Zootaxa 5839 (2): 201–244
https://www.mapress.com/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5839.2.1
http://zoobank.org/urn:lsid:zoobank.org:pub:54C5CF58-43E5-462F-BB3E-73BBE4C4CE38

Revision of the cicada genus *Tamasa* Distant, 1905 with the description of twelve new species from Queensland (Cicadidae: Cicadinae: Tamasini)

M.S. MOULDS
Australian Museum Research Institute, Australian Museum, 1 William St, Sydney, NSW 2010.
msmoulds@gmail.com; https://orcid.org/0000-0002-2505-1854

Table of Contents

Abstract

Twelve new species of *Tamasa* are described from Queensland, *T. capensis* **sp. nov.**, *T. dolabra* **sp. nov.**, *T. imber* **sp. nov.**, *T. ewarti* **sp. nov.**, *T. gigas* **sp. nov.**, *T. kirramae* **sp. nov.**, *T. lanei* **sp. nov.**, *T. lewisensis* **sp. nov.**, *T. lindsayi* **sp. nov.**, *T. pearsoni* **sp. nov.**, *T. rentzi* **sp. nov.** and *T. timothyi* **sp. nov.** A lectotype is designated for *Tibicen kurandae* Goding & Froggatt, 1904 and it is taken from synonymy with *T. tristigma* and treated as a distinct species. All 18 species are illustrated as close to live colour as possible, distinguishing features documented, and a key to males included. Distributions for all species are accurately documented for the first time. Discussion is provided on relationships and distributions.

Key words: Cicadoidea, Auchenorrhyncha, phylogeny, taxonomy, lectotype, key

Accepted by A. Sanborn: 16 May 2026; published: 29 Jun. 2026

Introduction

The endemic Australian genus *Tamasa* was established by Distant (1905) to accommodate three species, *Tamasa tristigma* (Germar, 1834), *T. doddi* (Goding & Froggatt, 1904) (later synonymised with *tristigma* by Distant 1914 but then resurrected by Southcott 1988, Moulds 1990), and *T. kurandae* (Goding & Froggatt, 1904) (later synonymised with *tristigma* by Distant 1907). However, Distant unknowingly described another new *Tamasa* at the time, *burgessi*, by incorrectly placing it in the genus *Abricta* from which it was removed by Moulds (2012) as *Tamasa burgessi* (Distant, 1905). Five years later Ashton (1912) added *Tamasa rainbowi*, the largest and most beautifully coloured of the *Tamasa* species. It was to be another 102 years before the next *Tamasa* was described, *T. caverna* Moulds & Olive, 2014, a remarkable species that haunts the caverns of Black Mountain in northern Queensland. Thus, as no further species have been described, the genus currently includes five recognised species, *T. burgessi*, *T. caverna*, *T. doddi, T. rainbowi* and *T. tristigma.*

Their biology has remained largely undocumented and details are only available for *T. tristigma*. Moulds (1990) noted that *T. tristigma* lay in dead twigs of *Casuarina* (family Casuarinaceae) and *Acacia prominens* (family Fabaceae). Ewart (2001) provides a detailed study of song behaviour in *Tamasa tristigma*, and Heath *et al*. (2022) list behavioural response temperatures; otherwise, documentation is scanty.

Most *Tamasa* species are remarkably similar in outward appearance, their colour being either predominantly light brown or shades of green or blue, but green and blue individuals lose their colour after death and eventually turn brown and thus appear similar to other *Tamasa* species in museum collections. This similarity in appearance, especially among museum specimens, has masked cryptic species that are easily distinguished by the male genitalia. In this revision a lectotype is designated for *Tibicen kurandae* Goding & Froggatt, 1904 and it is removed from synonymy with *T. tristigma* to be treated as a species in its own right. Twelve new species are described from Queensland, the centre of *Tamasa* diversity, thus taking the total number of recognised *Tamasa* species from five to 18.

Materials and methods. Full synonymies for previously described species are provided by Sanborn (2013) and are not repeated here.

