



## Australian Melolonthini (Coleoptera: Scarabaeidae: Melolonthinae): a third species of *Allothnonius* Britton, 1978, and notes on the other known species

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### Abstract

The genus *Allothnonius* Britton, 1978 (Coleoptera: Scarabaeidae: Melolonthinae: Melolonthini) is revised based on material of the two previously described Queensland species, *A. barretti* Britton, 1978 and *A. brooksi* Britton, 1978; and *A. mouldsi* Allsopp & Smith, **new species**, from the northwest of the Northern Territory. The diagnostic characters of the genus are revised, distinguishing it from other Australian Melolonthini. The female of *A. brooksi* is described for the first time. An identification key, distribution map and notes on the natural history of the three species are included.

**Key words:** Australia, nomenclature, taxonomy, classification, chafers, melolonthines

### Introduction

A conventional classification of the Australian Melolonthinae (Britton 1957, 1978; Houston & Weir 1992; Allsopp 2018, 2020a,b; Weir *et al.* 2019; Hutchinson & Allsopp 2021) (Coleoptera: Scarabaeidae: Melolonthinae) places a group of 17 genera and 123 species, dominated by *Lepidiota* Kirby, 1828, *Antitrogus* Burmeister, 1855, and *Rhopaea* Erichson, 1847, within the Melolonthini. Alternative classifications of the family have seen subtribes of the Melolonthini elevated to tribes, and Lacroix (2021) placed the Australian *Lepidiota* spp., *Holorhopaea* Britton, 1978, and *Nanorhopaea* Britton, 1978 in the Leucopholini, with the other Australian genera (presumably including *Alepida* Allsopp, 2018) remaining in the Melolonthini.

*Allothnonius* Britton, 1978, one of the smaller genera of Australian Melolonthini, was erected for two species from northeastern Queensland, *Allothnonius barretti* Britton, 1978 and *A. brooksi* Britton, 1978. Here, we review the genus, describing one new species and providing notes on the distribution, and natural history of the three known species.

### Materials and methods

We adhere to the phylogenetic species concept as outlined by Wheeler & Platnick (2000). This concept defines species as the smallest aggregation of populations diagnosable by a unique combination of character states. Some are easily recognized by examining one individual with a unique set of characters, and some must be proposed only after many individuals from different populations are examined.

Label data of the new species and types are given in full with a “|” separating different labels and with comments by us in square brackets. Measurement data were obtained using the measuring function of Photoshop. The maps were prepared using Cartographer 1.51 (Maddison & Maddison 2017). The images were made using a Canon EOS 5D camera body mounted with a Canon EF 200 mm macro lens. Image stacking was done using Zerene Stacker software and post-processing in Photoshop.

Abbreviations for collections:

ANIC—Australian National Insect Collection, Canberra, Australia

CMNC—Canadian Museum of Nature, Ottawa, Canada

QDAF—Queensland Department of Agriculture and Fisheries, Brisbane, Australia

QM—Queensland Museum, Brisbane, Australia

SAM—South Australian Museum, Adelaide, Australia

UQIC—University of Queensland Insect Collection (housed in QM)

### ***Allothnonius* Britton, 1978**

*Allothnonius* Britton, 1978: 38. Type species: *Allothnonius brooksi* Britton, 1978, by original designation.

**Diagnosis.** Labial palp with terminal palpomere about as long and wide as penultimate palpomere. Terminal maxillary palpomere slender, as long as the proximal 3 palpomeres together, upper side with a shallow, dull-surfaced depression. Antenna with 10 antennomeres, club with 6–7 lamellae in male. Labrum convex, not protruding beyond face of the clypeus, with long setae. Clypeus with anterior face wide, ratio of greatest width to mid depth about 4–5:1, with numerous scattered setiferous punctures including some longer setae, upper surface broadly rounded, without an emargination. Surface of frons, pronotum, and scutellum either with long, pale-yellow, backwardly directed setae, sometimes interspersed with elongate, adpressed, white setae; or only with adpressed white setae. Elytra sometimes with a few, long setae close to the base, otherwise with minute, stout setae; lateral margin with fringe of longer, stout, brown setae. Pygidium with uniform but sparse clothing of short setae or adpressed, elongate, white scales. Thorax with long, fine setae beneath. Spurs of metatibia long (1.2 mm) and uniformly tapered to apex. Claws long and sharply curved, with a strong tooth beneath the base.

