



Taxonomic revision of *Apteropilo* Lea, 1908 (Coleoptera: Cleridae)

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Abstract

The endemic Australian genus *Apteropilo* Lea is revised and *Pylusopsis* Elston **syn. n.** found to be synonymous with the former. *Apteropilo* is redefined herein to include two previously described species (*A. pictipes* Lea (= *Pylusopsis peckorum* Kolibáč **syn. n.**) and *A. chrysocome* (Elston) **comb. n.**), and four new species (*A. raldae* **sp. n.**, *A. humerofuscus* **sp. n.**, *A. clarinotus* **sp. n.** and *A. volans* **sp. n.**). Species are arranged into three species-groups. A dichotomous key to species is provided and the systematic position of *Apteropilo* within Cleridae briefly discussed.

Key words: Australia, Cleridae, Enopliinae, *Pylusopsis*

Introduction

The family Cleridae comprises approximately 4000 species and just over 300 genera worldwide (based on Gerstmeier 2000). The Australian clerid fauna is around 90% endemic (at the species and genus-level) with close to 360 species described in roughly 40 genera. The taxonomy of Australia Cleridae has not been actively worked for a long time. In the last 50 years three new Australian genera and 15 species have been described in five taxonomic papers (Winkler 1972, 1989, Gerstmeier 1990a, 1991, Kolibáč 2003) and another five papers deal with combinations or synonymy (Kolibáč 1998, Gerstmeier 1990b, 2001, 2002, Solervicens 2007).

Apteropilo Lea and its single flightless species *A. pictipes* Lea, from King Island, Bass Strait, were described by Lea (1908) who, as the generic name suggests, associated it with the clerine genus *Opilo* Latreille. The monotypic *Pylusopsis* Elston (including *P. chrysocome* Elston) was described by Elston (1929) from near Melbourne, Victoria, and assigned to Korynetinae. In a recent revision of the Australian Korynetinae *sensu lato* Kolibáč (2003) described *P. peckorum* Kolibáč from southwest Western Australia.

While visiting the South Australian Museum, Adelaide, I noticed a similarity between Lea's *A. pictipes* holotype specimen and the black and white photograph of *P. peckorum* accompanying Kolibáč's description. Subsequent examination of the primary types of both taxa indicated that *P. peckorum* **syn. n.** is synonymous with *A. pictipes*. As Kolibáč (2003) considered *P. peckorum* congeneric with *P. chrysocome* and as *Apteropilo* is presently assigned to Clerinae (Corporaal 1950), the taxonomic status and systematic position of *Apteropilo* and *Pylusopsis* require clarification.

Materials and methods

This revision is based on examination of 45 adult *Apteropilo*, plus five *Thriocerodes* Wolcott & Dybas and two *Neopylus* Solervicens, borrowed from the following private and institutional collections:

AMS Australian Museum, Sydney, New South Wales, Australia
ANIC Australian National Insect Collection, Canberra, ACT, Australia

CMNC	Canadian Museum of Nature Insect Collection, Ontario, Canada
JSBC	Justin S. Bartlett Collection, Indooroopilly, Queensland, Australia
MVMA	Museum Victoria, Melbourne, Victoria, Australia
QDPC	Queensland Department of Primary Industries and Fisheries Insect Collection, Indooroopilly, Queensland, Australia
SAM	South Australian Museum, Adelaide, South Australia
QM	Queensland Museum, South Brisbane, Australia
UQIC	University of Queensland Insect Collection, St Lucia, Queensland, Australia
WOPC	Weston Opitz Collection, Salina, Kansas, USA

Adult beetles were studied using Nikon SMZ1500 and Olympus SZ60 stereo dissecting microscopes. External reproductive organs were prepared for examination by dislodging the whole abdomen from the metathorax, soaking it in a cold solution of 10% KOH for 24 hours, then transferring it to an evacuated glass block containing 100% alcohol; the terminalia were prised apart using fine entomological pins, examined, illustrated, rinsed in Acetic Acid then again in distilled water, transferred to a glycerol-filled micro-vial and fixed to a pin below the adult beetle. Measurements were made using a scale reticule fitted to the Nikon SMZ1500. Total length is the distance from the distal limit of the clypeus to the elytral apices. Elytral and pronotal length to width ratios were calculated from measurements made of the longest and broadest extremities of those body parts. Terminology used herein follows Lawrence and Britton (1994) and Ekis (1977). Antennomere is abbreviated to 'A'. 'Callositous deposit' refers to the whitish, globular, enamel-like deposits variously distributed upon the elytral disc of some *Apteropilo* species (Fig. 3), while 'binodulate punctation' is descriptive of elytral punctation containing minute paired nodules upon their inside surface (Fig. 3); punctation of this kind was recently mentioned by Opitz (2007) in relation to the epiphloeine genus *Diapromeces* Opitz. Habitus images of adults were constructed with the aid of Helicon Focus montage software from photographs taken through a Nikon SMZ1500 stereo dissecting microscope fitted with a Prior Proscan II stepping-motor and a Nikon DS U2/DS-Fi1 digital image capture system.

Taxonomy

Synonymy of *Pylusopsis* with *Apteropilo* is supported by several shared apomorphies (absence of pro-tibial spurs, antennae reaching pronotal base, elytral punctation extremely reduced or absent within posterior half, slender phallobasic rod and broad phallus of males). The concept of *Apteropilo*, as applied herein, is based on similarities rather than a small number of superficial differences; such differences can be indicated by the assignment of species to species-groups.

Members of the Australian genus *Thriocerodes*, superficially resembling certain *Apteropilo*, differ by the form of elytral punctation, which are elongate and lack nodulation, the pronotal disc without conspicuous paired seta-baring pits, protibiae each with an apical spur, a comparatively more slender phallus and a tegmen with the apex of the phallobasic rod strongly converging. *Thriocerodes*, though related, appears to be phylogenetically independent of *Apteropilo*.

