






## *Excastra albopilosa*, a remarkable new genus and species of Lamiinae (Insecta: Coleoptera: Cerambycidae) from southeastern Queensland, Australia

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### Abstract

A new genus and species of Cerambycidae from the subfamily Lamiinae is described from subtropical rainforest in southeastern Queensland, Australia. *Excastra albopilosa* gen. et sp. nov. is easily distinguished from all other Australian Lamiinae by its dense covering of short adpressed white setae and the long erect white setae forming twisted spires. A modification to the key to Australian Lamiinae genera is provided to accommodate *Excastra* gen. nov.

Cite this paper as: Tweed JMH, Ashman LG & Ślipiński A (2024). *Excastra albopilosa*, a remarkable new genus and species of Lamiinae (Insecta: Coleoptera: Cerambycidae) from southeastern Queensland, Australia. *Australian Journal of Taxonomy* 54: 1–8. doi: <https://doi.org/10.54102/ajt.iv1x5>

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### Introduction

Longhorn beetles (Coleoptera: Cerambycidae) are one of the most diverse animal families on the planet with over 36,000 recognised extant species and 5,100 genera (Tavakilian and Chevillotte 2023). The Australian fauna contains approximately 1,400 recognised species distributed amongst more than 300 genera, as well as many that are as-yet undescribed (Lawrence and Ślipiński 2013). The Australasian biogeographic realm displays the highest rate of endemism amongst global Cerambycidae with 97.3% of known species being endemic (Rossa and Goczał 2021). Recent comprehensive work to revise the genera of Australian longhorn

beetles (Ślipiński and Escalona 2013, 2016, Ślipiński et al. 2023) has provided a significant platform on which to further advance our understanding of the Australian fauna.

Lamiinae is by far the most diverse subfamily of longhorn beetles, containing 58% of recognised species globally, and 53% of recognised genera (Rossa and Goczał 2021). In their generic review of the Australian Lamiinae fauna, Ślipiński and Escalona (2013) recognised a total of 74 genera and 536 species from mainland Australia and its remote offshore territories. Since then, only a single species has been described (Ashman et al. 2023), with many further genera and species awaiting description (Ślipiński and Escalona 2013).

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This paper was submitted on 21 December 2023 and published on 20 March 2024 (2024-03-20T02:16:35.430Z). It was reviewed by Roger de Keyzer and Eugenio Nearnas, and edited by Mark Harvey. *Australian Journal of Taxonomy*. ISSN: 2653-4649 (Online).

Here we describe a new genus and species of Lamiinae from southeastern Queensland, Australia. Both the genus and species are known only from a single specimen collected from the grounds of Binna Burra Lodge, an ecotourism lodge surrounded by Lamington National Park which itself is part of the Gondwana Rainforests of Australia World Heritage Area. Binna Burra and Lamington National Park, known as Woonoongoora in the Yugambah Aboriginal language, have a prolonged history of entomological collecting effort though the species is not known to have been collected previously (G. Monteith pers. comm). No specimens of this species were encountered during the preparation of the comprehensive text on Australian Lamiinae by Ślipiński and Escalona (2013), despite the authors examining thousands of specimens within major entomological collections all over the world (A. Ślipiński pers. obs. and H. Escalona pers. comm.). The fact that this striking species has avoided the attention of entomologists for so long is something of a mystery but serves to emphasise how much may be left to discover about the Australian Lamiinae fauna.

## Methods

Morphological terminology follows Ślipiński and Escalona (2013), and classification follows Ashman et al. (2022). Measurements were made using an Olympus SZX16 stereomicroscope. Body length was measured from the frons to the apex of the elytra. Photographs of the specimens in the field were taken with an Olympus TG-5 fitted with a LG-1. Photos of mounted specimens were taken using a Dun Ink BK Lab Plus system with source images aligned and stacked in Helicon Focus and edited in Adobe Photoshop.