In the most recent key to Australian Melolonthini *sensu lato* (Weir *et al.* 2019), *Allothnonius* separates from *Othnonius* Olliff, 1891 at couplet 11. *Allothnonius* have the metatibial spurs long and uniformly tapered (short, broad and flattened in *Othnonius*), and have at least a few broad or elongate, adpressed, white scales or flattened, adpressed setae on the anterior faces of the prefemora and/or protibiae (setose in *Othnonius*).

**Distribution.** Known from northeastern Queensland (Einsleigh Uplands and south of Townsville) and northwestern Northern Territory in areas dominated by savannah vegetation (Fig. 18). The area south of Townsville where *A. brooksi* occurs is the Burdekin Gap, an area of tropical savannah and the largest dryland biogeographical barrier on Australia's east coast (Bryant & Krosch 2016) – it separates the Wet Tropics from the moist Central Mackay Coast. Given the predominance of this vegetation type and the uniformity of climate types across the intervening area between the Queensland and Northern Territory distributions (Fig. 18), it would not be surprising if additional species were discovered. As with many other Australian Melolonthini, adults probably emerge only over a few days each year, and this has restricted collection opportunities.

### ***Allothnonius mouldsi* Allsopp & Smith, new species**

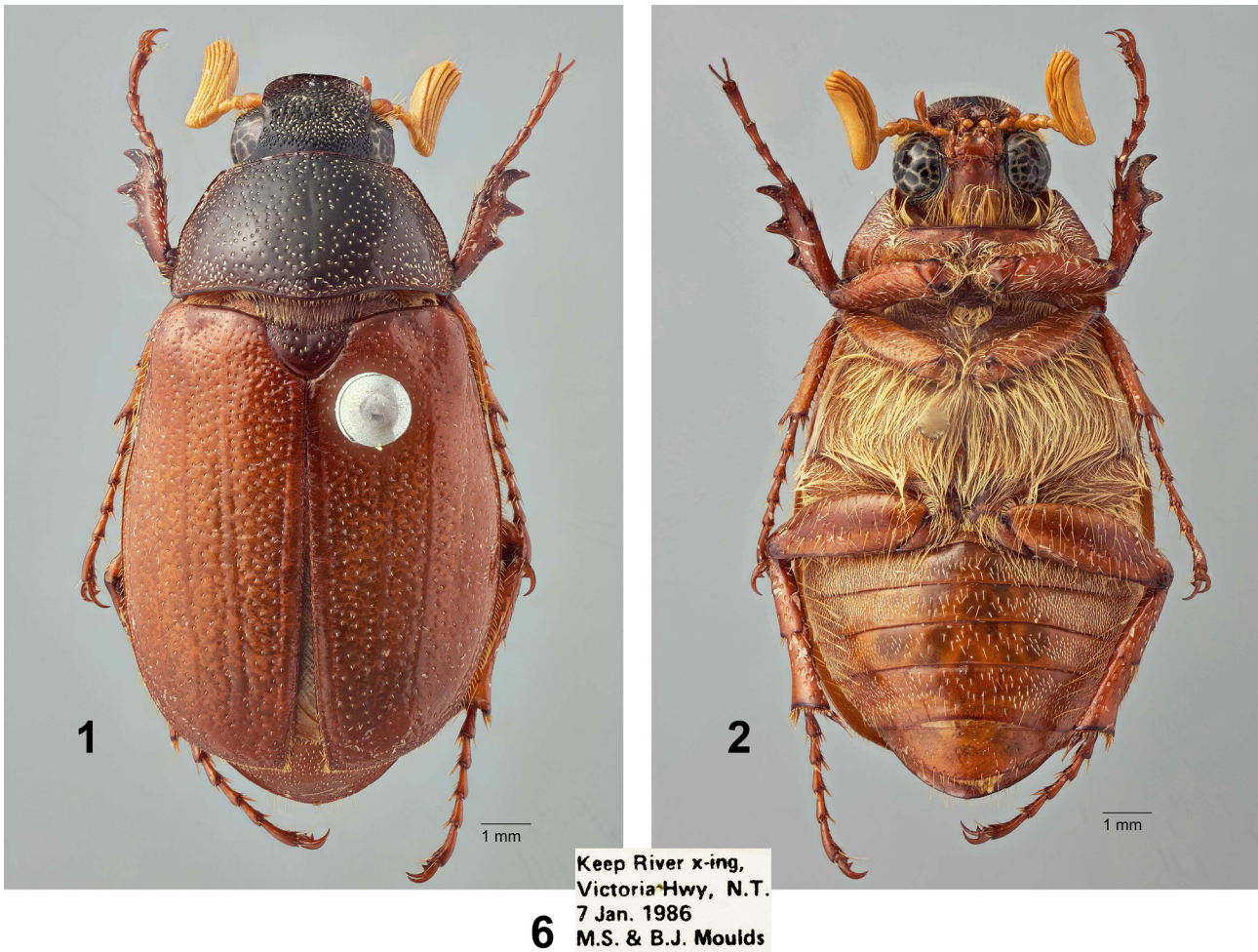
(Figs. 1–6, 18)