Kolibáč (2003) synonymised two South American genera, *Neopylus* and *Exochonotus* Barr, with the Australian *Pylusopsis* **syn n.**; a nomenclatural act subsequently ignored by Solervicens (2004, 2005). Examination of *Neopylus nahuelbutensis* Solervicens revealed that the wedge cell of the hind wing is closed, each protibia has an apical spur, and that the prosternal process is distally expanded; thus substantiating Solervicens's apparent rejection of the synonymy. No *Exochonotus* specimens were available for examination, but I have been informed that their protibiae each bear a single spur (R. Gerstmeier, personal communication), and is therefore also unlikely to be synonymous with *Apteropilo*. Though such differences support the removal of *Neopylus* and *Exochonotus* from synonymy with *Apteropilo* I am unable to determine whether the two South American genera are themselves synonyms.

Apteropilo Lea

Apteropilo Lea 1908: 162. Type species: *Apteropilo pictipes* Lea, by monotypy.

Pylusopsis Elston 1929: 352. **syn. n.**; Kolibáč 2003: 68; Solervicens 2005: 53. Type species: *Pylusopsis chrysocome* Elston, by monotypy.

Description. *Head:* Frontoclypeal suture faintly visible; eyes broadly emarginate in front, coarsely faceted, moderately bulging laterally, separated by approximately three eye-widths; terminal maxillary and labial palpomeres securiform, their distal and inside edges of sub-equal length; gular sutures convergent; antennae composed of 11 antennomeres, capitate, reaching beyond pronotal base, pedicel never longer than A3, A3–8 filiform (slender or slightly thickened), terminal three antennomeres forming a loose club, A9–10 cupuliform, A11 sub-ovate.

Thorax: Prothorax quadrate to slightly transverse; lateral carina complete, convergent with posterior margin of hypomerion at prothoracic hind angle; lateral tubercles present (distinct or indistinct); pronotum without distinct transverse subapical depression; disc with two pairs of conspicuously large circular seta-bearing pits positioned paralaterally and discally at the basal second-fifth (Figs. 1, 2) (of similar appearance to, but probably not homologous with, the trichobothria found in Epiphloeinae) (less conspicuous in *A. volans* sp. n. and *A. clarinotus* sp. n.); procoxal cavities externally wide open; prosternal process without distal expansion. Elytra elongate but compact (mean length to width ratio = 1.8:1), broadest near apical third, sides tightly encapsulating pterothorax and abdomen, apical slope relatively steep; elytral epipleurae converging near start of apical curve; basal half of disc impressed with conspicuous, circular, internally binodulate (Fig. 3), punctation arranged in ten rows, integument variously marked with pale pigmentation or callositous deposits; posterior half of disc smooth or with very fine setae-associated punctation. Hind wings well-developed (except for the brachypterous *A. pictipes*), wedge cell open. Legs moderately long; profemora very slightly swollen, meso- and metafemora slender; tibial spur formula 0–2–1; tarsal pulvillar formula 3–3–2; first and fourth tarsomeres reduced in length, the fourth barely visible; pretarsal claws simple, slightly thickened basally.

Abdomen: Comprising six ventrites; males with phallobasic rod of tegmen slender, sides sub-parallel (Figs. 10, 12, 14); phallus broad with broadly angled apical margin, distal sclerite with rearwards directed acumination (Figs. 11, 13, 15); spicular fork of consistent general shape throughout genus, usually slightly open at base, interspicular plate short, slender (Fig. 16).

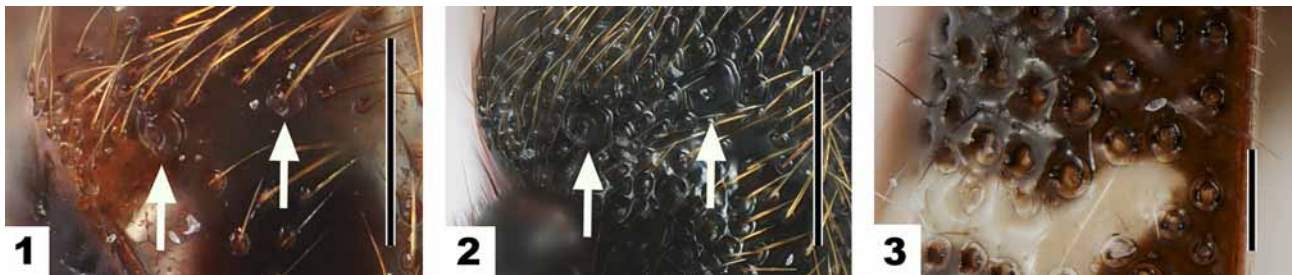
Systematic position of *Apteropilo*

Lea's (1908) choice of the generic name *Apteropilo* obviously relates to the brachypterous condition of the type species and indicates a perceived kinship with members of the genus *Opilo*, which he makes clear when he writes: "Other characters mostly as in *Opilo*", and "..... this genus would be placed next to *Opilo*, which I believe to be its correct position". Corporaal (1950) did not question this and positioned *Apteropilo* between the clerine genera *Phloiocopus* Spinola and *Opilo* Latreille in his world catalogue of Cleridae. The distinctive lateral prothoracic carinae and diminishment in size of the fourth tarsomeres of *A. pictipes* are characters that immediately exclude it from Clerinae and align it with the genera of Tarsosteninae, Enopliinae and Korynetinae. Elston (1929), on the other hand, recognising a kinship between his *Pylusopsis* and *Pylus* Newman, placed his genus within Korynetinae.

Despite the recently proposed synonymy of Enopliinae, Tarsosteninae and Epiphloeinae with Korynetinae (Kolibáč 1997), *Apteropilo* is classified herein as Enopliinae due to sharing with several typical New World enopliine genera (i.e. *Corinthiscus* Fairmaire & Germain, *Exochonotus* and *Neopylus*) characters relating to the form of the pronotal hind angle (see Solervicens 2005), the lateral prothoracic tubercles, and antennal form. Unless subsequent revision of higher taxa demonstrates otherwise, this classification for *Apteropilo* appears the most appropriate.