We examined the collections of the Australian National Insect Collection (ANIC) in Canberra, and the Queensland Museum (QMB) in Brisbane, to search for additional specimens but none were found.

## Taxonomy

### Revised key to Australian Lamiinae genera

*Excastra* gen. nov. can be included within the key to Australian Lamiinae genera of Ślipiński and Escalona (2013) by modifying couplet 61 and adding an additional couplet (61A).

- 61(60)** Eyes completely divided into upper and lower lobes **61A**  
**61(60)** Eyes deeply emarginate but not divided into upper and lower lobes **62**  
**61A(61)** Pronotum with broad lateral tubercule; vestiture consists of dense clusters of very long erect setae twisted into spires on the head, thorax, and elytra, with scattered long erect setae over rest of body including legs and antennae **Excastra gen. nov.**

- 61A(61)** Pronotum with narrow and sharp spine located near anterior angle; vestiture consists of short and mostly adpressed setae **Microlamia [part]**

**Family Cerambycidae** Latreille, 1802

**Subfamily Lamiinae** Latreille, 1825

**Tribe Ancitini** Aurivillius, 1917

### *Excastra* Tweed, Ashman & Ślipiński, gen. nov.

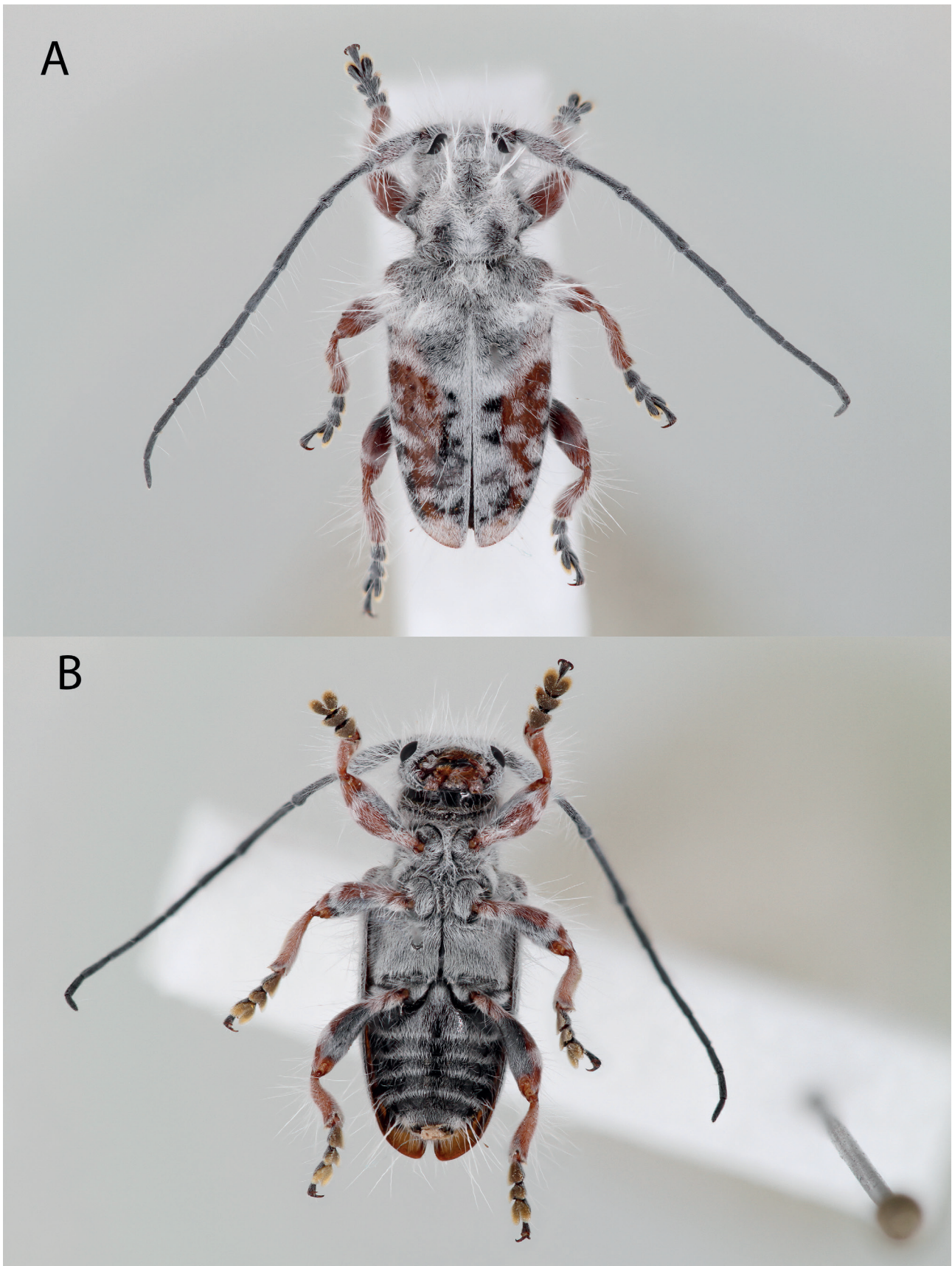
Figs 1A-B, 2A-D, 3A-B

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**Type species.** *Excastra albopilosa* Tweed, Ashman & Ślipiński, sp. nov.

**Diagnosis.** Distinguished from all known Australian Lamiinae genera by the combination of the following characters: completely separated eye lobes; absence of apical carina on scape; combined length of antennal segments 3 and 4 much shorter than 5-11 combined; broad lateral tubercule on the pronotum; clavate femora; paired protibial spurs; comb-like antennal cleaner on the mesotibia; twisted spires of elongated setae concentrated around the head, pronotum, and anterior third of the elytra.