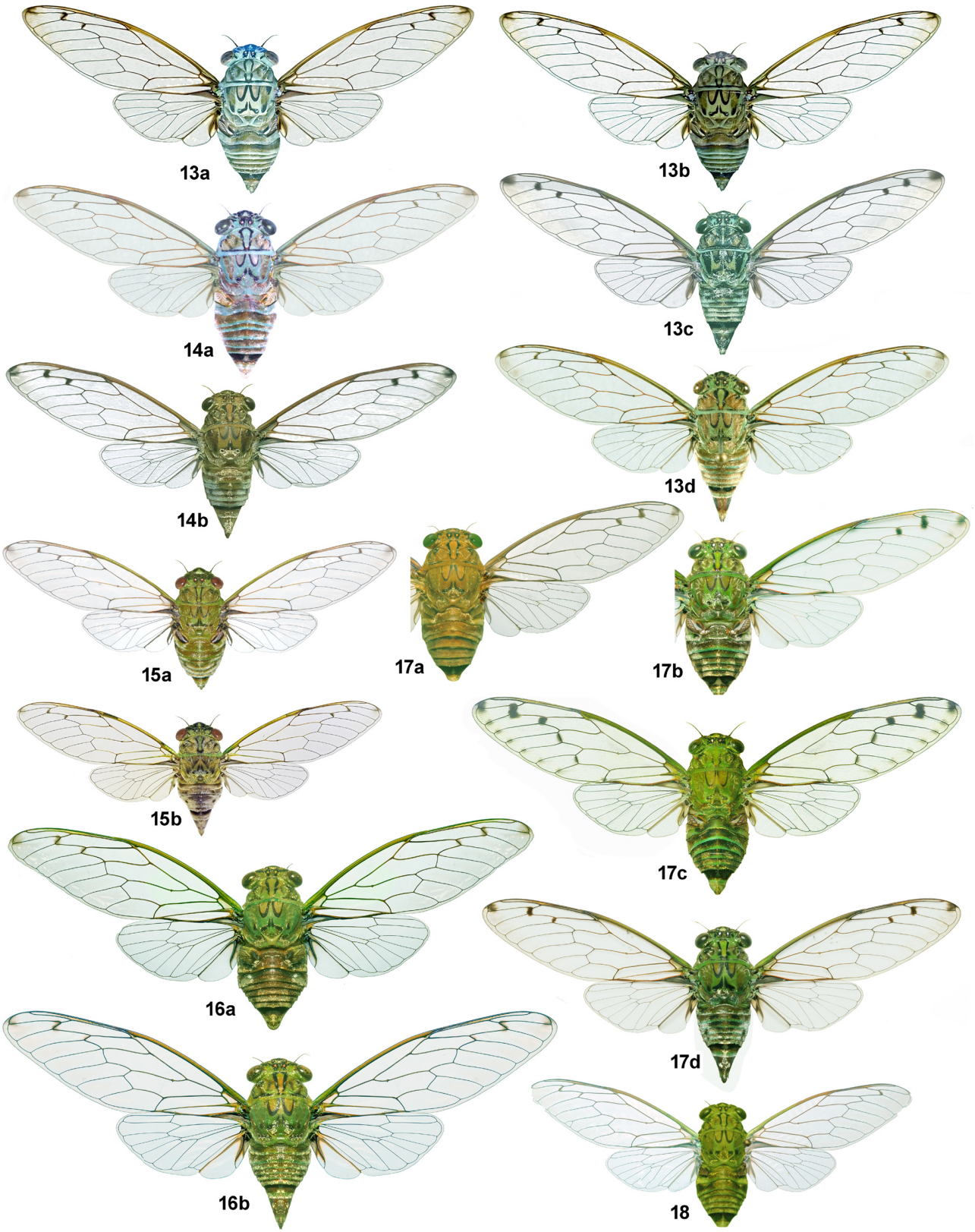
Except for distinctive species with external morphological features allowing positive identification, distributions are based on more than 200 male genitalia dissections confirming species identities that might otherwise be questionable. Molecular data for eight of the 18 *Tamasa* species are available from the Barcode of Life Database (BOLD) and have been used to corroborate species identities based on male genitalia. Songs are not included here and will be treated in a future publication.

Genitalia were dissected from relaxed males and processed through 10% KOH at room temperature to remove extraneous tissue and to lighten and soften structures for examination and illustration.