Key to species of *Apteropilo*

- 1) Elytra predominantly orange; terminal antennomere white 2 (chrysocome group)
 Elytra predominantly black; terminal antennomere not white 4
- 2) Head and pronotum densely punctate *A. chrysocome* Elston, **comb. n.**
 Head and pronotum not densely punctate 3
- 3) Elytra with sub-sutural black patch on humeral tubercles *A. raldae*, **sp. n.**
 Elytra with dark band spanning across entire humeri *A. humerofuscus*, **sp. n.**
- 4) Pronotum sparsely punctate, surface mostly glossy; elytra with pale callositous deposits
 *A. clarinotus*, **sp. n.** (clarinotus group)
 Pronotum densely punctate, with glabrous discs; pale markings of elytra not callositous 5 (pictipes group)
- 5) Hind wings vestigial; pronotum with one basal (Y-shaped) and two pre-apical (circular) glabrous discs
 *A. pictipes* Lea
 Hind wings functional; pronotum only with two pre-apical (circular) glabrous discs *A. volans*, **sp. n.**



FIGURES 1–3. (1) *A. humerofuscus* **sp. n.**, paired pronotal pits; (2) *A. chrysocome* **comb. n.**, paired pronotal pits; (3) *A. clarinotus* **sp. n.**, detail of elytra showing binodulate punctation and white callositous deposit. Scale bars = 0.2mm.

‘*chrysocome*’ species-group

Lateral tubercles of pronotum prominent; paired seta-bearing pits of pronotum conspicuous; antennal club large, terminal antennomere white; callositous deposits present on elytra (less distinct on *A. chrysocome*); rows of elytral punctation disorderly; anthicid-mimicking species with orange elytra.

Apteropilo chrysocome (Elston) **comb. n.**

(Figures 2, 4, 17)

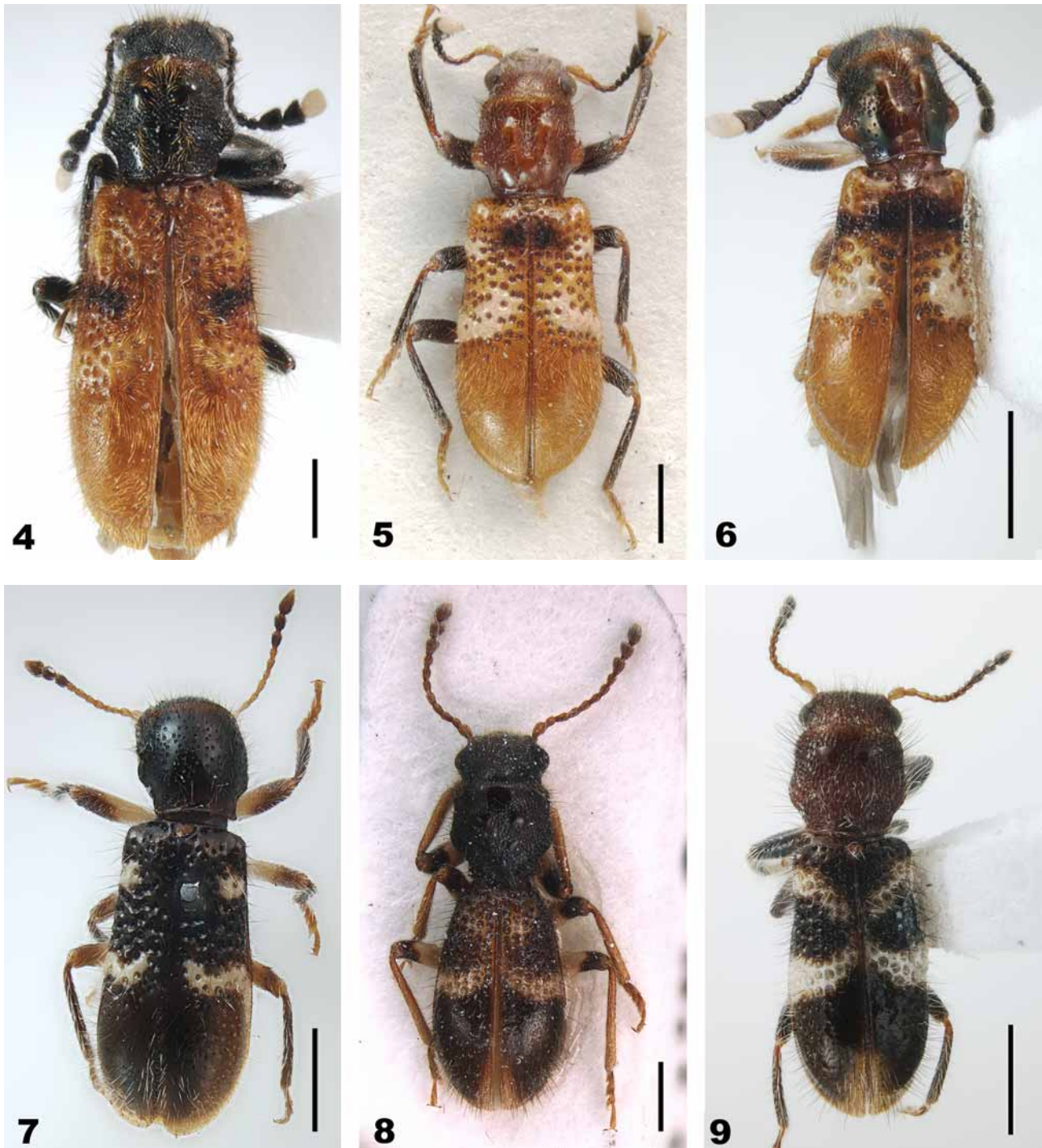
Pylusopsis chrysocome Elston 1929: 352.

Type material examined. Holotype: Victoria: Gembrook, Jun. 1927, C. Oke, ‘*Pylusopsis chrysocome*, 4558, Elston Type’, (A.H. Elston Collection, K 209312) (AMS). **Paratype: Victoria:** Belgrave, 19 Apr. 1922, C. Oke, ‘*Pylusopsis chrysocome*, Elston Co-Type’, (A.H. Elston Collection, K 209313) (1, AMS).

Other material examined. Victoria: 6.1 km ESE of Tanjil Bren, 590m, 37.50S 146.12E, wet sclerophyll forest, 29 Jan.–10 Feb. 1987, FMHD #87–244, A. Newton & M. Thayer, flight intercept (window) trap, ‘*Pylusopsis chrysocome*’ [J.F. Lawrence determination label], ‘compared with holotype’ [pink card] (1, ANIC).