**Description.** Length 9.7 mm; elongate-oval beetle, body ~2.5× as long as wide. Dense covering of short white setae across the head, thorax, and anterior third of the elytra; scattered long setae across much of the body; twisted spires of longer setae on head, pronotum, and anterior third of each elytron. **Head.** Frontoclypeus declined about 90°. Frontal surface outline rectangular, convex, approximately 0.8× as long as wide. Eyes finely faceted, divided into separate upper and lower lobes, lower lobe taller than upper lobe, upper lobes separated by approximately 0.75× scape length; lower lobes separated by 3× lobe width. Gena about as tall as lower eye lobe. Anterior tentorial pits and frontoclypeal suture weakly indicated. Clypeus short, anterior margin straight, merging with anteclypeus. Labrum anteriorly flat and setose. Mandibular apex coarsely pointed. Maxillary and labial palps fusiform apically. Antennal tubercles broadly separated at base. **Antennae.** 11-segmented, extending to just beyond the elytral apex. Scape expanded near middle, broadest point approximately 1.5× basal width, length approximately 3× maximum breadth, apical carina absent, posteriorly extends to anterior base of pronotal tubercule, ~3.7× pedicel length. Pedicel approximately as long as broad. Antennomere 4 longer than 3, 3 and 4 combined approximately 0.6× as long as 5-11, antennomere 11 shorter than 10. Sparse ventral fringe of long white setae. **Thorax.** Prothorax wider than long, length approximately 0.7× breadth (including lateral tuber-