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**Type series.** Holotype ♂. NORTHERN TERRITORY, Keep River x-ing [Crossing] [15.872°S, 129.182°E], Victoria Hwy [Highway], N.T. 7 Jan. 1986 M.S. & B.J. Moulds | Photographed Specimen [purple label] | QM Reg. No. T250929 [yellow label]; in QM.

Paratype. 1♂, same collection data as holotype [CMNC].

**Description. Male holotype** (Figs. 1–5). Body 14.5 mm long; head black; pronotum very dark brown to black; scutellum lighter brown; elytra, pygidium, legs and abdominal ventrites brown; antennae pale yellow-brown; palpi reddish brown. Labrum rounded laterally with deep median indentation, not protruding beyond anterior margin of upper clypeus, with a mixture of scattered short and longer setae. Terminal palpomere of maxillary palp slender, about as long as palpomeres 1–2 together, dull area on upper surface. Anterior face of clypeus 5x as wide as long, with line of setiferous punctures across middle and laterally; outline of upper surface broadly rounded with a



**FIGURES 1–6.** *Allothnonius mouldsi* Allsopp & Smith **new species**, holotype male. 1, dorsal view; 2, ventral view; 3, aedeagus, lateral view; 4, aedeagus, dorsal view; 5, aedeagus, ventral view; 6, label.

slight median indentation, without an emargination but reflexed on anterior, surface very coarsely punctured, with flattened, adpressed, white setae, longer, thinner and denser laterally. Frons coarsely and densely punctured, anterior quarter with long, thin, white setae with a few shorter, broader, flattened, white setae in between; median half covered with dense, flattened, white setae. Ocular canthi with longer, pale-yellow setae in addition to flattened, white setae. Antennal club in males 7-lamellate but lamella of antennomere 4 0.8x length of other lamellae; antennomere 3 wedge-shaped. Pronotal width across base 2x mid length, sides obtusely angled behind middle, anterior and posterior

angles obtuse, posterior angles slightly rounded, anterior and posterior margins narrowly raised and defined by grooves continuous from side to side; surface coarsely punctured, with short, flattened, white setae varying in size from contained within their punctures to about twice puncture diameter. Scutellum with scattered setae similar to pronotal setae. Elytral sutural and two other striae impressed, surface fairly uniformly punctured, punctures smaller than those on pronotum and each containing a small, flattened, pale seta; lateral margins with fringe of light-brown setae. Propygidium uniformly and densely clothed with recumbent, parallel-sided, flattened, pale-yellow setae. Pygidium with scattered, flattened, white setae, sparser in posterior angle; posterior margin with longer, finer, brown setae. Ventral thorax with dense, long, pale-yellow setae. Legs with scattered pale-yellow setae and a few flattened, white setae. Abdominal ventrites laterally with dense, flattened, white setae, longer and more scattered medially, posterior half of penultimate segment and posterior segment almost bare, bare area on penultimate segment bounded anteriorly by row of long, yellow-brown setae, posterior margin of posterior segment with long, yellow-brown setae. Aedeagus (Figs. 3–5) symmetrical, lateral edges slightly tapering then expanded, rounded and folded dorsally at apices.