Description. *Total length:* 5.0–6.7 mm.

Head: Cranium black-brown; palpi, labrum and anterior half of clypeus dark reddish-brown to orange-brown, antennae with scape and pedicel dark reddish-brown, A3–10 black, A11 off-white; frons, vertex and genae behind eyes densely distributed with network of pitted and semi-wrinkled punctation, clypeus mostly smooth; antennae with pedicel shorter than A3, club about as long as combined length of A2–8.



FIGURES 4–9. Adult habitus: (4) *A. chrysocome* (Elston), specimen from Tanjil Bren; (5) *A. raldae* **sp. n.**, paratype from Lilyvale; (6) *A. humerofuscus* **sp. n.**, holotype. (7) *A. clarinotus* **sp. n.**, holotype; (8) *A. pictipes* Lea (holotype of *P. peckorum* **syn. n.**); (9) *A. volans* **sp. n.**, holotype. Scale bars = 1mm.

Thorax: Prothorax slightly transverse (length to width ratio = 0.94:1), black-brown, turning reddish-brown along anterior margin; pronotal disc mostly covered by a dense network of pitted punctation, and with several smooth (glabrous) regions as follows: a post-basal Y-shaped area with a separate curved area at either side, then anterior to this, two large circular discs; lateral tubercles steep in basal half, slightly less steep in apical half; paralateral and discal seta-bearing pits conspicuously larger than other punctation (Fig. 2). Pterothoracic sterna deep reddish-black; elytra (length to width ratio = 1.91:1) bright orange, basal half with inconspicuous

callositous deposits forming a pale X-shaped pattern, within this, at each side, a laterally positioned black spot. Legs: femora and tibiae black-brown, tarsi black-brown to orange-brown, pulvilli yellowish.

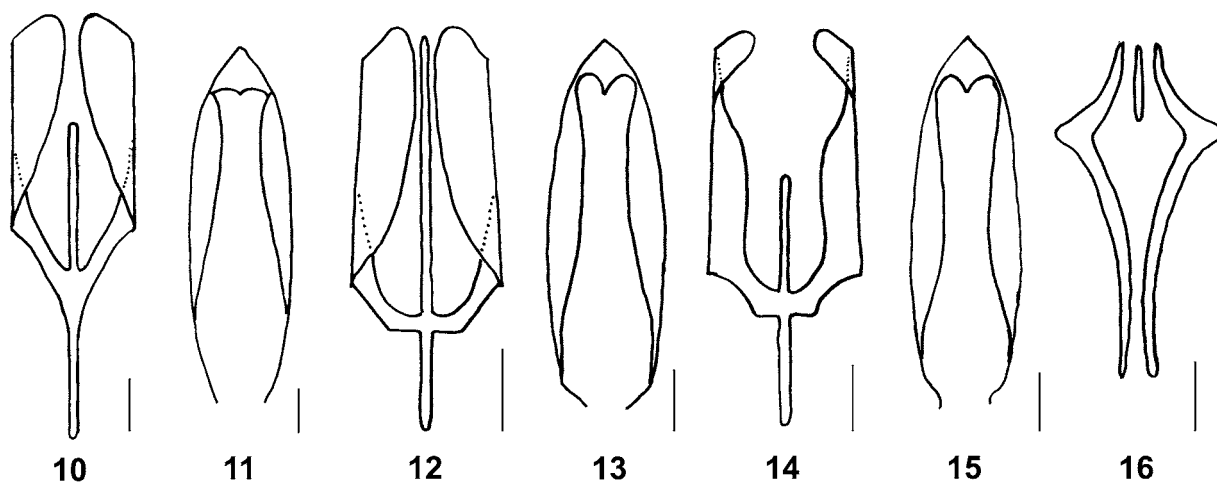
Abdomen: Ventrites bright orange.

Vestiture: Head and pronotum similarly vested with long erect black setae and short semi-decumbent orange setae which occasionally forms small tuft-like swirls; elytral disc with long erect sparsely distributed orange setae, and more densely vested with short orange setae arranged in swirls within apical half and along edges of callositous deposits and forming tufts upon the humeral tubercles, plus a small black laterally positioned setal-tuft near the middle.

Remarks. Only three specimens are known to me. A specimen from Millgrove, Victoria, mentioned by Elston (1929), was not located. Specimens incorrectly illustrated as *P. chrysocome* by Kolibáč (2003) are described below as *A. humerofuscus* **sp. n.** and *A. raldae* **sp. n.**

Apteropilo chrysocome is easily distinguishable from other orange coloured *Apteropilo* by its larger size, its heavily punctate head and pronotum, and by the central position of the black spot on each elytron.

Biology. Adults have been collected during January–February, April and June. A specimen from Tanjil Bren was obtained from a flight interception trap in wet sclerophyll forest. *Apteropilo chrysocome* bears an extraordinary, potentially mimetic, resemblance to beetles of the genus *Lemodes* Boheman (Anthicidae).



FIGURES 10–16. Male terminalia: (10–11) *A. pictipes*: (10) tegmen; (11) phallus; (12–13) *A. clarinotus*: (12) tegmen; (13) phallus; (14) *A. humerofuscus*, tegmen; (15) *A. raldae*, phallus; (16) *A. clarinotus*, spicular fork. Scale bars = 0.1mm.

***Apteropilo raldae* sp. n.**
(Figures 5, 15, 17)

Pylusopsis chrysocome (in part), *sensu* Kolibáč (2003: 69; figs. 48, 52) (incorrect determination).