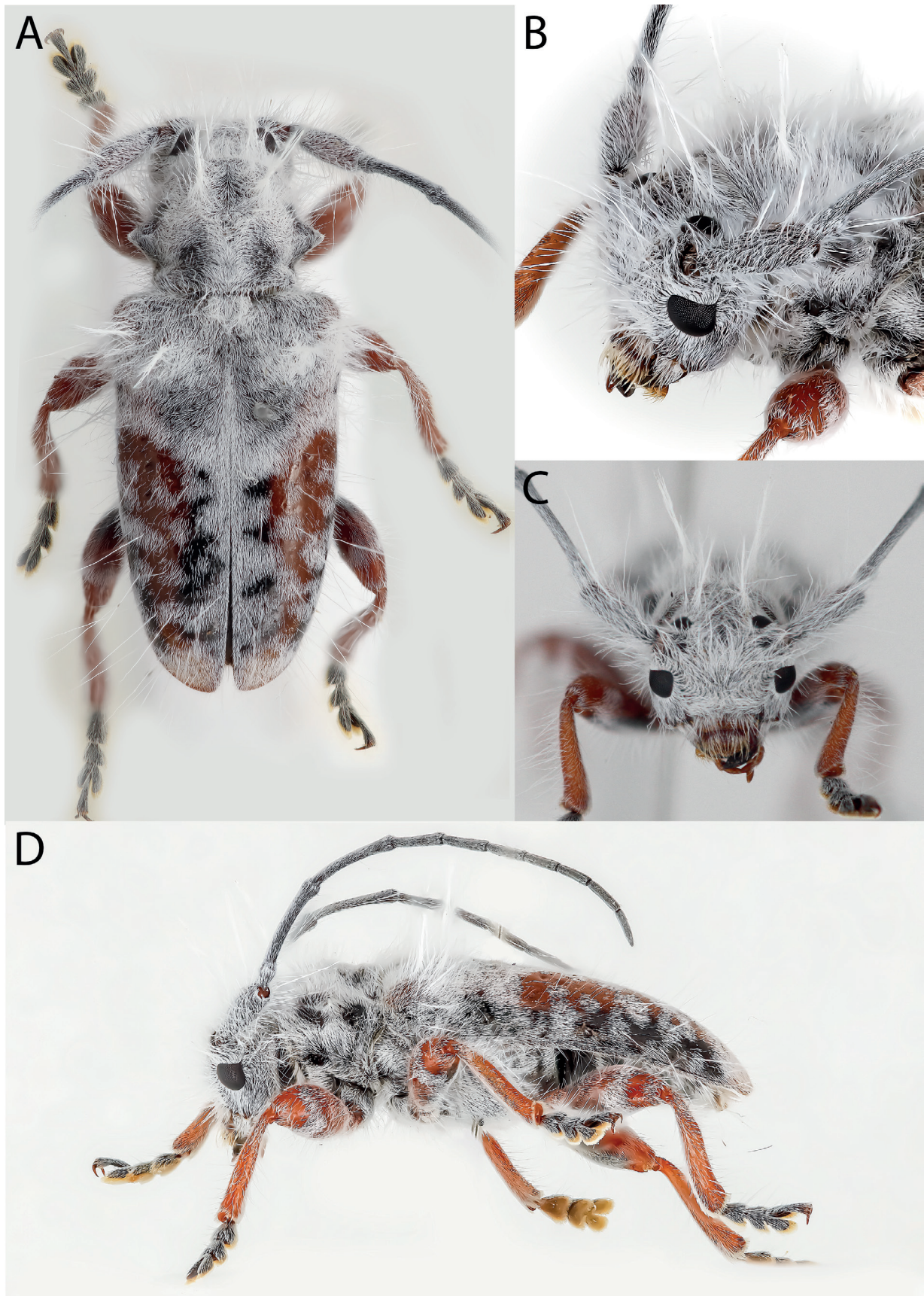


**Figure 1.** Holotype of *Excastra albopilosa* Tweed, Ashman & Ślipiński, gen *et. sp. nov.* A: dorsal. B: ventral. Images not to scale.

cules); slightly constricted posteriorly; base distinctly narrower than elytral shoulders; lateral margins with large median tubercule, pointed, broad, length approx-

imately 0.8× base. Pronotum with posteriorly directed triangular sulcus at 0.3× length, flanked by weakly raised nodules which converge posteriorly forming a keel