**Variation (paratype).** Body 13.8 mm long; head very dark brown to black; pronotum dark brown; scutellum and elytra brown with apices slightly darker; pygidium, ventral thorax, and legs lighter brown; ventrites dark brown except posterior half of penultimate and all of final ventrite lighter brown. Anterior face of clypeus 4.7x as wide as long. Pronotal length 1.8x width. Scutellum laterally with a few scattered setae similar to pronotal setae, centre almost bare. Abdominal ventrites with dense, flattened white setae extending across middle (except on posterior half of penultimate ventrite and posterior ventrite).

**Female.** Unknown.

**Etymology.** Named for Max Moulds, continuing the use in the genus of names that honour one of the collectors. A noun in the genitive case.

**Distribution.** Known only from the type locality (Fig. 18); it has a Köppen-Geiger climate classification (Beck *et al.* 2018) of Aw (savannah).

**Natural history.** The type series was collected during early January. Both specimens had moth scales attached, so were presumably taken at light.

### ***Allothnonius barretti* Britton, 1978**

(Figs. 7–10, 18)

*Allothnonius barretti* Britton, 1978: 39, Figs. 120–122, 276B.

**Type series.** Holotype (by original designation) ♂: AUSTRALIA: QUEENSLAND: 45 mi. [72 km] SSW of Mt Garnet [18.27°S, 144.82°E], 4.xii.1968, J. Barrett, flying in daylight [ANIC, examined].

Paratypes (examined). AUSTRALIA: QUEENSLAND. 8♂, same data as holotype [ANIC]; 1♂, Minnamoolka, 4.xii.1968 [UQIC, registration number 49187].

**Other specimens examined.** AUSTRALIA: QUEENSLAND. 8♂, Minnamoolka, Kennedy Turnoff, 4 mls [6.4 km] north Herberton Shire | flying over grass 11 am, 4.xii.[19]68, J.H. Barrett [QDAF, registration numbers 0-049919, 0-049920, 1-004146, 1-004147, 1-004148, 1-004149, 1-004150; QM].

**Redescription. Male** (Figs 7–10). Body 15–17 mm long; head black; pronotum, scutellum, elytra, ventral thorax, and abdominal ventrites dark red-brown; antennae yellow-brown; palpi and legs red-brown. Labrum slightly curved laterally with a median indentation, not protruding beyond anterior margin of upper clypeus, with long, reddish-yellow setae. Terminal palpomere of maxillary palp slender, shorter than palpomeres 1–2 together, with dull area on upper surface. Anterior face of clypeus 4x as wide as long, with setiferous punctures along anterior margin, posterior surface smooth; outline of upper surface broadly rounded with a slight median indentation without an emargination but reflexed on anterior, surface very coarsely punctured, with long, yellow-brown setae and flattened, adpressed, white setae. Frons coarsely and densely punctured, covered with dense, long, yellow-brown setae intermixed with a few short, adpressed, white setae; ocular canthi with dense, long, stout setae. Antennal club in males 7-lamellate but lamella of antennomere 4 0.75x length of other lamellae. Pronotal width across base 2x mid length, sides evenly rounded in middle, anterior angles widely obtuse, posterior angles obtuse and slightly rounded, anterior margin not defined, posterior margin defined across middle by a groove and ridge; surface sparsely and irregularly punctured, with long, erect, yellow-brown setae on anterior, posterior and extreme lateral edges, disc with short, flattened,