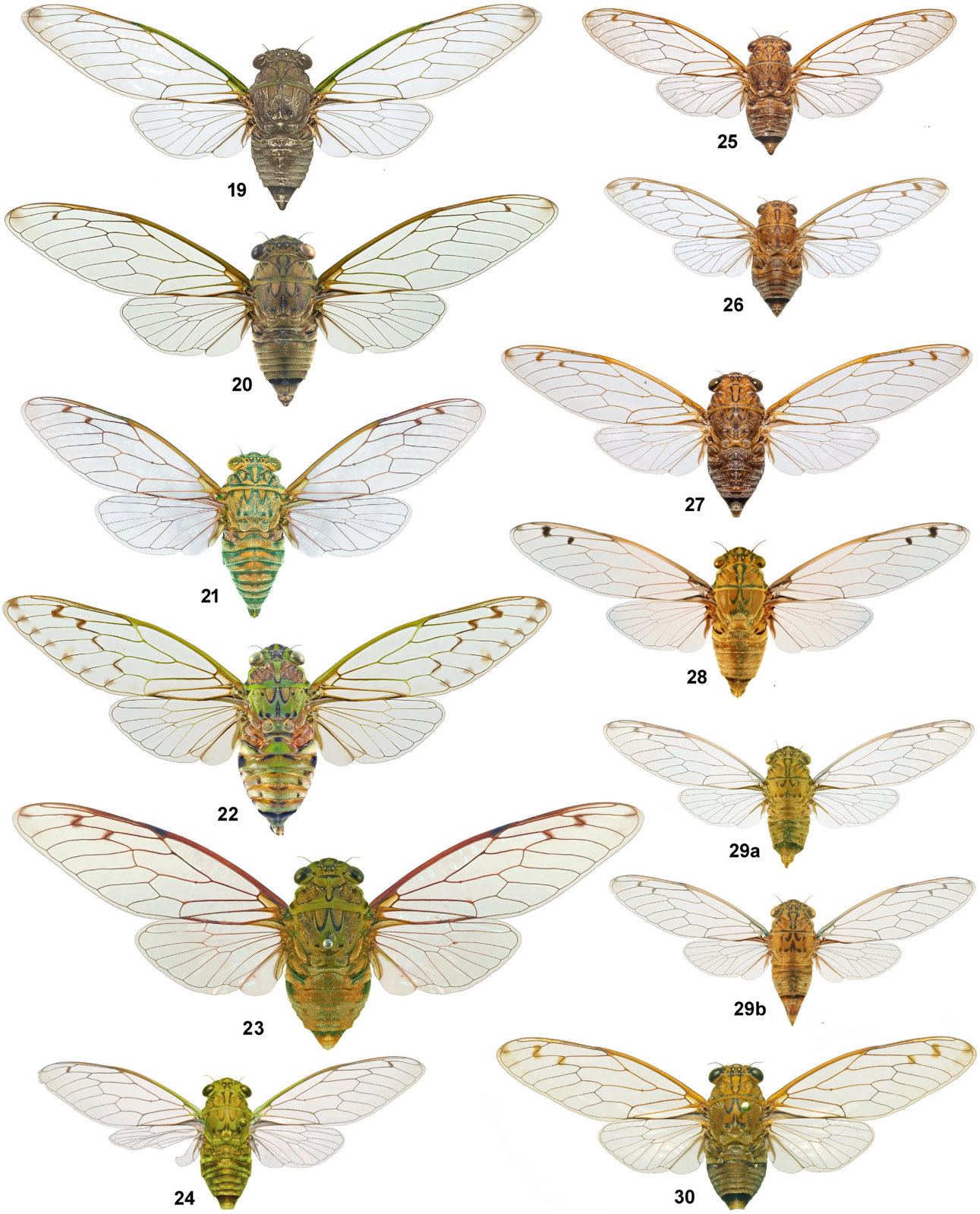
Terminology for morphological features follows that of Moulds (2005, 2012) where the morphology of *Tamasa tristigma* is figured in detail including the male and female reproductive systems. The following abbreviations are used for collections housing specimens: **AMS** Australian Museum, Sydney; **ANIC** Australian National Insect Collection, Canberra; **ASCU** Agricultural Scientific Collections Unit, Orange; **DE** collection of David Emery; **LWP** collection of Lindsay Popple; **MMUS** Macleay Museum, University of Sydney; **MSM** author's collection; **NMV** Museums Victoria, Melbourne; **NHMUK** Natural History Museum, London; **OUMNH** Oxford University Museum of Natural History, London, UK; **QM** Queensland Museum, Brisbane.

FIGURES 1–12. *Tamasa* species in life. **(1)** *T. tristigma* male in song mode; **(2)** *T. kurandae* stat. rev. male, brown form, Black Mountain Rd, Kuranda; **(3)** *T. kurandae* stat. rev., mating pair, blue male and brown female, Carrington Rd, Atherton; **(4)** *T. kurandae* stat. rev. male, blue form, Carrington Rd, Atherton; **(5)** *T. imber* sp. nov. male, Carrington Rd, Atherton; **(6)** *T. imber* sp. nov. male, Carrington Falls; **(7)** *T. pearsoni* sp. nov. female, Mandalay Heights, Airlie Beach; **(8)** wing of male *T. doddi* showing red ectoparasitic larval mites, *Caeculisoma mouldsi*, which favour attachment to the wing veins; **(9)** *T. lindsayi* sp. nov. female, Farnborough; **(10)** *T. lanei* sp. nov. male, green form, Atherton; **(11)** *T. caverna* male, Black Mountain; **(12)** *T. lanei* sp. nov. male, brown form, Eubenangee Swamp. Images not to scale.

Photograph credits: 1–6, 9, 10 and 12 by L. Popple; 7 by S. & A. Pearson; 8 and 11 by K. Hill and D. Marshall.



FIGURES 13–18. *Tamasa* species, reproduced in colour as close to life as was possible, mostly from live specimens. **(13a-b)** *T. imber* sp. nov., male colour variants; **(13c-d)** *T. imber* sp. nov., female colour variants; **(14a)** *T. kurandae* stat. rev., male blue form; **(14b)** *T. kurandae* stat. rev., female brown form; **(15a)** *T. pearsoni* sp. nov., male; **(15b)** *T. pearsoni* sp. nov., female; **(16a)** *T. lewisensis* sp. nov., male; **(16b)** *T. lewisensis* sp. nov., female; **(17a)** *T. lanei* sp. nov., male brown form; **(17b)** *T. lanei* sp. nov., male green form; **(17c)** *T. lanei* sp. nov., male with extra wing infuscations; **(17d)** *T. lanei* sp. nov., female green form; **(18)** *T. timothyi* sp. nov., male holotype. Approximately 1.3x natural size.