**Figure 2.** Holotype of *Excastra albopilosa* Tweed, Ashman & Ślipiński, gen *et. sp. nov.* A: dorsal view, cropped to show setal patterning. B: head, oblique view. C: head, frontal view. D: lateral view. Images not to scale.

shaped gibbosity. Prosternum in front of the procoxal cavity arcuate, rising to procoxae, approximately 0.4× the coxal cavity length; prosternal process narrow, width at narrowest point approximately 0.4× procoxal cavity diameter, convex but projecting less than coxae, expanded slightly posteriorly. Procoxal cavity oval with lateral projection, closed posteriorly. Scutellum large and clearly visible. Mesoventrite in front of mesocoxae rising to mesocoxae; mesocoxal cavities open to mesepimeron; mesoventrital process at narrowest point approximately 0.5× cavity diameter, convex but less strongly so than prosternal process. Metaventrite approximately 1.2× as long as mesoventrite. **Elytra.** Humeral angles blunt. Elytral disc mostly smooth and polished, sparsely punctate, those punctures present concentrated basally, punctures smooth-sided. Surface without tubercles. Elytral apices individually rounded. Fully winged. **Legs.** Procoxae conical, apex higher than mesocoxae. Femora clavate, greatest width at approximately 0.7× length, profemur especially swollen, metafemur slightly posteriorly curved. Tibia straight, all tibia with two short black spurs, mesotibial antennal cleaner comb-like, no obvious sulcus, extending from 0.2-0.9× length. Tarsi five-segmented, tarsal claws smooth and broadly divergent. **Abdomen.** Five free ventrites; abdominal process acute; length of ventrites as measured centrally relative to length of ventrite 1, ventrite 2 - 0.34×, ventrite 3 - 0.33×, ventrite 4 - 0.37×, ventrite 5 - 0.54×. Pygidium not exposed.

**Etymology.** The genus name is derived from the Latin words *ex* meaning “from”, and *castra* meaning “camp”, and is a reference to the discovery of this species within the Binna Burra Lodge campground. Gender feminine.

**Remarks.** *Excastra* gen. nov. is placed within the tribe Ancitini based on its strong resemblance to other members of the tribe. It falls within the broad morphological limits given by Ashman et al. (2022): small, oval-bodied, clavate femora, and a relatively long scape. Should further specimens be collected, molecular analyses should be conducted to confirm the tribal placement.

