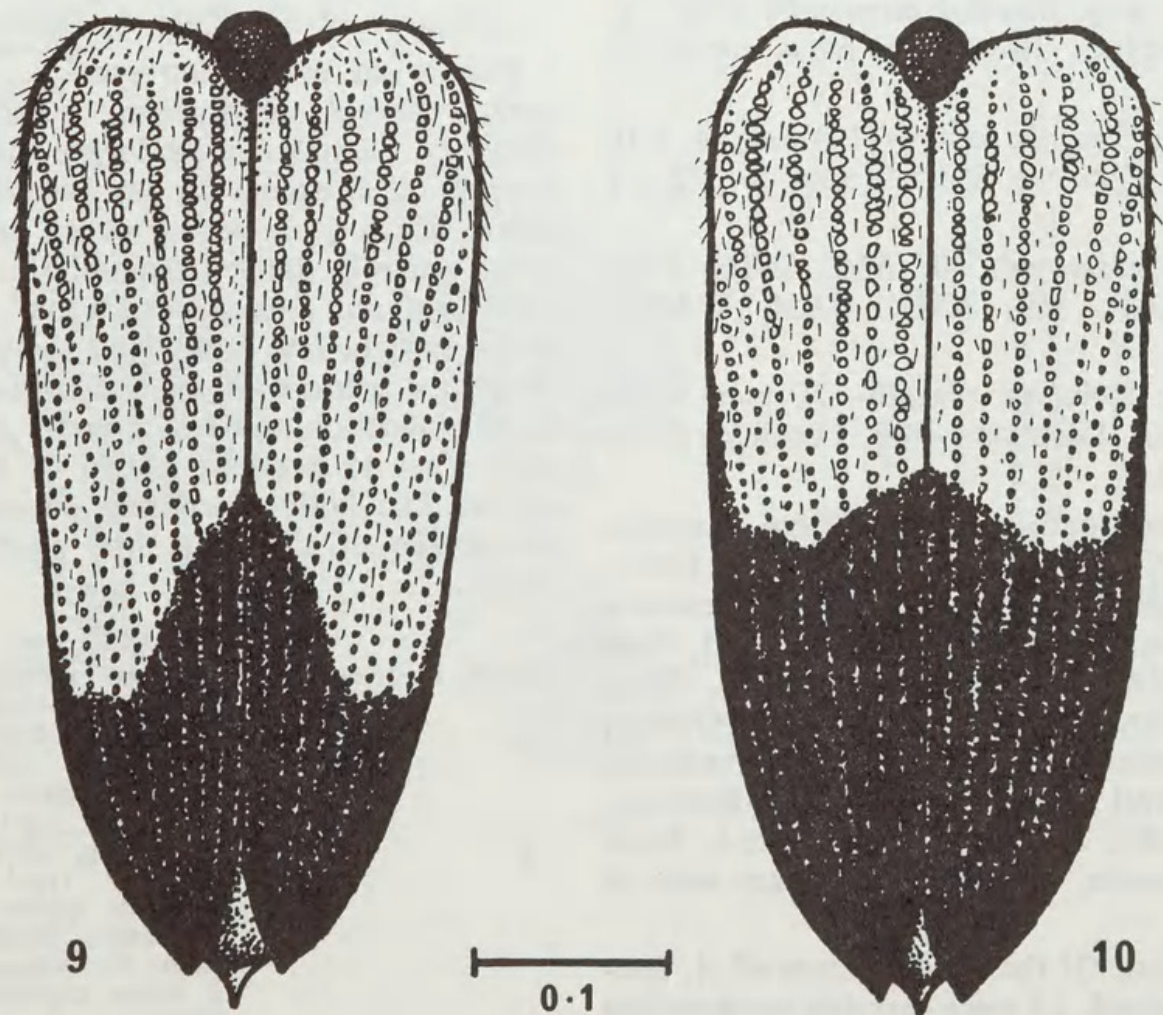
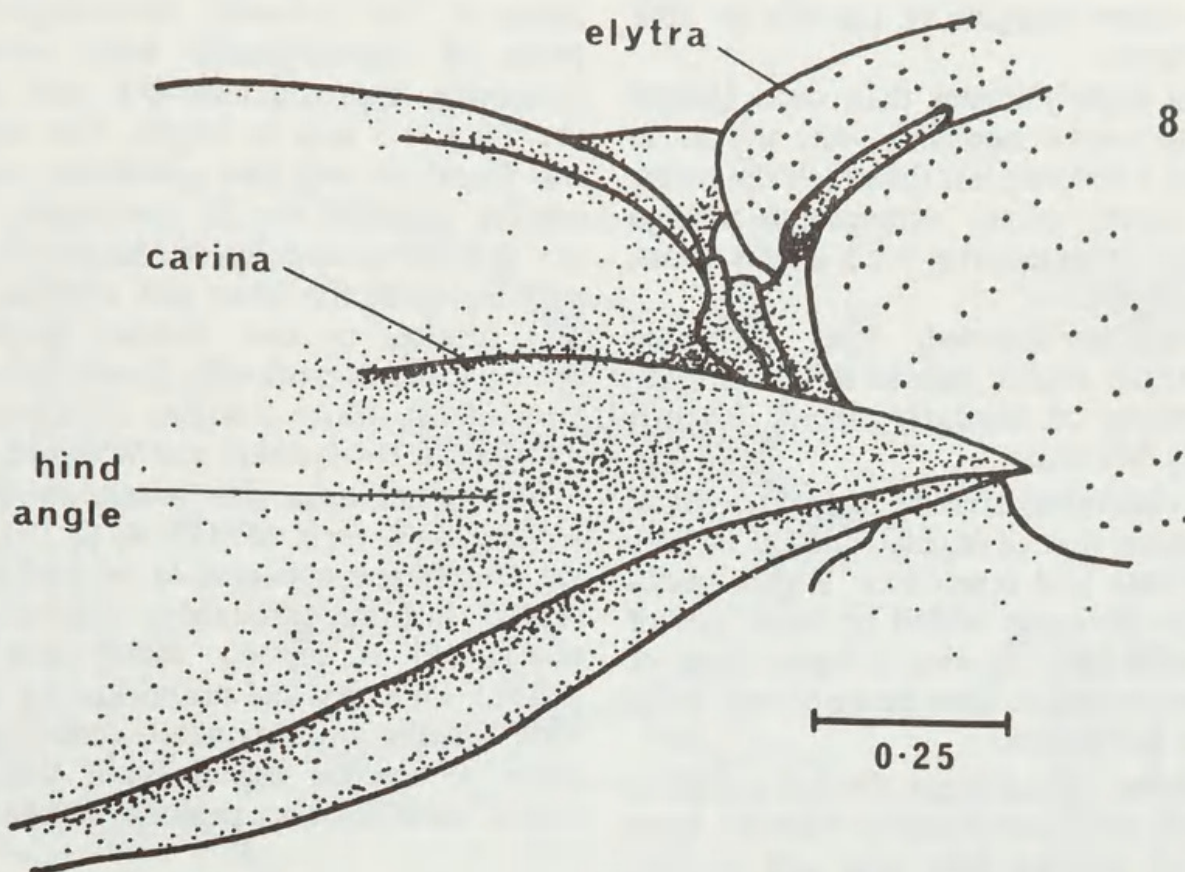
***Anilicus loricatus* Candèze**
(Figure 7; Plate 4, figures 4-6)

Anilicus loricatus Candèze, 1863: 331; Neboiss, 1956: 58.

The colouration of this Western Australian species is distinctive. Black, or reddish-black, extends from the apex to more than half the length of the elytra; a narrow black, or reddish-black, region stretches across the elytral base, and the two are separated completely by a band of yellow ochre or burnt sienna, with its greatest length along the 4th or 5th striae from the suture; elytra entirely covered by black to reddish-black pubescence. The Latin trivial name *loricatus* means 'clad in mail'. Sexual dimorphism present.