Type material. Holotype ♂: **New South Wales:** Robertson Nature Reserve, 34.35S 150.35E, 700m, subtropical rainforest, 25 Dec. 1993, C. Reid (ANIC). **Paratypes** (8): **New South Wales:** Eden, C. Oke, “*Pylusopsis mimulus*, TYPE Oke” [hand written], [gender label affixed to point mount] [Note: this is not a valid type specimen, see remarks] (1♀, MVMA); Kioloa State Forest, rainforest, 4–5 Mar. 1986, J. & N. Lawrence (1♀, ANIC); Lilyvale, 16 Sep. 1972, (R.H. Mulder collection, Australian Museum K 246840) (1, AMS); Lilyvale, 6 Jan. 1973, (R.H. Mulder collection, Australian Museum K 246841) (1, AMS); Lilyvale, 2 Nov. 1973, (R.H. Mulder collection, Australian Museum K 246842) (1, AMS); Lilyvale, 31 Mar. 1972, (R.H. Mulder collection, Australian Museum K 246843) (1♀, AMS); 5km W Comboyne, 5–13 Dec. 1983, G. & T. Williams, emerged from dry branchlet (1♀, ANIC); 5km W Comboyne, rainforest, 20–25 Dec. 1983, G. Williams, [ex] rotting wood (1, ANIC).

Note: Three specimens (two from 5km W Comboyne, one from Kioloa State Forest) bear an additional label as follows: “*Pylusopsis chrysocome* Elston, 1929, mentioned in: KOLIBÁČ, J. 2003: *Entomologica Basiliensia* 25”. A rectangle of red card labelled “PLESIOTYPUS” is attached to the female specimen from Kioloa State Forest.

Description. *Total length:* 3.7–5.4 mm.

Head: Cranium dark red-brown to chestnut brown, labrum orange, palpi yellow; antennae with scape and pedicel orange, A3–10 brown to black, A11 dull white to yellowish; frons and vertex moderately distributed with circular punctation, frons partly smooth medially, genae behind eyes with denser punctation, clypeus mostly smooth; antennae with pedicel shorter than A3, club about as long as combined length of A2–8.

Thorax. Prothorax slightly transverse (length to width ratio = 0.82–0.92:1), disc entirely red-brown to orange-brown (rarely dark brown); disc sunken in centre (giving laterally proximate regions a tuberculate appearance); discal punctation dense in sunken part, more moderately distributed sublaterally; area proximal to sunken part plus most of basal third smooth; paralaral and discal seta-bearing pits conspicuously larger than other punctation. Pterothoracic sterna orange-brown to brown; elytra (length to width ratio = 1.73–1.87:1) bright orange, basal quarter with a sub-basal black spot proximal to the suture and covering each humeral tubercle, at each side a white post-basal/sub-lateral callositous spot; basal second quarter of each elytron with a conspicuous globular callositous deposit which slopes posteriorly away from suture towards lateral margin; basal punctation large and deep, striae have appearance of being displaced by callositous deposits. Legs: basal half of femora yellowish to white, tibiae and rest of femora black-brown to brown, tarsi orange.

Abdomen: Ventrites orange to orange-brown. Males: Tegmen similar to that of *A. humerofuscus* sp. n. (see Fig. 14), phallus as in Fig. 15.

Vestiture: Head and pronotum similarly vested with long erect black or orange setae, and short semi-decumbent orange setae which sometimes forms small tuft-like clusters; elytral disc posterior of black band with long orange sparsely distributed erect setae and more densely vested with short orange setae; humeral tubercle with tuft of black setae.

Remarks. Kolibáč (2003: figs. 48, 52) illustrated the hind wing and internal copulatory organs of a female from Kioloa State Forest under the misconception that the material at hand represented *P. chrysocome*.

The specimen from Eden bears a hand-written label “*Pylusopsis mimulus*, TYPE, Oke”. The name however, is not available as it was never published.

Apteropilo raldae sp. n. can be distinguished from *A. humerofuscus* sp. n. by the lighter colouration of the head and pronotum, the additional post-basal/sub-lateral callositous spot on the elytra, the absence of a transverse fuscus band across the humeri, and more subtly by its slightly smaller and more compact elytral punctation.

The exact shape of the callositous deposits with the basal half of the elytra is subtly inconsistent over the entire species range; this appears to influence the precise distribution of elytral punctation.

Etymology. The specific epithet is a dedication to Ralda Ruberry who is very fond of the colour orange.

Biology. Adults have been collected between September and March, several from rainforest environments. Specimens from near Comboyne were reared from a dry branch and rotting wood (plant species unknown). *Apteropilo raldae* sp. n. bears an extraordinary, potentially mimetic, resemblance to beetles of the genus *Lemodinus* Blair (Anthicidae).

***Apteropilo humerofuscus* sp. n.**

(Figures 1, 6, 14, 17)

Pylusopsis chrysocome (in part), *sensu* Kolibáč (2003: 69; figs. 49–51) (incorrect determination).

Type material. Holotype (gender not determined): **Queensland:** Lamington National Park, 28.155°S 153.139°E, 282m, rainforest, 8–18 Mar. 2007, IBISCA Qld - Plot# IQ–300–B, C.Lambkin, N.Starick, malaise

trap, (22016) (QM). **Paratypes** (23): **New South Wales**: Acacia Plateau, Jan. 1948 (J.G. Brooks bequest, 1996) (1♂, ANIC). **Queensland**: Bald Mountain Area, via Emu Vale, 3000–4000', 26–30 Jan. 1973, G.B. Monteith (1, UQIC); Lamington National Park, 28.151°S 153.138°E, 260m, rainforest, 8–18 Mar. 2007, IBISCA Qld - Plot# IQ–300–C, C.Lambkin, N.Starick, malaise trap, (22018) (1, QM); Lamington National Park, 28.142°S 153.133°E, 248m, rainforest, 8–18 Mar. 2007, IBISCA Qld - Plot# IQ–300–D, C.Lambkin, N.Starick, malaise trap, (22020) (1, QM); Lamington National Park, 28.204°S 153.129°E, 748m, rainforest, 10–20 Mar. 2007, IBISCA Qld - Plot# IQ–700–D, C.Lambkin, N.Starick, malaise trap, (22036) (1, QM); Lamington National Park, 28.234°S 153.141°E, 904m, rainforest, 12–22 Mar. 2007, IBISCA Qld - Plot# IQ–900–A, C.Lambkin, N.Starick, malaise trap, (22038) (2, JSBC); Lamington National Park, 28.207°S 153.137°E, 471m, rainforest, 22 Mar.–1 Apr. 2007, Plot # IQ-500-D, G.B. Monteith & R. Menendez, flight intercept trap (22189) (1, QM); Lamington National Park, 28.188°S 153.121°E, rainforest, 20 Feb.–5 Mar. 2009, IBISCA 700A, G.B. Monteith, malaise (4, QM); Lamington National Park, 28.192°S 153.124°E, rainforest, 20 Feb.–5 Mar. 2009, IBISCA 700B, G.B. Monteith, malaise (2, QM); Lamington National Park, 28.193°S 153.128°E, rainforest, 20 Feb.–5 Mar. 2009, IBISCA 700C, G.B. Monteith, malaise (2, QM); National Park [presumably Lamington], Jan. 1928, Nicholson (1, ANIC); Tamborine Mountain, 19 Nov. 1925, H. Hacker (1, QM); Mt Glorious, Feb. 1982, Hiller, malaise trap (1♀, QDPC); Mt Glorious National Park, 360m, wet rain forest, 28 Feb.–9 Mar. 1984, L. Masner, MT [malaise trap?] (1♂, CMNC); Mt Glorious, 20 Mar. 1978, J. Sedlacek (1, WOPC); Bunya Mountains, 10 Dec. 1925, H. Hacker (1, QM); Nambour, Maroochy Horticultural Research Station, 15–22 Mar. 1985, malaise trap (1, QDPC).