### *Excastra albopilosa* Tweed, Ashman & Ślipiński, sp. nov.

Figs 1A-B, 2A-D, 3A-B

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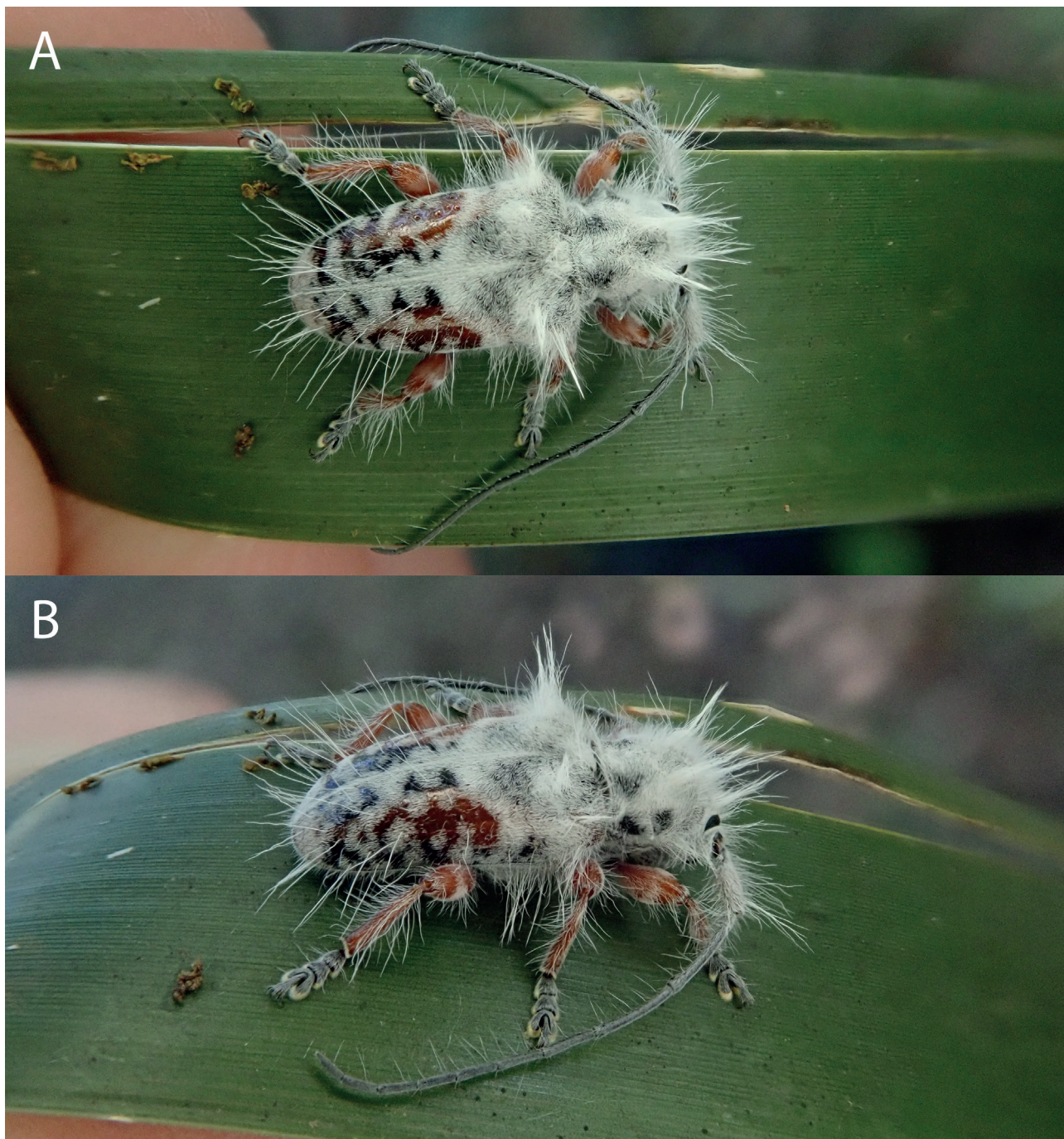
**Type material.** **Holotype**, unsexed, AUSTRALIA: Queensland: Binna Burra Lodge campground, Gold Coast hinterland, -28.1983, 153.1870, 793 m asl, resting on *Lomandra*, 29/12/2021, J. M. H. Tweed (ANIC).

**Diagnosis.** Small sized lamiine. Easily recognised by the reddish-orange and black integument, and the dense covering of short adpressed white setae covering the head, thorax, and anterior third of the elytra, with scattered patches in the posterior two-thirds of the elytra.

The prominent long erect setae scattered across the body, denser on head, pronotum and anterior third of elytra, forming paired twisted spires in these areas, are also highly distinct.