Antennae black, or black with a reddish tinge, shorter than pronotum in both sexes (pronotum measured medially), segments

Figures 8-10—*Anilicus xanthomus* (Macleay, W. S.)—8, lateral view of pronotum depicting hind angle; 9, inverted-V form of elytral marking (♂ from Mangrove Mt. Rd., Calga, N.S.W., JB); 10, W form of elytral marking (♂ from Kiata, Vic., NMV).



robust, the outer margins of the 4th to 10th segments convex.

Pronotum slightly longer than wide (length and width measured medially), with punctures separated by a distance less than their diameters and with short, coarse pubescence; median sulcus indistinct anteriorly; hind angles short, strongly divergent.

Mesoscutellum flattened, level with the elytra, elongate. Elytra parallel-sided for two-thirds of length, curvilinearly tapered towards apex, hardly divaricate.

Seventh abdominal sternite of male carinate and mucronate, that of female rounded or only weakly carinate and mucronate. Eighth abdominal tergite of female widest on basal side of middle, rectilinearly tapering to apex. Legs of a deep burnt sienna to deep ochre colour, paler towards the extremities.

Lateral lobes of aedeagus diverging slightly towards the apex, curvilinearly tapered close to the apex; median lobe long and slender, slightly shorter than lateral lobes; basal piece wider than long, rounded proximally (Fig. 7). Chitinous spines absent from bursa copulatrix of female.

Dimensions: Length, ♂ 8.4–11.0 mm, ♀ 8.0–11.0 mm; width, ♂ 2.3–3.0 mm, ♀ 2.2–3.1 mm.

Specimens examined: 40. AM, ANIC, ETS, JGB, MACL, MF, NMV, SAM, WADA, WAM.

Type data: Holotype (length—10 mm, width—2.5 mm); Location—BM; Locality—Swan River, W.A.

Distribution: South-western Western Australia—Beverley, Bullsbrook (Nov.), Bunbury (Jan.), Capel District (Jan.), Darlington, Denmark (Jan.), Dunsborough, Fremantle (Aug.), Glen Forrest, Hamel, Jurien Bay (Dec.), King George's Sound, King's Nat. Park (Nov.), Lake Austin, Mount Barker, Mundaring (Oct.), Naval Base (Dec.), Pinjarra, Rockingham (April), Stirling Ranges (Dec.), Swan River, Tammin, Wannamal—6.5 km west of (Dec.).

Ectoparasites: Of the 40 specimens of *A. loricatus* examined, 25 were carrying ectoparasitic

mites of the suborder Mesostigmata. Two types of mesostigmatid were present—one measuring approximately 0.6 mm in length, the other 0.3 mm in length. The larger form was found on only two specimens whereas the smaller occurred on 25 specimens, including the two parasitized by the larger mite. These may represent the adult and nymphal stage of one species, or two distinct species. Both belong to the superfamily Uropodoidea, family Uropodidae, which contains 15 known genera (Tragardh, 1844; Baker and Wharton, 1952).

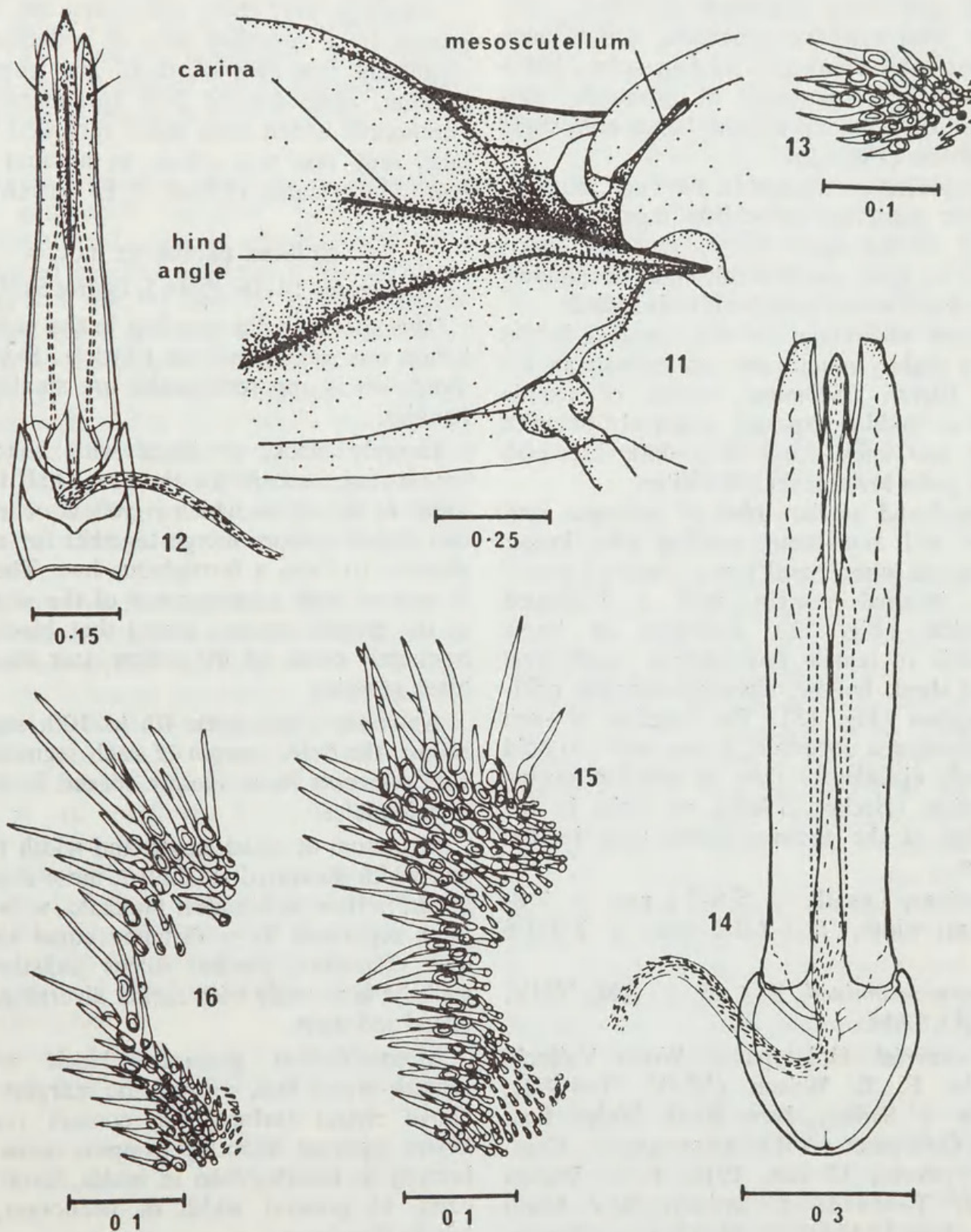
The larger mite was found on the dorsal surface of *A. loricatus* (Pl. 4, fig. 5), whereas the smaller one appeared to be confined to the ventral surface, particularly that of the prothorax (Pl. 4, fig. 6). Baker and Wharton (1952) state that the uropodids are of world-wide distribution, frequently attaching themselves to insects, especially in the nymphal stages. Their hosts are probably not harmed.

Anilicus rectilineatus sp. nov.

(Figures 11–13; Plate 5, figures 7–8)

This is an uncommon species. It exhibits marked sexual dimorphism, notably a size difference (females being larger than males). Entirely black except for the basal half of the elytra, which is a yellow ochre colour. The trivial name is derived from the Latin *rectus*—‘straight’ and *lineatus*—‘of a line’, and refers to the straight line formed by the junction of the yellow ochre with the black on the elytra. At this junction the two colours merge into each other to produce a line of ferruginous colour. The body is entirely covered with a pubescence of the same hue as the ground colour.

Figures 11–13—14–16—*Anilicus rectilineatus*, sp. nov.—11, lateral view of pronotum depicting hind angle; 12, aedeagus; 13, chitinous spines of ♀ bursa copulatrix; 14–16, *Anilicus parvus*, sp. nov.—14, aedeagus of ‘type’ form; 15, chitinous spines of ♀ bursa copulatrix, inland or ‘type’ form; 16, chitinous spines of ♀ bursa copulatrix, coastal form.