Note: Two specimens (National Park and Acacia Plateau) bear an additional label as follows: “*Pylusopsis chrysocome* Elston, 1929, mentioned in: KOLIBÁČ, J. 2003: *Entomologica Basiliensia* 25”. A rectangle of red card labelled “PLESIOTYPUS” is attached to a male specimen from Acacia Plateau.

Description. *Total length:* 3.6–4.9 mm.

Head: Cranium black-brown, labrum orange-brown, antennae with scape and pedicel orange, A3–10 blackish, A11 dull white to yellowish; frons and vertex moderately distributed with circular punctation, frons partly smooth medially, genae behind eyes with denser punctation, clypeus mostly smooth; antennae with pedicel shorter than A3, club about as long as combined length of A2–8.

Thorax. Prothorax slightly transverse (length to width ratio = 0.83–0.95:1), disc partly black-brown; tips of lateral tubercles, median part of disc and prosternum brown; disc sunken in centre (giving laterally proximate regions a tuberculate appearance); discal punctation dense in sunken part, more moderately distributed sublaterally; area proximal to sunken part plus most of basal third smooth; paralateral and discal seta-bearing pits conspicuously larger than other punctation (Fig. 1). Pterothoracic sterna reddish-brown; elytra (length to width ratio = 1.64–2:1) bright orange, basal quarter with a sub-basal transverse black to fuscous band (not completely covering extreme base and shoulders), basal second quarter of each elytron with a conspicuous globular callositous deposit which curves posteriorly away from suture towards lateral margin; basal punctation large and deep, striae have appearance of being displaced by callositous deposits. Legs: basal half of femora yellowish to white, tibiae and rest of femora black-brown to brown (anterior face sometimes paler than posterior face), tarsi orange-brown.

Abdomen: Ventriles orange-brown. Males: tegmen as in Fig. 14; phallus not discernibly different from that of *A. raldae* **sp. n.** (see Fig. 15).

Vestiture: Head and pronotum similarly vested with long erect black setae, and short semi-decumbent orange setae which sometimes forms small tuft-like clusters; elytral disc posterior of black band sparsely distributed with long erect orange setae and more densely with short orange setae; humeral tubercle with tuft of black setae.

Remarks. Kolibáč (2003: figs. 49–51, photo 13) illustrated the tegmen, phallus and spicular fork of a male from Acacia Plateau, and provided a black and white habitus image of another specimen, under the misconception that the material at hand represented *P. chrysocome*.

Apteropilo humerofuscus **sp. n.** can be distinguished from *A. raldae* **sp. n.** by the darker colouration of the head and pronotum, the absence of a post-basal/sub-lateral callositous spot on the elytra, the presence of a

transverse fuscus band across the humeri, and more subtly by its slightly larger and less compact elytral punctation.

A paratype specimen from Maroochydore, Queensland, has the head and pronotum entirely brown and the dark sub-basal elytral band interrupted before the shoulders. The exact shape of the callositous deposits with the basal half of the elytra is subtly inconsistent over the entire species range; this appears to influence the precise distribution of elytral punctation.

Etymology. The specific epithet, *humerofuscus* (from Latin *humerus* = shoulder, and *fuscus* = dark or dusky), is in reference to the transverse black to fuscus band spanning the humeral region of the elytra.

Biology. Adults have been collected from November to March. Many specimens were collected with malaise traps in montane rainforest environments. Like *Apteropilo raldae* **sp. n.**, *A. humerofuscus* **sp. n.** bears an extraordinary, potentially mimetic, resemblance to anthicid beetles of the genus *Lemodinus*.

Note: *A. humerofuscus* **sp. n.** and *A. raldae* **sp. n.** appear to be the two most recently evolved *Apteropilo* species due to their having very similarly structured male terminalia. The decision to describe them as separate species is due in part to their apparent geographic isolation and to the unique morphological characteristics consistent to each isolated population. Selection for the obvious morphological differences of these *Apteropilo* species may have been influenced by consequential prey avoidance due to resembling at least two morphologically and geographically distinct (presumably chemically defended; see Werner and Chandler 1995) species of *Lemodinus* within the original distributional range of the ancestral species.

'*clarinotus*' species-group

Lateral tubercles of pronotum inconspicuous; paired seta-bearing pits of pronotum inconspicuous; pronotal disc evenly rounded, smooth; antennal club moderately large, concolourous; callositous deposits present on elytra; rows of elytral punctation disorderly.

Apteropilo clarinotus **sp. n.**

(Figures 3, 7, 12, 13, 16, 17)

Type material. Holotype (gender not determined): **Queensland:** Cairncross Park, Maleny, 4 Dec.1966, G. Monteith (QM). **Paratypes** (2): **Queensland:** Lamington National Park, 28°13.20 S, 153°07.30 E, 1989, R. Kitching, High Canopy Fogging (H 4/19), (954), (GU 6540) (1 ♀, QM); Lamington National Park, 28°13.20 S, 153°07.30 E, 1989, R. Kitching, Low Canopy Fogging (L-8-2), (76.2), (GU 6539) (1 ♂, QM).