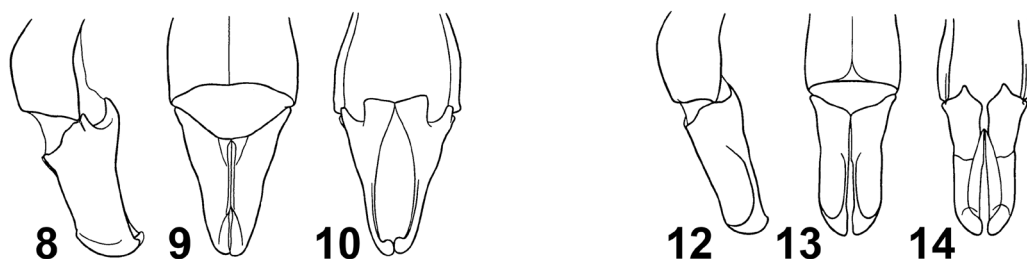
white setae varying in size from contained within their punctures to about 1.5x puncture diameter. Scutellum with scattered, long setae mainly across anterior. Elytra with odd-numbered intervals narrow, convex and unpunctured, punctures smaller than those on pronotum and each containing a small, pale seta; lateral margins with a fringe of longer, stout, light-brown setae. Propygidium densely covered with thin, pale-yellow setae. Pygidium with scattered thin, pale-yellow setae up to 2x as long as puncture diameter. Ventral thorax with dense, long, pale-yellow setae. Legs with scattered pale yellow setae and a few, flattened, white setae. Abdominal ventrites with long, pale yellow setae. Aedeagus (Figs. 8–10) with lateral edges tapering to rounded apices.

**Female.** Unknown.

**Distribution.** Although labelled differently, all specimens appear to have come from the same location (Fig. 18) and were collected on the same day. The locality has a Köppen-Geiger climate classification (Beck *et al.* 2018) of Cwa (humid subtropical).

**Natural history.** Adult males were flying in daylight at 11:00 hr in early December.

**Remarks.** Britton (1978) stated that some of the 23 paratypes with the same data as the holotype were in QDAF. However, none of the seven specimens in QDAF have paratype labels or Britton's identification labels.



**FIGURES 7–14.** *Allothnonius* spp., males. 7–10. *Allothnonius barretti* Britton, 1978. 7, dorsal view; 8, aedeagus, lateral view; 9, aedeagus, dorsal view; 10, aedeagus, ventral view. 11–14. *Allothnonius brooksi* Britton, 1978. 11, dorsal view; 12, aedeagus, lateral view; 13, aedeagus, dorsal view; 14, aedeagus, ventral view. Figs. 8–10, 12–14 reproduced from Britton (1978) (© CSIRO).



FIGURES 15–17. *Allothnonius brooksi* Britton, 1978, female. 15, dorsal view; 16, ventral view; 17, dorso-lateral view.

***Allothnonius brooksi* Britton, 1978**

(Figs. 11–18)

*Allothnonius brooksi* Britton, 1978: 39, Figs. 13, 117–119, 276A; Weir *et al.* 2019, Fig. 31.156, Plate 60B.

**Type series.** Holotype (by original designation) ♂: AUSTRALIA: QUEENSLAND: Emmett Creek, Cromarty [19.47°S, 147.05°E], 6.xii.[19]65, J.G. Brooks & E.P. Brooks [ANIC, examined].

Paratypes (examined). AUSTRALIA: QUEENSLAND: 20♂, same data as holotype [ANIC]; 4♂, Townsville [19.26°S, 146.82°E], Dodd [SAM]; 4♂ on one card, Emmett Creek, Cromarty, about 20 miles S Townsville, 6.xii.1963, J.G. Brooks & E.P. Brooks [ANIC]; 2♂, Cromarty, Townsville, 6.i.1964, J.G. Brooks [ANIC]; 2♂, Brandon [19.55°S, 147.35°E], 13.viii.1968, I.T. Freshwater [ANIC, QM registration number T250928].

**Other specimens examined.** AUSTRALIA: QUEENSLAND. 1♂, Emmett Creek, Cromarty, 6.xii.1965 J.A.G. Brooks [QDAF registration number 1-004151]; 1♂, Cromarty, 12 km south, J & E B[rooks] [ANIC]; 1♀, Brandon [19.55°S, 147.35°E], 13.viii.1968, I.T. Freshwater [QM]; 18♂ Airville [19.65°S, 147.35°E], 21.i.[19]70, A. Johnson E. Adams [ANIC].