Antennae black, with 4th to 10th segments long, slender and triangular in the male, slightly more rounded in the female.

Pronotum only slightly longer than wide (length and width measured medially), quite convex, with punctures separated by a distance less than their diameters; median sulcus indistinct anteriorly; posterior of pronotum with carina close to lateral margin, hence hind angle very narrow (Fig. 11).

Mesoscutellum triangular, flattened, narrow, with the posterior two-thirds tapering rectilinearly to the apex. Elytra tapering curvilinearly to apex, basal width equal to greatest width of pronotum, apex hardly divaricate.

Seventh abdominal sternite rounded in the female, slightly mucronate and carinate in the male. Eighth abdominal tergite of female widest at middle, tapering concavely between middle and apex. Legs of a dark brownish colour, paler towards the extremities.

Lateral and median lobes of aedeagus very slender and acuminate; median lobe longer than lateral lobes; basal piece truncated proximally, internal margin with a V-shaped depression (Fig. 12). Entrance of bursa copulatrix of female possessing a small, oval area of short, hollow, inwardly-directed, chitinous spines (Fig. 13). The function of such sclerotization is uncertain; it may serve to hold the male ejaculatory duct in position during copulation (Becker, 1956), or assist in the retention of the spermatophore after its deposition.

Dimensions: Length, ♂ 5.8–7.1 mm, ♀ 7.8–8.6 mm; width, ♂ 1.7–2.1 mm, ♀ 2.3–2.6 mm.

Specimens examined: 8 ♂, 5 ♀. AM, NMV, QM, QU, SAM.

Type material: Holotype ♂ Woori Yallock, Victoria. F. E. Wilson (NMV: T-4580); allotype ♀ Sydney, New South Wales. Lea. Elston Collection (AM); paratypes—♂ Caulfield, Victoria, 17 Jan. 1918. F. E. Wilson (NMV: T-4581); ♂ Sydney, New South Wales. Lea (SAM); ♀ Stanthorpe, Queensland, E. Sutton Collection, donated Dec. 1964 (QM: T-7231).

Distribution: Reported only from Alexandra

(April), Caulfield (Jan.), East Warburton (Mar.) and Woori Yallock in Victoria, from Sydney in New South Wales, and from Brisbane and Stanthorpe in Queensland.

Although only three specimens are accompanied by a recorded date of collection it is significant that two of these are from early autumn, since out of 208 specimens of *A. xanthomus* which have dates recorded on the label only one was caught in autumn (Brisbane, Queensland, 12 Mar., F. E. Wilson).

Anilicus parvus sp. nov.

(Figures 14–16; Plate 5, figures 9–10)

This species is the smallest in the genus and hence was named *parvus* ('little'). Sexual dimorphism is apparent; males are smaller than females.

Entirely black, or black with a reddish-brown tinge, except for the basal half to two-thirds of the elytra which is yellow ochre. The two elytral colours merge together for a short distance to form a ferruginous hue. The body is covered with a pubescence of the same hue as the ground colour, except that black hairs frequently occur on the yellow near the apical black marking.

Antennae black, with 4th to 10th segments robust, the outer margin of each segment convex, segments more closely spaced in females than in males.

Pronotum of equal length and width (length and width measured medially), more depressed in males than in females; punctate, with punctures separated by a distance equal to their own diameters; median sulcus indistinct anteriorly; hind angle with carina diverging, angle broad and short.

Mesoscutellum generally black with a reddish-brown hue, convex, the margins raised above elytral surface, the corners rounded. Elytra tapering smoothly to apex, more curvilinearly in females than in males, basal width equal to greatest width of pronotum, apex hardly divaricate.

Sexual dimorphism of seventh sternite not apparent. Eighth abdominal tergite of female widest in basal half, tapering more or less curvi-

linearly to apex. Legs sienna brown, paler towards the extremities.

Lateral lobes of aedeagus of nearly equal width over entire length, curvilinearly tapered close to apex; median lobe shorter than lateral lobes; basal piece rounded at proximal end (Fig. 14). Female possessing an irregular crescent-shaped area of hollow chitinous spines at entrance of bursa copulatrix (Figs. 15 and 16).

Phenotypic variation: This species appears to exhibit geographic variation. Two forms can be distinguished—one is characterized by a pronounced blackish inverted-V at the elytral apex (Pl. 5, fig. 9) and by more numerous chitinous spines covering a larger area of the entrance to the bursa copulatrix of the female (Fig. 15); the second form has the black marking terminating in a nearly straight line at its junction with the yellow ochre of the elytra (Pl. 5, fig. 10) illustrates an extreme variant of this character) and the bursa copulatrix of the female has fewer chitinous spines (Fig. 16).

The intraspecific variation appears to coincide with an inland or mountainous (inverted-V form of elytral marking, more numerous spines on ♀ bursa copulatrix) as opposed to a coastal, habitat. North-south variation may also be involved as two specimens from A.C.T. and one from Victoria are all of the second form, as are specimens from the vicinity of Sydney and Brisbane.

The inadequate sample size prevents any definite conclusions being drawn concerning the relationship between this phenotypic variability and the distribution of the species. There is a scarcity of small specimens of *Anilicus* in loan collections.

Dimensions: Length, ♂ 5.3–6.8 mm, ♀ 6.7–7.9 mm; width, ♂ 1.5–2.0 mm, ♀ 2.0–2.2 mm.

Specimens examined: 22 ♂, 6 ♀. AM, ANIC, CALIF, JA, MACL, MCZ, NMV, QM, QU, SAM.

Type material: Holotype ♂ Jandowae, Queensland, Dec. 1926. Mr Hobler (NMV: T-4582); allotype ♀ Jandowae, Queensland, Dec. 1926. Mr Hobler (NMV: T-4583); paratype ♂

Bogan River, New South Wales. J. Armstrong (NMV: T-4584).

Coastal form not selected as paratypes since these two forms may prove to be sibling species — ♂ Hunter River, New South Wales (NMV); ♀ Maitland, New South Wales, 19 Nov. 1951 (NMV); ♀ Hornsby, New South Wales (AM).

Distribution: Queensland—Brisbane (Feb.), Clermont (Jan.), Dalby, Bunya Mountains (Jan.), Jandowae (Dec.), Millmerran (Dec.). New South Wales—Bogan River, Hornsby (Nov.), Hunter River, Maitland (Nov.), Reedy Creek (near Inverell, Nov.), Wilson's Downfall (Nov.). Australian Capital Territory—Black Mountain (Jan.). Victoria—Tambo Crossing (Jan.).

Genus *Augenotus* gen. nov.

(Figures 17–22)

Type species: *Melanoxanthus quadriguttatus* Erichson (present designation).

Species of medium size, measuring 8.0 mm to 13.6 mm in length, elongate and bicoloured. Sexual dimorphism present. Females generally larger and more robust than males.

Head black to blackish-ferruginous, approximately square in shape; frons moderately punctate, covered with a brownish pubescence, anterior margin tapering to a rounded point. Mandibles bidentate. Terminal segment of maxillary palps dolabriform. Labrum wider than long. Antennae black, of moderate length, as long as the pronotum in females, longer in males; 1st segment thickened, 2nd very short, rounded and longer in females than in males, 3rd slightly longer and more triangular than second, 4th to 10th segments flattened, triangular and subequal, 11th (terminal) segment elongate.

Prothorax longer than wide (length and width measured medially), appreciably narrowed anteriorly in males, almost parallel-sided in females, subconvex, more depressed in males (Fig. 17) than in females, nitid, sparsely punctate and covered with a fine pubescence; median sulcus indistinct; hind angles narrow, with carina hardly divergent in

females, more so in males. Prosternal lobe almost straight anteriorly, antennal grooves absent; lateroposteriorly directed projection present on posterior margin of propleuron; prosternal process laterally compressed on ventral side, widened dorsally.