Note: The holotype was originally deposited in the University of Queensland Insect Collection, St Lucia. Both paratypes were originally deposited in the insect collection of the Kitching Lab, Griffith University, Nathan.

Description. *Total length:* 3.8–4.2 mm.

Head: Cranium black-brown, area above antennal insertions and underside of head brown, clypeus and labrum brown to dull yellow, palpi yellowish, basal antennomeres yellow, antennae progressively more brown towards club, club brown to very dark brown; frons and part of vertex partly smooth yet moderately distributed with circular punctation, clypeus smooth; antennae with pedicel shorter than A3, club about as long as combined length of A3–7.

Thorax: Prothorax quadrate (length to width ratio = 1:1), disc black-brown blending to brown along apical margin, prosternum brown; pronotal disc partly smooth with reasonably sparse conspicuous circular punctation; lateral tubercles inconspicuous; paralateral and discal seta-bearing pits inconspicuous (faint circular impressions surrounding two regular looking pits on each side of pronotum can be observed under diffused light). Pterothoracic sterna deep red-brown to blackish; elytra (length to width ratio = 1.77–1.93:1) very dark brown, each elytron with a transverse, weakly S-shaped, white callositous fasciae in the middle

which reaches the lateral margin but not suture (Fig. 3), and a small sub-lateral globular white callositous spot just below the humeral flank. Legs: basal half to two-thirds of femora yellow, apical third to half of femora and entire tibiae brown, entire tarsus yellowish.

Abdomen: Ventrites brown with apical margins slightly paler. Males: genitalia as in Figs. 12 (tegmen) and 13 (phallus).

Vestiture: Head thinly vested with pale, long and short, erect to slightly posteriorly directed, setae; pronotum similarly vested with fine, pale, slightly anteriorly directed setae, and slightly thicker darker erect setae; elytra thinly vested with short, black, and white, posteriorly directed erect setae, and longer erect setae; humeral tubercles with short tuft of black setae.

Remarks. This small black species is separated from *A. pictipes* and *A. volans* by the presence of white callositous deposits on the elytra, the reduction of the prothoracic lateral tubercle and by the smooth evenly rounded pronotal disc, which only has very small paralateral and discal seta-bearing pits.

Etymology. The specific epithet, *clarinotus* (from Latin *clarus* = bright or distinct, and *nota* = mark), is in reference to the bright appearance of the white callositous marks against the black background of the elytra.

Biology. Nothing specific is known of the biology of this species.

'*pictipes*' species-group

Lateral tubercles of pronotum conspicuous but not prominent; paired seta-bearing pits of pronotum slightly less conspicuous than those of chrysocome group; pronotal disc with glabrous discs; antennal club slender, concolourous; callositous deposits not present on elytra; elytral punctation arranged in regular rows.

Apteropilo pictipes Lea

(Figures 8, 10, 11, 17)

Apteropilo pictipes Lea 1908: 193.

Pylusopsis peckorum Kolibáč 2003: 72, **syn. n.**

Type material examined. *A. pictipes* Lea: **Lectotype** (here designated): **Tasmania:** King Island [left specimen on card with Paralectotype, dorsal surface exposed] (SAM). **Paralectotype** (here designated): **Tasmania:** King Island [right specimen on card with Lectotype, ventral surface exposed] (SAM).

P. peckorum Kolibáč: **Holotype:** **Western Australia:** Walpole National Park, Shedley Drive, 22 Jun. 1980, S & J Peck, [ex] berlesate rotton bark & fungi, (SBP 78) (σ , ANIC). **Paratype:** **Western Australia:** Nornalup, Valley of Giants, 21 Jun. 1980, S & J Peck, berlesate rotten tingle bark (SBP 74) (1 σ , ANIC).

Other material examined. **South Australia:** Lighthouse Island, South Neptune Islands, 35°20'14"S 136°7'12"W, 19–21 Oct. 2001, South Neptune Islands Survey (NEP00701), pitfalls (1 ♀, SAM).

Description. *Total length:* 4.0–5.6 mm.

Head: Cranium dark brown to black-brown, anterior half of clypeus and palpi yellowish, labrum and antennae light brown; frons, most of vertex and genae behind eyes densely distributed with network of wrinkled punctation; clypeus smooth; antennae with pedicel subequal in length to A3, club about as long as combined length of A4–8.

Thorax: Prothorax slightly transverse to quadrate (length to width ratio = 0.94–1:1), black-brown; pronotal disc mostly covered by a dense network of wrinkled punctation (sub-basal punctation more circular) and with several glabrous regions as follows: a post-basal Y-shaped area, then anterior to it, two large circular discs, then less conspicuously, an area adjoining the anterior margin; paralateral and discal seta-bearing pits conspicuously larger than other punctation. Pterothoracic sterna black-brown; elytra narrowed at base (length to width ratio = 1.52–1.79:1), dark brown with a yellowish curved X-shaped pattern across basal half, along

suture in apical quarter yellowish; elytral punctation more reduced than other *Apteropilo* species; hind wings vestigial, reduced to small stubs (brachyptery). Legs: base of femora yellow, distal third dark brown, tibiae and tarsi light brown, pulvilli dull yellow.

Abdomen: Ventrites mostly dark brown, apical margins with thin yellowish band. Males: genitalia as in Figs. 10 (tegmen) and 11 (phallus).

Vestiture: Head and pronotum similarly vested with yellowish, long erect, and short semi-decumbent, setae; elytral disc sparsely vested with black erect setae and shorter, finer, yellow or white setae.

Remarks. This species can be separated from *A. volans* **sp. n.**, with which it is most closely related, by its darker pronotum, which bears a Y-shaped glabrous disc at its base, by its narrower elytral base, and by its reduced elytral punctation.

Biology. The Western Australian specimens were extracted using a berlese funnel from rotting bark of giant Tingle trees (*Eucalyptus* spp.) and from unknown bark and fungi (Kolibáč 2003). Lea (1908) noted that his specimens were obtained near beach environments, two of which were collected on a thick-leaved vine, and a third specimen (not located) from an unknown plant occasionally wet with sea spray. Specimens were collected in June and October.