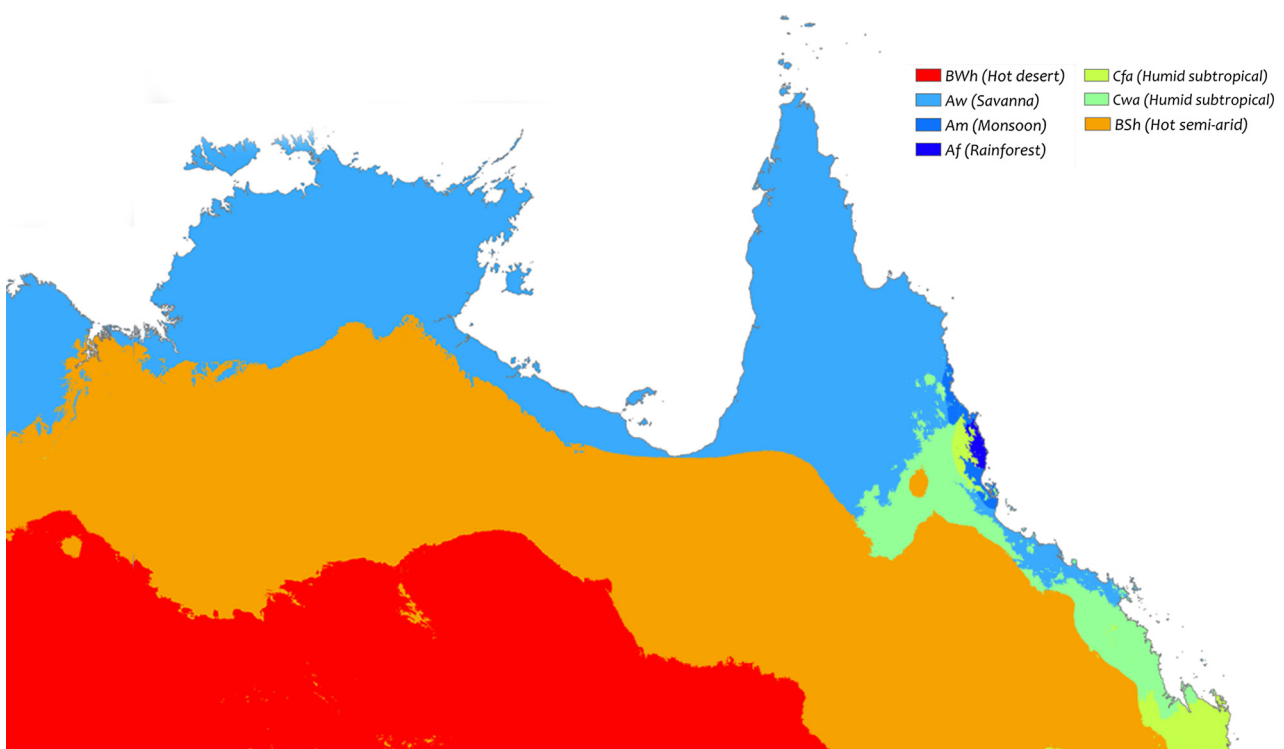
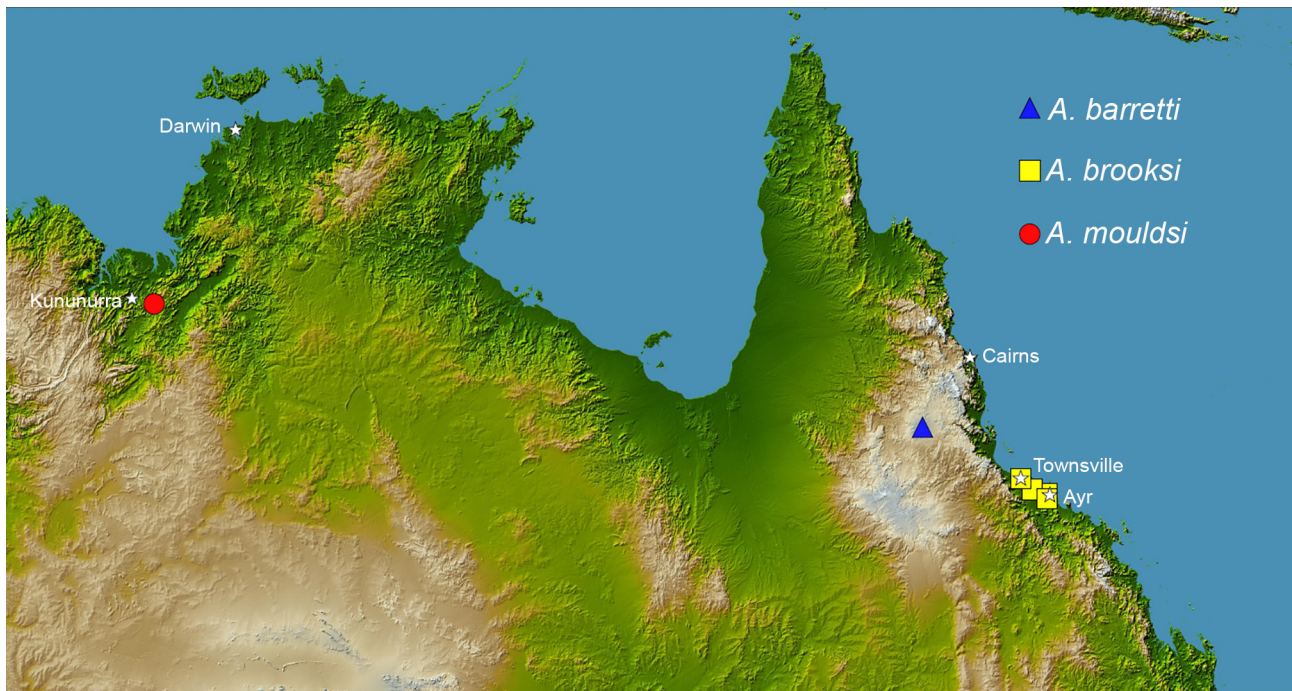