Mesoscutellum elongate, flattened, widest points at base and middle, broader in females than in males. Elytra more than twice as long as prothorax, as wide as widest part of prothorax, parallel-sided as far as the middle, curvilinearly tapered to the apex, the latter rounded. Elytral surface nitid, striae formed by single rows of punctures, intervals slightly convex, lightly pubescent, 3rd interval forming a raised ridge anteriorly. Venation of hind wing (Fig. 18) similar to that in *Anilicus* Candèze.

Underside of body and legs black to ferruginous, moderately punctate, covered with fine golden brown hairs. Seventh abdominal sternite rounded in both sexes. Tibia bearing two ventral spines at distal end. Tarsi simple, filiform, segments decreasing in length from the 1st to the 4th, the 5th as long as the 1st; two equal claws.

Lateral lobes of aedeagus with large apical hook bearing setae; median lobe acuminate, extending beyond apices of lateral lobes, apex slightly deflected ventrally; furca wide and short (Figs. 20-22). Bursa copulatrix and spermathecal duct of female internal reproductive organs bearing large areas of chitinous spines.

The generic name is derived from the Greek words 'auge' meaning 'shine' or 'lustre', and 'notos' meaning 'back'. The name refers to the shine of the pronotal and elytral cuticle.

KEY TO SPECIES OF *AUGENOTUS*

- 1—Elytra blackish with four ferruginous spots, two basal and two towards the middle. . . .
A. quadriguttatus (Erich.)
- Elytra bicoloured, but lacking spots 2
- 2—Elytra yellow ochre to ferruginous with blackish suture and apical margin.
A. australis (Cand.)
- Elytra with basal third to two-thirds orange ochre to burnt sienna colour, remainder black. *A. aurantius* sp. nov.

Distribution: Tasmania (Fig. 19), Victoria, South Australia, New South Wales, and Queensland.

Augenotus quadriguttatus (Erichson), comb. nov.

(Figures 17-20; Plate 6, figures 15-16)

Melanoxanthus quadriguttatus Erichson, 1842: 139;
Candèze, 1859: 520; Lea, 1908: 157.

Anilicus quadriguttatus, Candèze, 1863: 332; Neboiss, 1956: 58; 1961: 27.

The trivial name of this species is derived from the Latin *quadri*—'four' and *guttatus*—'spotted', referring to the ferruginous markings on the elytra. There are two small basal ferruginous spots on each side of the mesoscutellum, and two larger areas on either side of the suture near to the middle. The colour of these maculae varies from yellow ochre to burnt sienna; the elytral black frequently possesses a reddish tinge.

Head, antennae and pronotum blackish; the pronotum of some specimens possessing ferruginous bands on the lateral margins.

Dimensions: Length, ♂ 9.1-12.0 mm, ♀ 11.2-13.6 mm; width, ♂ 2.2-2.9 mm, ♀ 2.8-3.3 mm.

Specimens examined: 10 ♂, 10 ♀. MCZ, NMV, PM, QM, SAM, UT.

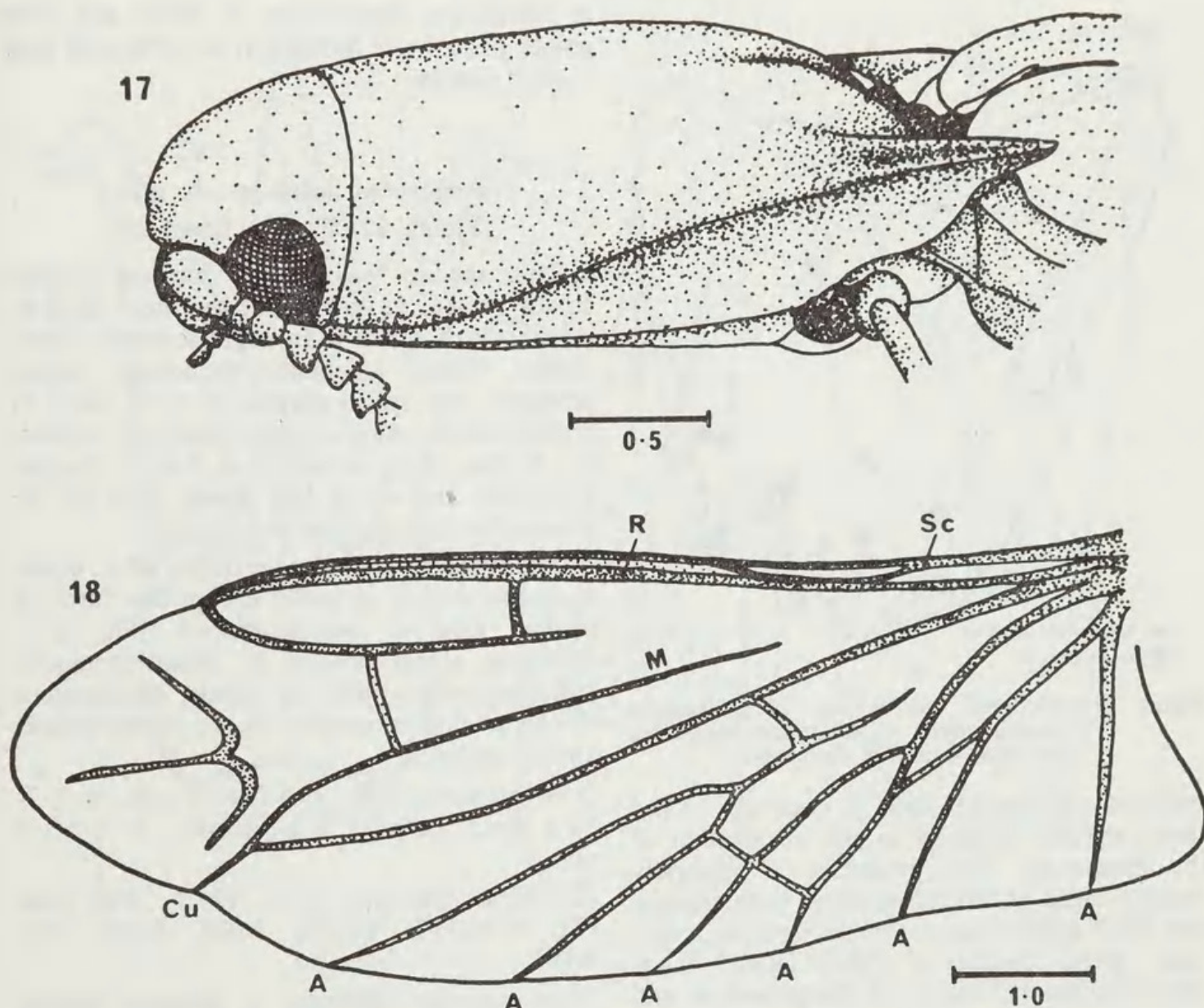
Type data: Location—ZM; Locality—'Tasmanie'.

Distribution: Tasmania (Fig. 19)—Cradle Mountain (Jan.), Lake St Clair—Cynthia Bay (Jan.), Frankford, Huon River, King Island (Dec.), Kingston Nat. Park (Jan.), Lake Pedder (Jan.), Sheffield (Dec.), Tewkesbury (Jan.), Tyenna (Dec.), Waratah, Wedge Bay (Jan.), Hartz Mt. (Feb.).

Augenotus australis (Candèze), comb. nov. (Figures 19, 21; Plate 6, figures 17-19)

Melanoxanthus australis Candèze, 1859: 520;
Neboiss, 1956: 37; 1961: 17; Zwaluwenburg, 1959: 385.

The trivial name of this species is Latin for 'southern', indicating its Tasmanian distribution. This species is similar to *A. quadriguttatus* in many respects, but is notably different in its elytral markings. The elytra are mostly yellow



Figures 17–18—*Augenotus quadriguttatus* (Erich.)
—17, ♂ pronotum and head, lateral view; 18, wing venation.

ochre to burnt sienna, with a darker area just posterior to the mesoscutellum; the mesoscutellum, suture and apical margins are black to reddish-black.

Head, antennae and pronotum black to reddish-black; pronotum exhibiting some colour variation as in *A. quadriguttatus*.