**Description.** Integument mostly black; labrum and palpi reddish-brown, mandibles black; scape mostly black, reddish orange basally and dorsodistally; medial longitudinal reddish-orange stripe on each elytron, beginning at approximately 0.25× elytral length and extending to apex, gradually tapers apically before expanding to occupy apical area, rest of elytron black; legs predominantly reddish-orange, some black on ventral surface of all femora, relatively small on profemur, extending to the posterior and dorsal surfaces of the metafemur, tarsi dorsally black and dull-yellow ventrally. **Head.** Most areas of head densely covered with white setae largely obscuring integument, scattered erect longer setae throughout, notable tufts arising near dorsal margin of upper eye lobe, clypeus bare, palpi sparsely setose. **Antennae.** Scape densely clothed in short white seta, numerous long erect setae present, concentration of these increasing both ventrally and apically, longest setae approximately equal to length of scape. Pedicel densely clothed in short white setae; numerous long erect setae present, concentration increasing ventrally. Antennomeres sparsely clothed with short fine white setae, sparse ventral fringe of white setae. **Thorax.** Pronotum densely covered in short white setae largely obscuring integument, densest in a stripe running from top of gibbosity to posterior margin of pronotum, relatively bare patches anteriorly and posteriorly of lateral tubercle base and in posterior constriction; long erect setae scattered throughout, forming paired twisted spires on dorsoanterior margin and dorsally at approximately 0.3× pronotum length, longest setae approximately 0.7× pronotum length. Prosternum densely clothed in short untidy setae. Mesoventrite and metaventrite densely clothed in short white setae largely obscuring integument, untidy on mesoventrite, uniform on metathorax. Scutellum large, densely clothed in short white setae. **Elytra.** Setae forming distinct pattern; dense area of shorter white setae clothing the basal third of each elytron, tapered from the lateral margins to the elytral suture, forming a posteriorly pointed pentagon in combination, continues unbroken in a narrow line along the elytral suture, expanding in the apical region, longer erect setae scattered throughout; two paired spires of long setae protruding from amongst the denser short setae on each elytron, one near the scutellum and a second nearer the humeral angle and slightly basal of the first; remainder of each elytron covered in numerous small patches of dense white setae, most circular or oval, some merging into each other and/or the setose areas along the elytral suture and apex, most patches with a single long white setae protruding from the centre, patches asymmetrical, integument visible between patches, sparse long erect setae protruding from the areas of unclothed integument.





**Figure 3.** Holotype of *Excastra albopilosa* Tweed, Ashman & Ślipiński, gen *et. sp. nov.* as it was found; resting on a *Lomandra* leaf in Binna Burra Lodge campground. A: dorsal. B: lateral.

**Legs.** Coxae densely clothed in short white setae; each femur with sparse covering of short white setae, not obscuring integument, densest in basal two-thirds, scattered longer white setae throughout, longer setae densest ventrally, prominent band of dense white setae on each femur at approximately 0.75× length, band width approximately 0.15× femoral length; tibiae with sparse covering of short white setae, sparse long erect setae present, all tibia with apical ring of coarse yellowish setae; tibial spurs black; setae of mesotibial antennal cleaner yellowish; tarsi with sparse white setae dorsally, some long erect white setae interspersed, setae of

tarsal pads yellowish. **Abdomen.** Ventrites setose, increasing in density posteriorly on each ventrite, relatively bare patches in centre of ventrites 1, 2 and 3; scattered longer erect setae throughout, tufts of long twisted erect setae protruding from lateral margins of ventrites 5.

**Dimensions (mm), holotype (unsexed).** Total length, 9.7 mm; length of prothorax at centre, 2.3 mm; greatest width of prothorax (across tubercles), 3.3 mm; anterior width of prothorax, 2.2 mm; posterior width of prothorax, 2.5 mm; humeral width, 3.8 mm; elytra length, 6.4 mm; antennal length, 11.9 mm, scape length, 1.6 mm;

pedicel length, 0.3 mm; antennomere (A) lengths, A3, 1.9 mm; A4, 1.9 mm; A5, 1.2 mm; A6, 1 mm; A7, 0.9 mm; A8, 0.8 mm; A9, 0.8 mm; A10, 0.7 mm; A11, 0.8 mm; femora (F) lengths, F1, 2.3 mm; F2, 2.2 mm, F3 2.8 mm; tibia (T) lengths, T1, 2.1 mm, T2, 2.1 mm, T3, 2.3 mm.