***Apteropilo volans* sp. n.**

(Figure 9, 17)

Type material. Holotype ♀: **Western Australia:** Rocky Gully, -34.509 117.113, 19 Nov. 2008, S.L. Winterton & S.D. Gaimari, roadside vegetation (QM).

Description. *Total length:* 3.7 mm.

Head: Cranium reddish-brown, palpi and lacinae dull yellow-orange, A1–6 orange brown, A6–9 dark brown, antennal club black-brown; frons, most of vertex and genae behind eyes densely distributed with a network of close punctation which is slightly wrinkled above and behind eye; clypeus smooth; antennae with pedicel shorter than A3, club slightly longer than combined length of A4–8.

Thorax: Prothorax quadrate (length to width ratio = 1:1), reddish-brown; pronotal disc mostly covered by a dense network of wrinkled punctation and with a pair of conspicuous circular glabrous discs before the anterior margin; paralateral and discal seta-bearing pits less conspicuous than *A. pictipes* (closer together than those of other species). Mesosternum reddish-brown; metasternum black-brown; elytra (length to width ratio = 1.91:1) glossy black with a whitish curved X-shaped pattern across basal half, along suture in apical quarter pale brown; hind wings functional. Legs mostly dark brown, joints and base of femora stained with a dull yellowish-orange; tarsi orange-brown, pulvilli yellowish.

Abdomen: Ventrites 1-5 dark brown with pale apical margins; sixth ventrite narrow, yellowish.

Vestiture: Head, pronotum and elytra similarly vested with long dark erect setae, and shorter pale semi-decumbent setae.

Remarks. This species can be separated from *A. pictipes* by the reddish colour of its pronotum, which lacks a basal Y-shaped glabrous disc, and by its broader elytral base and well-developed hind wings.

Etymology. The specific epithet *volans* (Latin = flying or capable of flight) was chosen because *A. pictipes*, the species most closely related to *A. volans* **sp. n.**, is brachypterous.

Biology. The single known specimen was collected from unknown roadside vegetation in November.

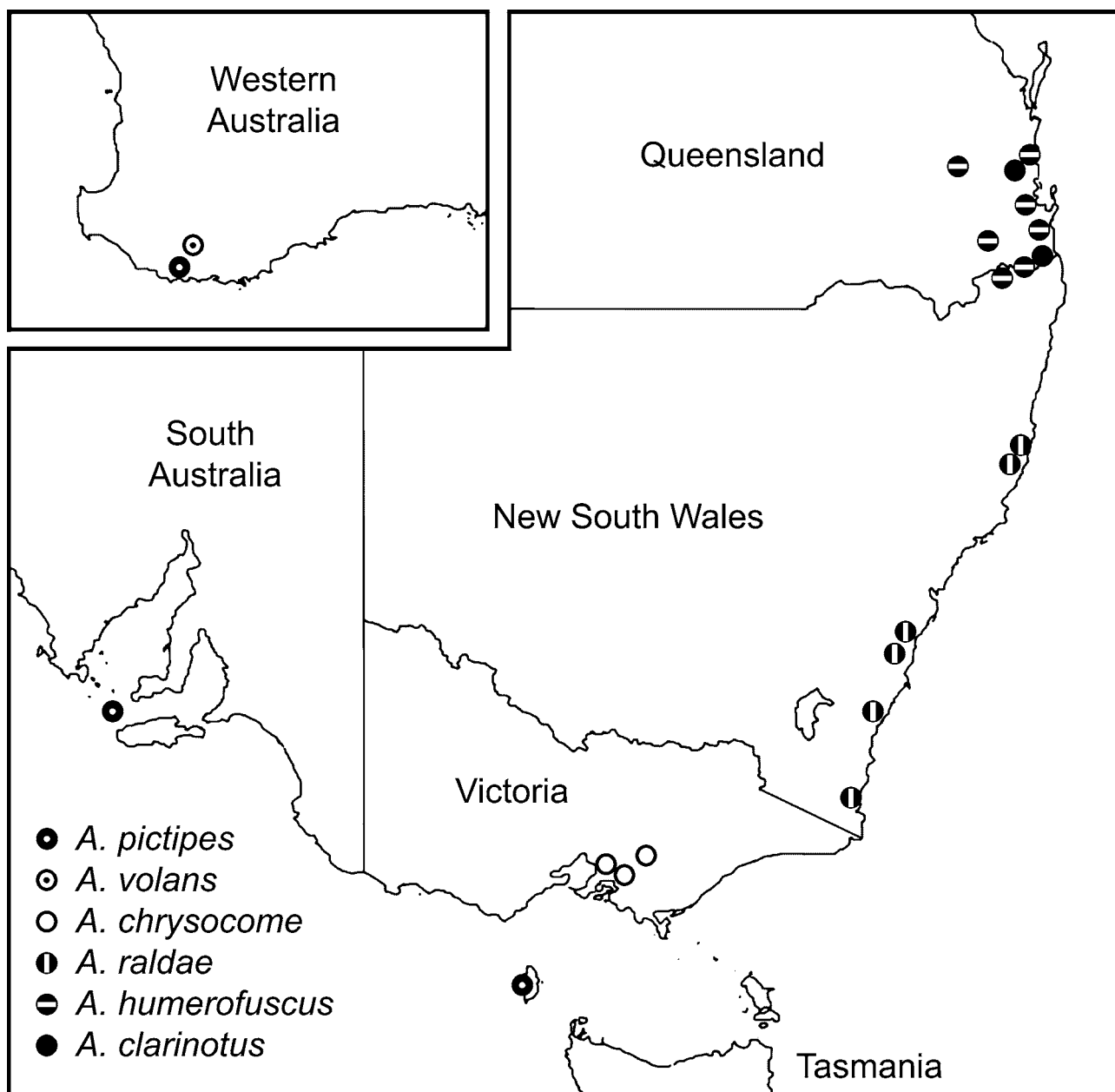


FIGURE 17. Map of south-eastern Australia and south-west Western Australia (inset) illustrating the geographic distribution of *Apteropilo* species.

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