Lateral lobes of aedeagus (Fig. 21) with greater indentation below apical hook than in *A. quadriguttatus* (Fig. 20).

Dimensions: Length, ♂ 9.3–11.8 mm, ♀ 10.8–13.5 mm; width, ♂ 2.2–3.1 mm, ♀ 2.6–3.4 mm.

Specimens examined: 16 ♂, 8 ♀. ANIC, BM, FH, HOWITT, NMV, SAM, TDA.

Type data: Holotype probably ♀ (length, 10 mm), id. Candèze. Labelled 'type' (Fleutiaux's label). Location—PARIS (box 172); no locality.

Distribution: Tasmania (Fig. 19)—Buckland, Cressy (Jan.), Devonport, Hobart (Jan.), Huon River, Mount Barrow (Jan.), Orford (Jan.), Russell Falls (Dec.), Ulverstone, Wedge Bay (Jan.), Wilmot.

One ♂ specimen has a doubtful locality label—'Melbourne/Janson Coll. ex Candèze 1903' (BM).

Pronotal colour variation in the Tasmanian species: The Tasmanian species *A. quadri-*



Figure 19—Recorded distribution of *Augenotus quadriguttatus* (Erich.) and *Augenotus australis* (Cand.) in Tasmania.

guttatus (Erichson) and *A. australis* (Candèze) exhibit variation in the colouration of the pronotum. The pronotum is generally entirely black or reddish-black in both species, but some specimens possess ferruginous markings. These consist of either lateral bands extending the full length of the pronotum and widening posteriorly (Pl. 6, fig. 19), or of small ferruginous areas immediately anterior to the carina. One specimen of *A. australis* (♂, Buckland) has an entirely ferruginous pronotum.

Specimens with pronotal colouration appear to be confined to eastern Tasmania, being most common in the south-east within about 50 km of Hobart. Pronotal markings are absent from specimens collected from areas further south (Huon River), south-west (Lake Pedder) and north-west (Cradle Mt., Lake St. Clair-Cynthia Bay, Devonport, Ulverstone).

This phenotypic variation is possibly related to climatic and vegetational factors. Guiler (1953) observed a similar phenomenon in the brush possum *Trichosurus vulpecula* (Kerr),

in which the distribution of black and grey colour phases was thought to be correlated with rainfall pattern.

Augenotus aurantius sp. nov.

(Figure 22; Plate 6, figure 20)

This species was named for the orange colour present on the elytra, the basal third to two-thirds of which is an ochre to burnt sienna colour. Head, antennae, pronotum, meso-scutellum and apical portion of elytra black to reddish-black; black of elytra generally extending further along suture than lateral margin. Pronotum and elytra less glossy than in the Tasmanian species; more pubescent.

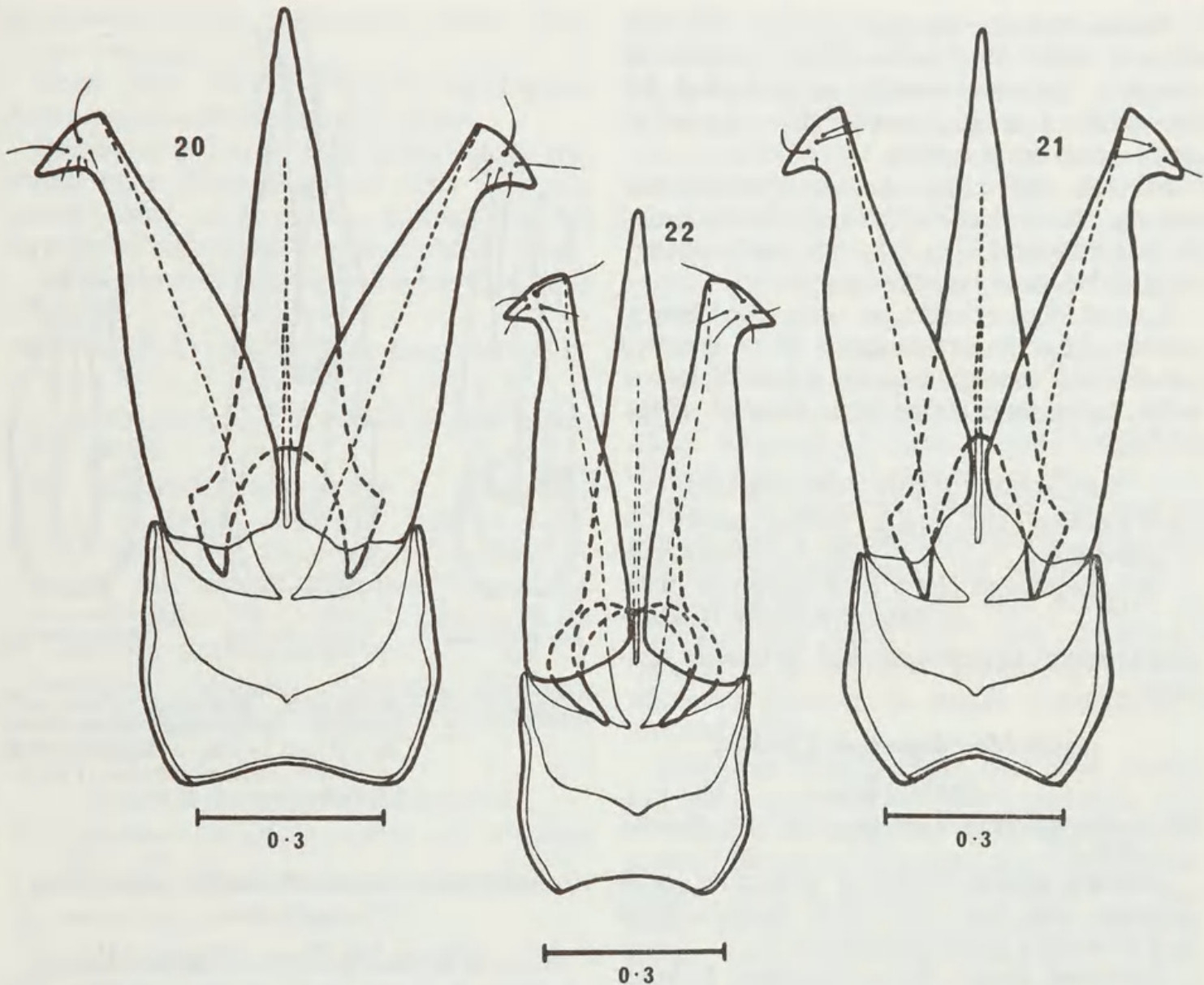
Aedeagus basically similar to that of *A. quadriguttatus* and *A. australis*, except that furca of median lobe is crescent-shaped (Fig. 22). Chitinous spines present in bursa copulatrix and spermathecal duct of female, arrangement similar to that of females of *A. quadriguttatus* and *A. australis*.

Dimensions: Length, ♂ 8.0–11.5 mm, ♀ 8.7–12.8 mm; width, ♂ 2.1–3.0 mm, ♀ 2.2–3.3 mm.

Specimens examined: 8 ♂, 18 ♀. AM, BM, FH, HOWITT, MACL, MCZ, NMV, QU, SAM.

Type material: Holotype ♂ Buxton, Marysville, Victoria, 10 Feb. 1921, Blackwood (NMV: T-4585); allotype ♀ Wingan River, Victoria, 26 Dec. 1914, E. T. Smith (NMV: T-4586); paratypes—♂ Erinundra Plateau, 48 km north of Club Terrace, Victoria, 3 Feb. 1970, Howick (NMV: T-4587); ♂ Mount Lofty, South Australia, J. G. O. Tepper (SAM); ♀ Gippsland, Victoria, (NMV: T-4588); ♀ Sherbrooke Forest, Belgrave, Victoria, 29 Dec. 1931, A. Musgrave (AM).