FIGURE 18. Known collection localities of *Allothnonius* spp. in northern Australia.

**Redescription Male** (Figs 11–14). Body 11–14 mm long; head, pronotum, scutellum, and ventral thorax black; elytra and abdominal ventrites dark red-brown; antennae pale yellow-brown, scape sometimes light brown; palpi and tarsi reddish brown; coxae, femora, and tibiae very dark brown to black. Labrum rounded laterally with slight median indentation, not protruding beyond anterior margin of upper clypeus, with a few scattered, short setae. Terminal palpomere of maxillary palp slender, about as long as palpomeres 1–2 together, with dull area on upper surface. Anterior face of clypeus 4x as wide as long, with setiferous punctures along anterior margin, posterior surface smooth; outline of upper surface broadly rounded, without emargination but reflexed on anterior, surface very coarsely punctured, long, yellow-brown setae intermixed with a few, flattened, adpressed, white setae across

the posterior margin and scattered on anterior half. Frons coarsely and densely punctured, covered with dense, long yellow-brown setae intermixed with a few short, adpressed, white setae; ocular canthi with dense fringe of long, stout, yellow-brown setae. Antennal club 6-lamellate, all lamellae about the same length; antennomere 4 slightly wedge-shaped anteriorly. Pronotal width across base 2x mid length, sides obtusely angled in middle, anterior angles widely obtuse, posterior angles obtuse and slightly rounded, anterior and poster margins narrowly raised and defined by grooves continuous from side to side except in middle of posterior margin; surface coarsely punctured, covered with long, erect, yellow-brown setae intermixed with short, flattened, white setae varying in size from contained within their punctures to about 2x puncture diameter. Scutellum with a few scattered setae similar to both pronotal types. Elytra with only sutural stria impressed, surface fairly uniformly punctured, punctures smaller than those on pronotum and each containing a small, pale seta; lateral margins with a fringe of very long, stout, light-brown setae. Propygidium and pygidium uniformly clothed with recumbent, parallel-sided, flattened, white setae. Ventral thorax with dense, long, pale-yellow setae. Legs with scattered, pale-yellow setae and a few flattened, white setae. Abdominal ventrites with long, pale-yellow setae intermixed with denser, flattened, white setae. Aedeagus (Figs. 12–14) with lateral edges almost parallel then rounded at apices.