FIGURES 19–30. *Tamasa* species, reproduced in colour as close to life as was possible, mostly from live specimens. **(19)** *T. doddi*, male; **(20)** *T. rentzi* sp. nov., male; **(21)** *T. caverna*, male; **(22)** *T. rainbowi*, male; **(23)** *T. gigas* sp. nov., male holotype; **(24)** *T. dolabra* sp. nov., male holotype; **(25)** *T. ewarti* sp. nov., male; **(26)** *T. capensis* sp. nov., male; **(27)** *T. tristigma*, male; **(28)** *T. burgessi*, male; **(29a)** *T. lindsayi* sp. nov., male; **(29b)** *T. lindsayi* sp. nov., female; **(30)** *T. kirramae* sp. nov., male holotype. Approximately 1.2x natural size.

Tribe Tamasini Moulds, 2005

Genus *Tamasa* Distant, 1905

Type species: *Cicada tristigma* Germar, 1834, by original designation.

An endemic Australian genus now including 18 species distributed through eastern Australia, mostly through eastern Queensland as far north as Bamaga but as yet unknown from the Torres Strait Islands.

The genus has been defined in detail by Moulds (2012). Typically, *Tamasa* species can be recognised in having forewing infuscations at the wing apex (always except in some aberrant specimens) and often to crossveins r and r-m (variable), a keyhole-shaped outline along the pronotal midline, and the submedian sigilla outlined in black but the lateral sigilla ill-defined. The male genitalia are clearly diagnostic for all species, in particular in the shape of the uncus and theca.

The phylogenetic relationships of *Tamasa* to other genera has been investigated by Moulds (2005) and Marshall *et al*. (2018). *Tamasa* falls as sister to *Parnquila* and *Parnkalla* (all Tamasini), these in turn sister to *Burbunga* (Burbungini).

Key to species of *Tamasa* (males only)

Tamasa species are remarkably similar in colour and markings and blue or green individuals turn brown over time following death causing further difficulties in identification of collection specimens. Consequently, in using this key it is sometimes necessary to dissect the male genitalia to obtain a reliable identification although locality is often helpful. Females are best identified by locality where that is definitive but otherwise in association with males collected concurrently. Characters are best viewed under magnification.

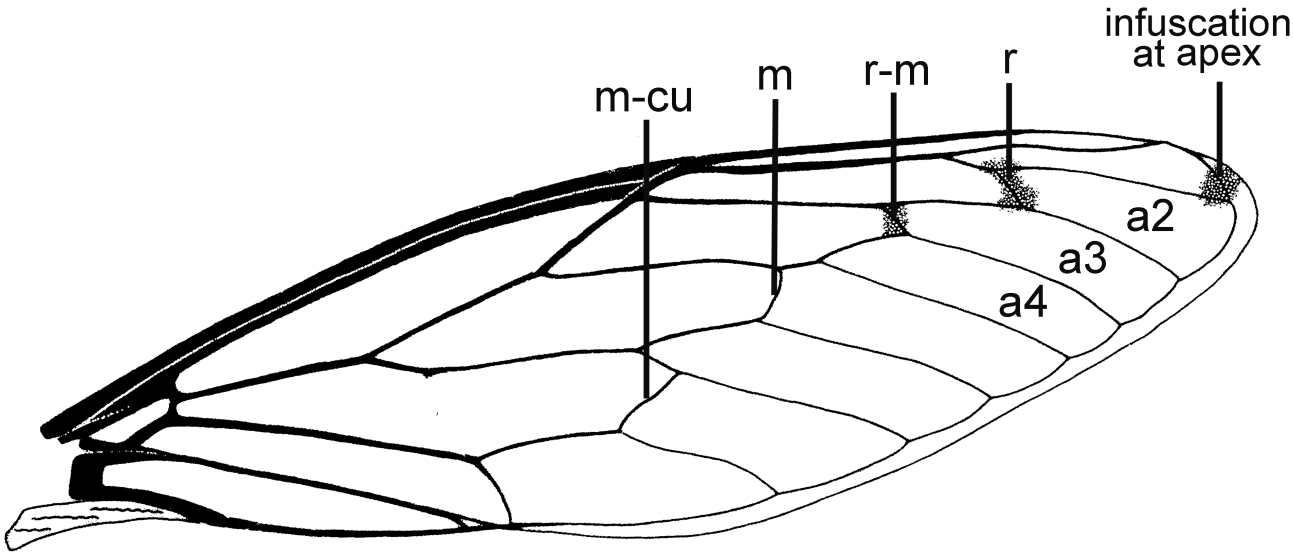


FIGURE 31. *Tamasa* forewing showing infuscations, crossveins and apical cells.