Distribution: Queensland—Nat. Park (not specified). New South Wales—Blue Mountains (Dec.), Mount Kosciusko (1,500 m, Dec.), Tumut Ponds (Feb.). Victoria—Buxton (Feb.), Erinundra Plateau (Feb.), Gippsland, Mordialloc (Melbourne), Sherbrooke Forest (Belgrave, Dec.), Wingan River (Dec.).



Figures 20-22—*Augenotus quadriguttatus* (Erich.)—20, aedeagus; *Augenotus australis* (Cand.)—21, aedeagus; *Augenotus aurantius*, sp. nov.—22, aedeagus.

Genus *Anilicoides* Candèze (Figures 23-24)

Anilicoides Candèze, 1895: 52; Neboiss, 1956: 57.

Type species: Anilicoides depressus Candèze (by monotypy).

This genus has affinities with *Anilicus* Candèze from which members of *Anilicoides* Candèze are distinguished by their depressed thorax and abdomen, distinctive flattening of the posterior region of the pronotum, absence of a basal incisure internal to the carina, shape of the antennal segments (segments more

serrate in *Anilicus*) and mesoscutellum, and morphology of the aedeagus.

Frons densely punctate, anterolateral margin with ridge above antennae. Terminal segment of maxillary palps dolabriform. Antennae with 1st segment thickened, 2nd and 3rd small, rounded, of similar size, 4th to 10th segments triangular, subequal, with rounded vertices, 11th segment elongate.

Pronotum as wide as long (length and width measured medially), depressed, parallel-sided posteriorly, curvilinearly tapered anteriorly; posterior margin flattened, basal incisure of carina absent; median sulcus absent. Prosternal lobe arcuate anteriorly; prosternal suture with grooves for reception of antennae present anteriorly as in *Anilicus*.

Mesoscutellum elongate, oval, punctate, covered with long hairs. Elytra depressed, elongate, punctate striate, parallel-sided for two-thirds of length, curvilinearly tapered to apex; apices not divaricate.

Seventh abdominal sternite rounded posteriorly. Tarsi thickened, segments decreasing in length from 1st to 4th, 5th approximately equal in length to 1st; claws simple.

Lateral lobes of aedeagus with apical hooks; median lobe broad, tapering to a rounded point which extends beyond apices of lateral lobes; furca short; basal piece truncate (Figs. 23-24).

KEY TO SPECIES OF *ANILICOIDES*

- 1—Pronotum and elytra golden brown or testaceous *A. depressus* Cand.
—Pronotum and elytra dark brown to black *A. haemorrhoidalis* (Cand.)

Distribution: Queensland and Western Australia.

Anilicoides depressus Candèze

(Figure 23)

Anilicoides depressus Candèze, 1895: 52; Neboiss, 1956: 57.

Entirely golden brown or testaceous, with antennae and legs paler than body; clothed in a semi-erect golden pubescence.

Antennae longer than pronotum. Labrum wider than long.

Pronotum punctate, depressions of moderate size, separated by a distance about equal to their diameters; hind angle with carina rounded and very close to the lateral margin, slightly divergent.

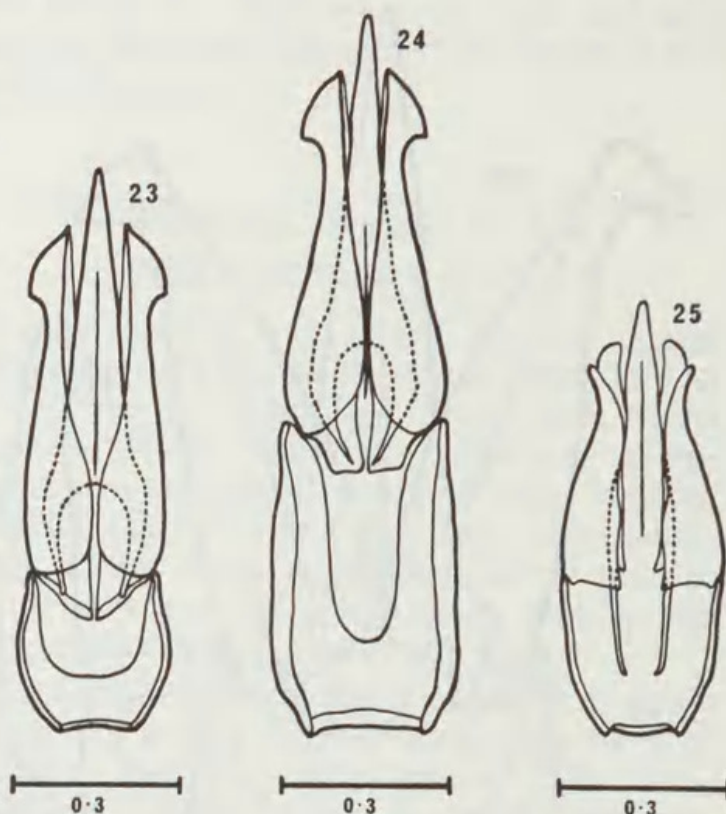
Aedeagus (Fig. 23) with basal piece approximately equal in length and width.

Dimensions: Length, 8.0-10.7 mm; width, 2.2-2.4 mm.

Specimens examined: 2 ♂, 1 of undetermined sex (probably ♀). AM, BM, NMV.

Type data: Holotype ♂ (length, 10.0 mm; width, 2.25 mm). Location—IRSNB; Locality—Peak Downs, Australia.

Distribution: Queensland—Clermont (♂), one specimen labelled 'N. Holl. Q'land'; another unlabelled.



Figures 23-25—*Anilicoides depressus* Cand.—23, aedeagus; *Anilicoides haemorrhoidalis* (Cand.)—24, aedeagus; *Melanoxanthus melanocephalus* (Fab.)—25, aedeagus.

Anilicoides haemorrhoidalis (Candèze), comb. nov.

(Figure 24; Plate 5, figure 11)

Anilicoides haemorrhoidalis Candèze, 1889: 120; Neboiss, 1956: 58.

This species was placed in *Anilicoides* by Candèze, who distinguished it from other members of this genus by its more uniform dorsal colouration and the reddish colour of the last two abdominal segments, the name *haemorrhoidalis* being derived from the Greek words for 'red' and 'rump'. However, the morphological features of this species are sufficiently distinct to necessitate its removal from *Anilicoides* Candèze. Its true affinities appear to lie with *Anilicoides depressus* Candèze. The genus *Anilicoides* Candèze has thus been redescribed to include *Anilicoides haemorrhoidalis* Candèze.

Head, pronotum, mesoscutellum, elytra and underside of body of a deep brownish-black; antennae and legs golden brown to testaceous; 6th and 7th abdominal sternites reddish-

ferruginous; coarse, semi-erect, golden pubescence over entire body.

Head with small, hemispherical labrum. Antennae equal in length to pronotum.

Pronotum punctate, depressions small, separated by a distance greater than their diameters; hind angle short, carinate, hardly divergent. Prosternal suture of a reddish colour.

Basal piece of aedeagus longer than wide (Fig. 24).

Dimensions: Length, 6.5-7.8 mm; width, 1.8-2.2 mm.

Specimens examined: 6. Sexes undetermined. NMV, SAM.

Type data: Holotype probably ♀. Location—IRSNB; Locality—Australia, labelled 'Australia/Collection E. Candèze/*Anilicus haemorrhoidalis* Cd. det. E. Candèze/Type/n. sp. *haemorrhoidalis* Cdz. Austral.', (the last label in Candèze's own handwriting).

Distribution: Western Australia—Guildford (Oct.), Pinjarra (Type comparison by Neboiss), 3 unlabelled.

Genus *Melanoxanthus* Eschscholtz

Melanoxanthus Eschscholtz, 1836: tab; Candèze, 1859: 510.

Type species: *Elater melanocephalus* Fabricius (by monotypy; see Hyslop, 1921).

Melanoxanthus melanocephalus (Fabricius)

(Figure 25; Plate 5, figure 12)

Elater melanocephalus Fabricius, 1781: 272; 1801: 239; Neboiss, 1956: 37.

Elater nigroterminatus Macleay, W. S., 1827: 441, syn. nov.