**Distribution and habitat.** Known only from the holotype collected within the campground of Binna Burra Lodge which is surrounded by Lamington National Park (LNP). LNP is part of the Gondwana Rainforests of Australia World Heritage Area which forms the most extensive subtropical rainforest in the world (Department of the Environment and Heritage 2000).

**Biology.** Nothing known. The type specimen was found resting on a leaf of a *Lomandra* sp. (Asparagales: Asparagaceae) within the campground. This is likely to be a casual association only as *Lomandra* is not known to be a host plant for any other Australian Cerambycidae (Ślipiński and Escalona 2013, 2016).

**Conservation status.** As this species is known only from a single specimen, there is insufficient evidence to assign it to an appropriate threat category (IUCN 2012). As such, *Excastra albopilosa* gen. et. sp. nov. should be regarded as Data Deficient. However, the apparent absence of this species from Australian entomological collections suggests it may be rare, possibly owing to a naturally restricted distribution and/or a unique life history (e.g., high host specificity). The discovery of additional specimens is required to provide information necessary to assess its conservation status.

**Etymology.** The species epithet is derived from the Latin *albus* meaning “white”, and *pilosa* which is the feminine form of *pilosus* meaning “hairy”, in reference to the white hairs that cover much of this species’ body.

**Remarks.** Despite having collectively examined thousands of Australian Lamiinae specimens in institutions around the world (particularly AS and LGA) and having spoken to numerous other authorities on Australian Coleoptera, the authors are not aware of any specimens of *Excastra albopilosa* gen. et. sp. nov. other than the holotype. Binna Burra, and Lamington National Park more broadly, have a strong history of entomological collecting, having been a popular field destination for staff, students, and visiting researchers from the University of Queensland Entomology Department, particularly through the 1960s and 70s (G. Monteith pers. comm.). Lamington National Park has also been a popular collecting location for entomologists at the Queensland Museum, including Henry Hacker and Geoff Monteith, as well as many of Australia’s preeminent early Coleopterists such as Arthur Lea and Herbert Carter (G. Monteith pers. comm.). The distinctive and conspicuous appearance of this remarkable new species makes it even more surprising that it has remained undiscovered despite such extensive entomological collecting efforts. Subsequent trips to the type locality by the first author have also failed to reveal any further specimens.

It seems likely that as-yet unknown elements of this species biology, ecology, and/or distribution somehow limit collection opportunities.

The exact function of the characteristic setae of this species is unknown. It is possible that the setae provide an unusual form of Batesian mimicry, disguising *Excastra albopilosa* gen. et. sp. nov. as an insect infected with an entomopathogenic fungi, possibly reducing its palatability to predators. In the similarly white and setose North American velvet ant *Dasymutilla gloriosa* (Saussure, 1868), research has shown that the setae likely act to regulate body temperature as opposed to disguising the species as an inedible creosote bush seed as was previously hypothesised (Wilson et al. 2020). Thermal regulation may therefore also be a function of the setae of *Excastra albopilosa* gen. et. sp. nov. Alternatively, the setae may disguise it as a hairy Lepidopteran larvae, the hairs of which often have irritating qualities to deter predators, or they may camouflage it amongst the flowers of Myrtaceae species. Further work is needed to understand the biology and ecology of this remarkable species.

## Disclosures

The authors declare no conflicts of interest.

## Acknowledgments

Thank you to Binna Burra Lodge who have provided plenty of support and enthusiasm for the description of this species and willingly shared their knowledge, particularly Steve Noakes and Barry Davies. Thank you to Geoff Monteith who discussed the history of entomological collecting at Binna Burra and within Lamington National Park, as well as his personal experiences collecting in the area. Thanks also to Karin Koch and Susan Wright for facilitating the JMHT’s visit to the Queensland Museum entomology collection. Thank you to Lingzi Zhou (ANIC) for the photos of the pinned holotype. We wish also to express thanks to the reviewers, Roger de Keyzer and Eugenio Nearn, for their helpful comments, and the editor Mark Harvey.

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