**Female** (Figs. 15–17). Body 13.8 mm long; head, pronotum, scutellum, and ventral thorax dark brown; elytra and abdominal ventrites red-brown; antennae pale yellow-brown, scape light brown; palpi and legs reddish brown, coxae brown. Labrum rounded anteriorly, not protruding beyond anterior margin of upper clypeus, with a few scattered, short setae. Terminal palpomere of maxillary palp slender, about as long as palpomere 1, with dull area on upper surface. Anterior face of clypeus 4x as wide as long, with setiferous punctures across middle, anterior surface smooth, posterior surface smooth with occasional punctures; outline of upper surface broadly rounded, without emargination but slightly reflexed on anterior, surface very coarsely punctured, with long, yellow-brown setae. Frons coarsely and densely punctured, covered with dense, long yellow-brown setae intermixed with a few short, adpressed, white setae; ocular canthi with dense fringe of long, stout, yellow-brown setae. Antennae of 10 antennomeres, club 6-lamellate but club rounded with lamella of antennomere 5 about 0.5x length of antennomere 9 (the longest antennomere of the club). Pronotal width across base 1.9x mid length, sides rounded, anterior angles widely obtuse, posterior angles slightly obtuse and slightly rounded, anterior and poster margins narrowly raised and defined by grooves continuous from side to side except in middle of posterior margin; surface coarsely punctured, covered with long, erect, yellow-brown setae intermixed with short, flattened, white setae varying in size from contained within their punctures to about 2x puncture diameter. Scutellum with a few scattered setae similar to both pronotal types. Elytra with only sutural stria impressed, surface fairly uniformly punctured, punctures smaller than those on pronotum and each containing a small, pale seta; lateral margins with a fringe of very long, stout, light-brown setae. Propygidium and pygidium uniformly clothed with recumbent, parallel-sided, flattened, white setae. Ventral thorax with dense, long, pale-yellow setae. Legs with scattered, pale-yellow setae and a few flattened, white setae. Abdominal ventrites with long, pale-yellow setae intermixed with denser, flattened, white setae.

**Distribution.** Known from the coastal area between Townsville and Ayr in northeastern Queensland (Fig. 18). All localities have a Köppen-Geiger climate classification of Aw (savannah).

**Natural history.** Adults of both sexes have been collected in August and December–January.

Female antennae (Fig. 17) are consistent (Allsopp 1990) with other Australian old-Gondwanan Melolonthini (Allsopp 1995) where both genders do not feed as adults, and the females fly little (if at all) and attract males with pheromones (Allsopp 1993). This contrasts with more recent Oriental arrivals, such as *Lepidiota* spp., where male and female antennal clubs are similar, and mating appears to take place at feeding sites.

## Key to males

- 1 Frons (Fig. 1) with anterior three-quarters covered with dense, flattened, white setae that are shorter medially, without long setae; pronotum (Fig. 1) without long setae, with short, flattened, white setae varying in size from contained within their punctures to about twice puncture diameter; aedeagus as in Figs. 3–5; northwestern Northern Territory . . . . . *Allothnionius mouldsi* Allsopp & Smith, **new species**
- Frons with dense, long, yellow-brown setae intermixed with a few short, adpressed, white setae; pronotum with long, erect setae at least on the anterior and posterior margins; northeastern Queensland . . . . . 2



- 2 Pronotum (Fig. 7) with long, erect setae on the anterior and posterior margins, disc without long setae but with short, flattened, white setae varying in size from contained within their punctures to about 1.5x puncture diameter; propygidium with dense, pale-yellow setae, pygidium with scattered, thin, pale-yellow setae up to about 1.5x as long as puncture diameter; antennal club in males 7-lamellate but lamella of antennomere 4 0.75x length of other lamellae; pronotum reddish brown; aedeagus as in Figs. 8–10 ..... *Allothnonius barretti* Britton, 1978
- Pronotum (Fig. 11) covered with long, erect setae intermixed with short, flattened, white setae varying in size from contained within their punctures to about twice puncture diameter; propygidium and pygidium uniformly clothed with recumbent, parallel-sided, flattened, white setae; antennal club in males 6-lamellate, all lamellae about the same length (in females 6-lamellate but club rounded with lamella of antennomere 5 about half length of lamella 9); pronotum very dark brown, almost black; aedeagus as in Figs. 12–14 ..... *Allothnonius brooksi* Britton, 1978

## Acknowledgements

We thank Peter Hudson (SAM), Justin Bartlett (QDAF), Thekla Pleines, and Adam Ślipiński (ANIC) for facilitating access to specimens in their care, Geoff Thompson (QM) for the new images, and Claire Gibson (CSIRO) for permission to reproduce figures from Britton (1978). Aleš Bezděk and Paul Hutchinson provided useful comments on the manuscript.

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