1 Forewings with at least three infuscated spots (Fig. 31), one at wing apex (sometimes indistinct), *and* always one on crossveins r and one on crossvein r-m (i.e. at bases of apical cells 2 and 3), and sometimes others. **2**

\- Forewings with two such spots, or just one, or rarely no spots at all, but usually infuscated at apex and often on crossvein r (i.e. at base of apical cell 2) **20**

2 Forewings with a row of usually six lightly infuscated spots along outer margin (at the ends of veins forming the apical cells). **3**

\- Forewings lacking such spots **4**

3 Sternite VIII (the last ventral segment, under the genitalia) entirely black; from far south-eastern Queensland . . . ***rainbowi***

\- Sternite VIII pale yellowish with a black midline of variable shape and extent; from wet tropics of north-eastern Queensland, particularly from the vicinity of Mt Fisher . . . . . ***lanei* sp. nov.**

4	Forewing 30 mm or more	**5**
-	Forewing 29 mm or less (if doubtful use this)	**12**
5	Sternite VIII (the last ventral segment, under the genitalia) pale yellowish with a clearly defined black or blackish marking on midline of variable shape and extent	**6**
-	Sternite VIII uniformly black or brown, rarely yellow, the brown or yellow sometimes with a broad, brown, central making or hints of black but never with a clearly defined black marking	**9**
6	Head close to the width of the lateral margins of pronotum (excluding lateral angles) (two large and rare species found only at Black Mountain and Paluma)	**7**
-	Head much wider than lateral margins of pronotum, sometimes nearly as wide as lateral angles (widely distributed	**8**
7	Forewings less than 37 mm long; timbals with 4 long ribs (Fig. 37); tergite 3 brown laterally; only from Black Mountain	***caverna***
-	Forewings longer than 37 mm; timbals with 5 long ribs (Fig. 45); tergite 3 black laterally; only from Paluma	***gigas* sp. nov.**
8	Distinguishable by the aedeagus of male genitalia (requires dissection) (Fig. 75); known only from Mt Lewis	***lewisensis* sp. nov.**
-	Distinguishable by the aedeagus of male genitalia (requires dissection) (Fig. 73); wet tropics of north-eastern Queensland south to Tully, including Atherton Tablelands but excluding Mt Lewis	***lanei* sp. nov.**
9(5)	Opercula pale yellow to muddy yellow; eastern Queensland south from the Mackay region	rare variant of ***tristigma***
	Opercula black or mostly so; north-eastern Queensland south to Innisfail region	**10**
10	Forewings with strongly infuscated spots at apex and on crossveins r and r-m (known only from the Kirrama Range)	***kirramae* sp. nov.**
-	Forewings with small weak infuscations; rare aberrant individuals (tropical Queensland but excluding the Kirrama Range)	**11**
11	Distinguishable by aedeagus of male genitalia (requires dissection) (Fig. 83); Gordonvale to Etty Bay	***rentzi* sp. nov.**
-	Distinguishable by aedeagus of male genitalia (requires dissection) (Fig. 59); Laura to Gordonvale including Atherton Tablelands (rare variant)	***doddi***
12(4)	Rostrum passing clearly beyond apices of hind coxae (well beyond bases of femora)	**13**
-	Rostrum reaching to or very slightly beyond hind coxae	**14**
13	Rostrum reaching to hind margin of opercula; north-eastern Queensland south to Townsville	***burgessi***
-	Rostrum *not* reaching hind margin of opercula; eastern Queensland and NSW north to the Mackay region	***tristigma***
14	Timbal covers developed and clearly projecting forwards (check carefully on lower half of timbal cavity posterior margin, and often hidden by wings in set specimens - requires magnification) (Figs 40, 41, 42)	**15**
-	Timbal covers undeveloped, ridged but not or barely developed forwards (Figs 32, 33, 36, 38)	**17**
15	Sternite VIII (the last ventral segment, under the genitalia) lacking a distinct black or blackish marking on midline (occasionally with a little blackish suffusion across base)	***kurandae* stat. rev.**
-	Sternite VIII with a black or blackish midline of variable shape and extent often broadest basally	**16**
16	Timbal covers project clearly less than half way across the timbal membrane (Fig. 40); forewing never more than 29 mm long	***imber* sp. nov.**
-	Timbal covers project about half way across the timbal membrane (Fig. 42); *some* individuals with forewing longer than 29 mm	***lanei* sp. nov.**
17(14)	Timbal covers entirely without anterior development (Figs 32, 33)	**18**
-	Timbal covers with a small anterior development (Figs 36, 38)	**19**
18	Abdomen clearly wider than thorax; confirm by aedeagus of male genitalia that tapers to a long sharp point (Fig. 55); Bamaga to McIlwraith Range (S of Iron Range)	***capensis* sp. nov.**
-	Abdomen about as wide as thorax; confirm by aedeagus of male genitalia that is apically deeply divided (Fig. 77); south-eastern Queensland south from Yeppoon	***lindsayi* sp. nov.**
19	Sternite VIII entirely dark brown to black; Elliot Falls and near Captain Billy Landing, in the far north of Cape York Peninsula	***ewarti* sp. nov.**
-	Sternite VIII pale green with a black midline widest basally; central eastern Queensland from Mackay and Cathu regions	***pearsoni* sp. nov.**

20(1) Rostrum very long, reaching to about hind margin of opercula . . . . . ***burgessi***
- Rostrum *not* reaching hind margin of opercula, extending at most just a little past apex of hind coxae **21**