Melanoxanthus melanocephalus, Candèze, 1859: 512; Zwaluwenburg, 1942: 53; 1959: 387, 390; Neboiss, 1961: 17.

Anilicus nigroterminatus, Candèze, 1891: 192; Neboiss, 1956: 58.

Zwaluwenburg (1959) provides descriptions and a key to some *Melanoxanthus* species in the Genoa Museum (Museo Civico di Storia Naturale 'Giacomo Doria', Genoa), from which it was found that *Anilicus nigroterminatus* (Macleay, W. S.) keyed out to be *Melanoxanthus melanocephalus* (Fabricius). In addition, Fabricius's original description (1781) of *Melanoxanthus melanocephalus* and a specimen identified by C. M. F. Hayek (BM) as *M. melanocephalus* (Fabricius) agree well

with W. S. Macleay's description and type specimen of *Anilicus nigroterminatus*, indicating the synonymy of the two species.

Description: Dark luteo-saffron yellow, sub-opaque, with dorsal surface of head, antennae, macula of pronotum, elytral apex and lateral margins of 6th and 7th abdominal sternites black to brownish-black; covered with a short, coarse pubescence of the same hue as the ground colour.

Head small, very rounded, densely punctate; anterior margin of frons tapering to a rounded point. Labrum small and hemispherical. Mandibles bidentate. Maxillary palps with long slender segments. Antennae as long as pronotum; 1st segment thickened, its anterior margin with a narrow longitudinal ridge, 2nd and 3rd segments small and rounded, 4th to 10th segments triangular and subequal at proximal end, equal and more rectangular distally, 11th segment hexagonal, parallel-sided for most of its length, tapering to a rounded point.

Pronotum slightly longer than wide (length and width measured medially), punctate, with the depressions separated by a distance equal to their diameters, diameters larger posteriorly; convex; median sulcus only distinct at posterior margin; hind angles hardly divergent, carina well-defined, close to lateral margin. Macula of pronotum sub-acuminate, widest at anterior margin, reaching beyond middle. Prosternal lobe arcuate anteriorly; prosternal grooves for reception of antennae absent; prosternal process long, narrow and punctate.

Mesoscutellum punctate, triangular, narrow and acuminate. Elytra punctate-striate, with single rows of regularly spaced circular punctures, parallel-sided for two-thirds of length, curvilinearly tapered to apex, the latter truncate and divaricate.

Seventh abdominal sternite rounded apically, or rounded but bearing a central inflection on distal margin.

Aedeagus (Fig. 25) with lateral lobes and basal piece fused; apices of lateral lobes bidentate, deflected ventrally; median lobe narrowing near middle, widening anteriorly, acuminate at apex, apex deflected ventrally;

basal piece about as long as lateral lobes and truncate at base. Bursa copulatrix of female without sclerotization.

Dimensions: Length, 7.0-9.1 mm; width, 1.7-2.3 mm.

Specimens examined: 9. MACL, NMV, SAM.

Type data: Holotype *Elater melanocephalus* Fabricius, sex undetermined (length, 9.4 mm). Location—BM (Banks collection); no locality label. The original description reads 'Habitat in Coromandel. Mus. Dom. Banks'.

Holotype *Elater nigroterminatus* Macleay, W. S. Location—MACL (now in ANIC); Locality—New Holland, labelled '*E. nigroterminatus* Mc.L. New Holland, Capt. King/*Anilicus nigroterminatus* W. S. MacL. Type. Australia'. (Actual type seen.)

Distribution: Cocos Keeling Is., Dili (Timor, Mar., at light), Java (Jan.-Feb.), Cape York Area or North Australian Coast, Ovalau (Fiji), Vitu Levu (Fiji). Zwaluwenburg (1942) wrote of *Melanoxanthus melanocephalus* (Fabricius) 'A single specimen was taken by Swezey in a house in Piti, Sept. 9, 1936. It occurs throughout the Pacific area, and westward to the islands of the Indian Ocean.' In 1959 Zwaluwenburg reported that a specimen in the Musée Nationale d'Histoire Naturelle, Paris, identified by Fleutiaux, was from New Zealand.

Remark: A single specimen of a species that is apparently closely related to *Melanoxanthus melanocephalus* (Fabricius) has been collected from Claudie River, North Queensland (NMV) (Pl. 5, fig. 13), and probably constitutes a new species. More material is required before a description can be made.

Genus *Acroniopus* Erichson

Atelopus Erichson, 1842: 142.

Acroniopus Erichson, 1843: 175; Neboiss, 1956: 62.

Type species: *Atelopus humilis* Erichson (original designation).

Acroniopus rufipennis Macleay, W. J.

Plate 5, figure 14)

Acroniopus rufipennis Macleay, W. J., 1872: 259; Carter, 1939: 326; Neboiss, 1956: 63.

Anilicus flavipennis Candèze, 1878: 192, syn. nov.; Neboiss, 1956: 58.

The proposed synonymy of *Acroniopus rufipennis* Macleay, W. J. and *Anilicus flavi-*

pennis Candèze is based on the examination of specimens compared with the types of both 'species' by Arturs Neboiss.

Head black to reddish-brown, punctate, pubescent and declined downward; frons ridged above antennae. Labrum small and hemispherical. Mandibles short, broad and acuminate. Maxillary palps slender, distal segment parallel-sided. Antennae ferruginous to brown, longer than pronotum; 1st segment thickened, 2nd and 3rd small and elongate, 4th to 10th segments elongate, triangular and subequal, 11th segment elongate.

Pronotum wider than long (length and width measured medially), ferruginous to brownish-black with ferruginous margins, densely punctate, pubescent and convex; median sulcus absent; carina close to lateral margin. Prosternal lobe arcuate anteriorly; antennal grooves absent.

Mesoscutellum triangular, acuminate, reddish-black to ochre coloured. Elytra yellow ochre, pubescence of same hue as ground colour, punctate-striate, intervals slightly convex, 3rd and 4th striae fusing posteriorly, parallel-sided for half of length, curvilinearly tapered to apex, apices not divaricate.

Underside ferruginous to reddish-black, ochre coloured along lateral margins of abdomen, pubescent. Seventh abdominal sternite arcuate posteriorly. Legs yellow ochre; tarsal segments decreasing in length from 1st to 4th, 5th segment as long as the 2nd; two simple claws.

Genitalia not described.

Dimensions: Length, 4.5-5.2 mm; width, 1.5-1.8 mm.

Specimens examined: 7. MACL, NMV, QM, SAM.

Type data: Holotype *Acroniopus rufipennis* Macleay, W. J. (length, 5.2 mm). Location—AM; Locality—Gayndah, Queensland.

Holotype *Anilicus flavipennis* Candèze (length, 5.0 mm; width, 1.3 mm). Location—IRSNB; Locality—Tropical Australia, Rockhampton.

Distribution: Queensland—Cairns District, Magnetic Island, Rockhampton, Gayndah, Nat. Park (Dec.).