21 Small cicadas, forewing less than 28 mm long **22**
- Larger cicadas, forewing 28 mm or longer **29**

22 Timbal covers undeveloped, ridged but not or barely developed forwards (check carefully on lower half of timbal cavity, and often hidden by wings in set specimens; requires magnification) (Fig. 33); northern Cape York Peninsula, Queensland south to the McIlwraith Range near Coen . . . . . ***capensis* sp. nov.**
- Timbal covers developed forwards but not necessary very far (Figs 34, 35, 36, 38, 40, 41, 42); eastern Queensland excluding northern Cape York Peninsula **23**

23 Timbal covers project about half way across timbal membrane (Fig. 42). . . . . ***lanei* sp. nov.**
- Timbal covers project less than half way across timbal membrane (Figs 34, 35, 36, 38, 40, 41) **24**

24 Abdomen below brown with varying amounts of black, sometimes extensive but never predominantly jet black; north-eastern Queensland from the McIvor River (north of Cooktown) south to Paluma 25
- Abdomen below jet black, sometimes with narrow green or yellow hind margins to some segments; Iron Range and McIlwraith Range (on Cape York Peninsula) OR Mackay region including Whitsundays. **26**

25 Sternite VIII (the last ventral segment, under the genitalia) lacking a distinct black or blackish marking on midline (occasionally with a little blackish suffusion across base). . . . . ***kurandae* stat. rev.**
- Sternite VIII with a black or blackish midline of variable shape and extent often broadest basally. . . . . ***imber* sp. nov.**

26 Timbal cover small and evenly rounded (Figs 34, 38). **27**
- Timbal covers small and angular (Figs 35, 36) **28**

27 Distinguishable only by aedeagus of the male genitalia (requires dissection) (Fig. 79); Mackay region including the Whitsundays. . . . . ***pearsoni* sp. nov.**
- Distinguishable only by the aedeagus of male genitalia (requires dissection) (Fig. 61); Iron Range . . . . . ***dolabra* sp. nov.**

28 Distinguishable only by the aedeagus of male genitalia (requires dissection) (Fig. 85); McIlwraith Range . . . . . ***timothyi* sp. nov.**
- Distinguishable only by the aedeagus of male genitalia (requires dissection) (Fig. 63); Elliot Falls and near Captain Billy Landing, in the far north of Cape York Peninsula . . . . . ***ewarti* sp. nov.**

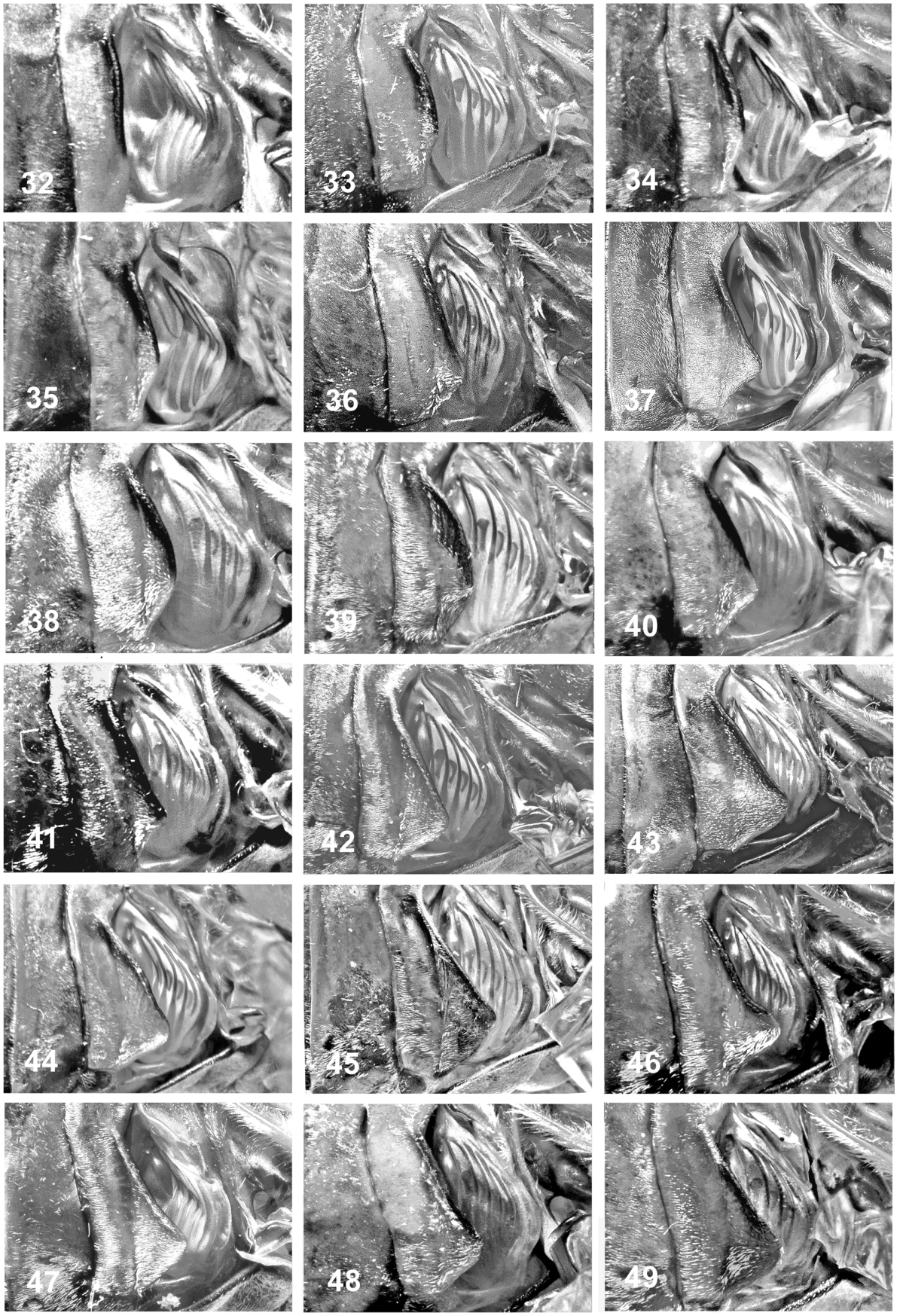
29(21) Sternite VIII (the last ventral segment, under the genitalia) pale yellowish with a *clearly defined* black midline of variable shape and extent but broadest basally; an aberrant specimen with reduced wing infuscation **30**
- Sternite VIII uniformly black or brown, rarely yellow, the brown or yellow sometimes with hints of black. **32**

30 Timbal covers barely projecting forwards (check carefully on lower half of timbal cavity posterior margin, often hidden by wings in set specimens, requires magnification) (Fig. 35); McIlwraith Range, northern Cape York Peninsula . . . . . ***timothyi* sp. nov.**
- Timbal covers clearly projecting forwards but no more than half way across timbal membrane (Figs 40, 42); Atherton Tablelands south to Paluma **31**

31 Timbal covers project clearly less than half way across the timbal membrane (Fig. 40); forewing never more than 29 mm long. . . . . ***imber* sp. nov.**
- Timbal covers project about half way across the timbal membrane (Fig. 42); forewing may also be less than 29 mm but often more than 29 mmm. . . . . ***lanei* sp. nov.**

32 Opercula pale yellow to muddy yellow; eastern Queensland south from the Mackay region. . . . . rare variant of ***tristigma***
- Opercula black or mostly so; north-eastern Queensland south to Innisfail region **33**

33 Distinguishable by aedeagus of male genitalia (requires dissection) (Fig. 83); Gordonvale to Etty Bay . . . . .***rentzi* sp. nov.**
- Distinguishable by aedeagus of male genitalia (requires dissection) (Fig. 59); Laura to Gordonvale including Atherton Tablelands . . . . . ***doddi***



FIGURES 32–49. Timbals and timbal covers of *Tamasa* species arranged in sequence from smallest to largest. **(32)** *T. lindsayi* sp. nov.; **(33)** *T. capensis* sp. nov.; **(34)** *T. dolabra* sp. nov.; **(35)** *T. timothyi* sp. nov.; **(36)** *T. ewarti* sp. nov.; **(37)** *T. caverna*; **(38)** *T. pearsoni* sp. nov.; **(39)** *T. rainbowi*; **(40)** *T. imber* sp. nov.; **(41)** *T. kurandae* stat. rev.; **(42)** *T. lanei* sp. nov.; **(43)** *T. lewisensis* sp. nov.; **(44)** *T. kirramae* sp. nov.; **(45)** *T. gigas* sp. nov.; **(46)** *T. doddi*; **(47)** *T. rentzi* sp. nov.; **(48)** *T. burgessi*; **(49)** *T. tristigma*. Not to scale.

Tamasa tristigma (Germar, 1834)

Synonymy change

Tibicen kurandae, listed as a junior synonym of *T. tristigma* since Distant (1907), is here taken from synonymy and treated as a species in its own right.

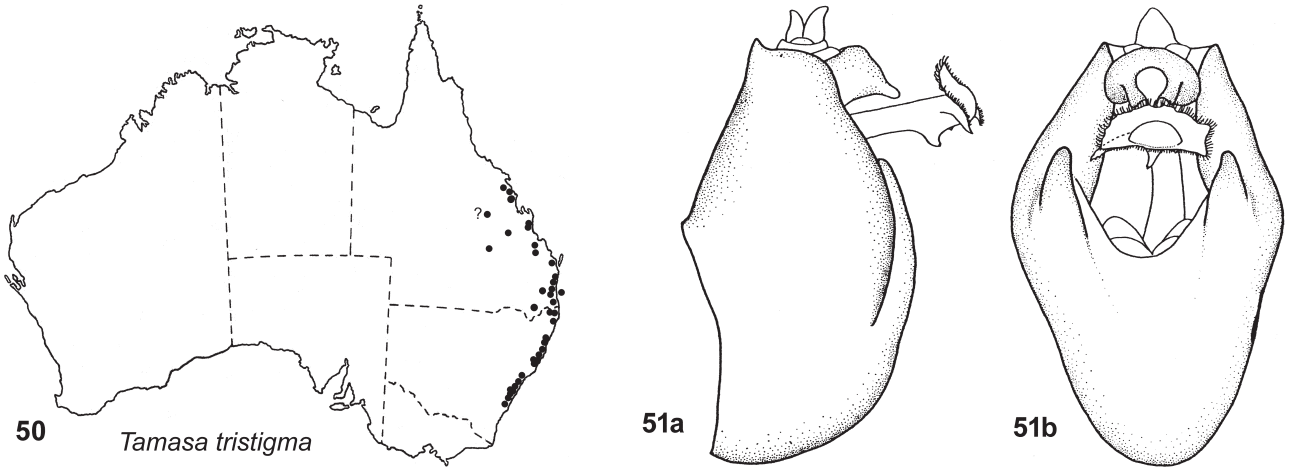
Type material. *Syntype* female, bearing two labels as follows: (1) faded blue label handwritten in ink, 'Abroma/ tristigma/Germ.', possibly by Stål, I. Landsbury pers. comm. to A. Ewart (Ewart 1990); (2) partly printed, partly handwritten in a rectangular black border 'TYPE HEM: 787/Cicada/tristigma Germar/ HOPE DEPT. OXFORD'. Examined from photographs (in **OUMNH**).