References

- BAKER, E. W. and G. W. WHARTON, 1952. *An Introduction to Acarology*. The Macmillan Company, New York.
- BECKER, E. C., 1956. Revision of the nearctic species of *Agriotes* (Coleoptera: Elateridae). *Can. Ent.* 88 (Suppl. 1): 1-101.
- BROOKS, A. R., 1960. Adult Elateridae of Southern Alberta, Saskatchewan and Manitoba (Coleoptera). *Can. Ent.* 92 (Suppl. 20): 1-63.
- CANDEZE, E., 1859. Monographie des Élatérides. Vol. 2. *Mem. Soc. Sci. Liege* 14: 1-543 (510-513, 520-521).
- , 1863. Monographie des Élatérides. Vol. 4. *Mem. Soc. Sci. Liege* 17: 1-534 (328-332).
- , 1878. Élatérides nouveaux. *C.R. Ann. Soc. ent. Belg.* 21: 189-199 (192).
- , 1889. Élatérides nouveaux. *Ann. Soc. ent. Belg.* 33: 67-123 (120).
- , 1891. *Catalogue methodique des Élatérides*. (connus en 1890): 1-246 (192).
- , 1895. Élatérides nouveaux. *Mem. Soc. Sci. Liege* (Ser. 2) 18: 1-76 (52-53).
- CARTER, H. J., 1939. Australian Coleoptera. Notes and new species. No. XI. (Mostly Elateridae.) *Proc. Linn. Soc. N.S.W.* 64: 297-330 (326).
- CROWSON, R. A., 1967. *The Natural Classification of the Families of Coleoptera*. E. W. Classey Ltd., Middlesex, England.
- ERICHSON, W. F., 1842. Beitrag zur Insecten-fauna von Vandiemensland, mit besonderer Berücksichtigung auf die geographische Verbreitung der Insecten. *Arch. Naturgesch* 8 (1): 82-285 (139, 142).
- , 1843. Bericht über die wissenschaftlichen Leistungen in der Naturgeschichte der Insecten, Arachniden, Crustaceen, und Entomostraceen während des Jahres. *Arch. Naturgesch* 9 (2): 149-288 (175).
- ESCHSCHOLTZ, J. F., 1836. Table Elaterides. *Rev. Ent. (Silberm.)* 4.
- FABRICIUS, I. C., 1781. Classis I. Eleuterata. Genus *Elater*. *Species Insectorum*. Vol. 1, p. 272.
- , 1801. *Systema Eleutheratorum*. Vol. 2, p. 239.
- FROGGATT, W. W., 1907. *Australian Insects*. William Brooks and Company, Ltd., Sydney.
- GERMAR, E. F., 1844. Bemerkungen über Elaterider von Herausgeber. *Z. Ent.* 5: 163.
- GOUDIE, J. C., 1923. Notes on the Coleoptera of north-western Victoria. *Victorian Nat.* 40: 21-24.
- GUILER, E. R., 1953. Distribution of the brush possum in Tasmania. *Nature, Lond.* 172: 1091-1093.
- HYSLOP, J. A., 1921. Genotypes of the elaterid beetles of the world. *Proc. U.S. natn. Mus.* 58: 621-680.
- LEA, A. M., 1908. The Coleoptera of King Island, Bass Strait. *Proc. Roy. Soc. Vict. (N.S.)* 20: 143-207 (157).
- MACLEAY, W. J., 1872. Notes on a collection of insects from Gayndah. *Trans. ent. Soc. N.S.W.* 2: 239-318 (259-260).
- MACLEAY, W. S., 1827. A list and description of the subjects of natural history collected during Captain King's survey of the intertropical and western coasts of Australia. Coleoptera. In: *Narrative of a Survey of the Intertropical and Western Coasts of Australia*. Vol. 2 (P. P. King). Appendix B, pp. 438-454 (441-442). John Murray, London.
- NEBOISS, A., 1956. A check list of Australian Elateridae (Coleoptera). *Mem. natn. Mus. Vict.* 22 (2): 1-75 (36, 37, 57-58, 63).
- , 1957. The genera *Hapatesus* Candèze and *Toorongus*, gen. nov. (Coleoptera: Elateridae). *Aust. J. Zool.* 5 (4): 496-520.
- , 1961. Additions and corrections to the check list of Australian Elateridae (Coleoptera). *Mem. natn. Mus. Vict.* 22 (10): 1-29 (17, 27).
- SCHWARZ, O., 1907. Coleoptera. Family Elateridae. *Genera Insectorum*. 46: 225-370 + pls. (264).
- SHARP, D. and F. MUIR, 1912. The comparative anatomy of the male genital tube in Coleoptera. *Trans. Roy. ent. Soc. Lond.* 1912: 477-642.
- SNODGRASS, R. E., 1935. *Principles of Insect Morphology*. McGraw-Hill Book Company, New York.
- TILLYARD, R. J., 1926. *The Insects of Australia and New Zealand*. Angus and Robertson, Ltd., Sydney.
- TRAGARDH, I., 1844. Zur systematik der Uropodiden. *Ent. Tidskr.* 65: 173-186.
- TUXEN, S. L. (Ed.), 1970. *Taxonomist's Glossary of Genitalia of Insects*. 2nd Ed. Munksgaard, Copenhagen, p.p. 80-88.
- ZACHARUK, R. Y., 1958. Structures and functions of the reproductive systems of the prairie grain wireworm, *Ctenicera aeripennis destructor* (Brown) (Coleoptera: Elateridae). *Can. J. Zool.* 36: 725-751.
- ZWALUWENBURG, R. H. van, 1942. Elaterid and eucnemid beetles of Guam. *Bishop Mus. Bull.* 172: 53-55 (53).
- , 1959. Some type designations, with notes on Pacific Elateridae (Coleoptera). *Pacif. Insects* 1: 347-414 (385, 387, 390).

Acknowledgements

The author wishes to acknowledge the Institutions and private collectors for the loan of specimens and permission to study their material. Special thanks to Dr G. Ettershank, Department of Zoology, Monash University, for advice and critical reading of the manuscript, to Dr A. Neboiss, Curator of Insects, National Museum of Victoria, for assistance and for loan of elaterid material, and to my husband, Dr P. K. Gullan, Botany Department, Monash University, for helpful encouragement while this work was being undertaken.

The paper is based on a thesis that was submitted to the department of Zoology, Monash University, in 1974 in partial fulfilment of the requirements for the degree of Bachelor of Science with Honours.

Explanation of Plates

Specimens to approximately same scale (x 7), except figures 7, 9 and 14 which have been magnified 9 times.

PLATE 4

- Figure 1—*Anilicus attenuatus* Cand. ♂ (NMV).
 Figure 2—*Anilicus xanthomus* (Macl. W. S.) ♂ (JB).
 Figure 3—*Anilicus xanthomus* (Macl. W. S.) ♀ (NMV).
 Figure 4—*Anilicus loricatus* Cand. ♂ (NMV).
 Figure 5—Mesostigmatid mites on the dorsal surface of *Anilicus loricatus* Cand. (Bunbury, W.A., ANIC).
 Figure 6—Mesostigmatid mites on the ventral surface of *Anilicus loricatus* Cand. (Pinjarra, W.A., NMV).

PLATE 5

- Figure 7—*Anilicus rectilineatus*, sp. nov., Holotype ♂ (NMV).

- Figure 8—*Anilicus rectilineatus*, sp. nov. ♀ (AM).
 Figure 9—*Anilicus parvus*, sp. nov. ♂ (AM).
 Figure 10—*Anilicus parvus*, sp. nov. ♀ (QM).
 Figure 11—*Anilicoides haemorrhoidalis* (Cand.), 3 specimens (NMV).
 Figure 12—*Melanoxanthus melanocephalus* (Fab.) ♀ (NMV).
 Figure 13—Undescribed species related to *Melanoxanthus melanocephalus* (Fab.) (NMV).
 Figure 14—*Acroniopus rufipennis* (Macl. W. J.) (SAM).

PLATE 6

- Figure 15—*Augenotus quadriguttatus* (Erich.) ♂ (NMV).
 Figure 16—*Augenotus quadriguttatus* (Erich.) ♀ (NMV).
 Figure 17—*Augenotus australis* (Cand.) ♂ (FH).
 Figure 18—*Augenotus australis* (Cand.) ♀ (NMV).
 Figure 19—*Augenotus australis* (Cand.) ♀ (QM) exhibiting pronotal colour variation.
 Figure 20—*Augenotus aurantius*, sp. nov., Holotype ♂ (NMV).



Gullan, P. J. 1977. "A revision of the genus *Anilicus* Candèze, with notes on related genera (Coleoptera: Elateridae)." *Memoirs of the National Museum of Victoria* 38, 209–230.

View This Item Online: <https://www.biodiversitylibrary.org/item/121136>

Permalink: <https://www.biodiversitylibrary.org/partpdf/50161>

Holding Institution

Museums Victoria

Sponsored by

Atlas of Living Australia

Copyright & Reuse

Copyright Status: Permissions to digitize granted by rights holder.

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>.