Germar (1834) provided a very brief description of the species and did not state the sex or number of specimens he examined, nor did he provide a locality apart from 'Australasia'. Ewart (1990) identified a female in OUMNH as the only available syntype.

Other material examined. QUEENSLAND: 1 male (K294845 and genitalia prep. T8), Blackdown Tableland, Expedition Range, 8.i.1976, G. Daniels; 2 males (K294837, K294842 and genitalia preps T2, T5), Lower Beechmont, 1-4.i.1982, G. J. & A. Holloway; 2 males (one K63611, K294784, genitalia prep. TAM172, the other K63611, K294785), 1 female (K294786), Clermont, i.1929, Dr K.K. Spence (**AMS**). 1 female, Brisbane, Mt Coottha, 2.iii.1985, D.P. Sands, CY 1022-11, ANIC database No. 20 005097; 1 female, (CY 1023-11, ANIC database No. 20 005098), St Lucia, Brisbane, 26.xi.1990, A.I. Knight (**ANIC**). 1 male, 1 female, Landsborough, 26°48'S 152°58'E, 25.i.1998, L. & J. Popple, [lpop]112-0001 & 112-0002; 1 male, 1 female, Carina Heights, xii.2000, L.W. & R. J. Popple, [lpop]112-0006 to 112-0007; 1 male, Carina Heights, ii.2003, L.W. Popple, [lpop]112-0008; 1 male, Carina Heights, ii.2003, R. J. Popple, [lpop]112-0010; 1 male, Carina Heights, 27°29'48"S 153°05'40"E, 17.xii.2004, L.W. Popple, [lpop]112-0023; 2 males (one genitalia prep. TAM102), Carina Heights, 27°29'48"S 153°05'40"E, xii.2007, L.W. Popple, [lpop]112-0025 & 112-0026; 1 male, Carina Heights, 27.4966 153.0945E, xii.2004, L.W. Popple, [lpop]112-0027; 1 male, Carina Heights, Brisbane, 29.i.2003, J. M. Popple, [lpop]112-0016; 1 male, Tingalpa Reservoir, 27°32'S, 153°10'E, 21.ii.1998, L. & R. Popple, [lpop]112-0003; 1 male, Camp Hill, 27°30'S 153°04'E, 10.ii.1998–26.i.1999, L. Popple, [lpop]112-0004; 1 male, Belmont Hills, 27°30'S, 153°08'E, 31.x.1999, L.W. Popple, [lpop]112-0005; 1 male, Highfields, 26.xii.2001, L. Popple & A. Strange, [lpop]112-0012; 1 female, Darra, Brisbane, iii.2003, A. & L. Lindsay, [lpop]112-0013; 1 female, Park Ridge, 18.i.1999, W. Popple, [lpop]112-0014; 1 female, Brisbane, 14.i.1998, F. Jordan, [lpop]112-0015; 1 male, Darra, 27°34'S, 152°57'E, i.2003, A. & L. Lindsay, [lpop]112-0017; 1 male, 1 female, Camp Mountain summit, 27°25'S 152°52'E, 21.xii.2003, L.W. Popple, [lpop]112-0018 & 112-0019; 1 female, Taringa, Brisbane, 27°30'S 152°59'E,5.i.2004, L.W. Popple, [lpop]112-0020; 2 males, St Lucia West, 27°30'S 153°00'E, 26.i.2004, L.W. Popple, mv lamp, [lpop]112-0021 & 112-0022; 1 male, 1 female, Governor's Chair, Spicers Gap, 28°05'07"S 152°25'03"E, 2.i.2013, L.W. Popple and A.E. McKinnon, at light, [lpop]112-0028 & 112-0029; 1 male, 1 female, Lorikeet Tourist Park, Arrawarra, 30°02'44"S 153°11'34"E, 6.xii.2015, L.W. Popple & A.E. McKinnon, at light, [lpop]112-0030 & 112-0031 (**LWP**). 1 male (molecular voucher 08.AU.QL.CUC.02), Cathu S.F., 0.7 km up range, 20º48.869'S 148º31.362'E, 645 m, 22.xii.2008, Hill, Marshall, Moulds, Owen; 17 males (two genitalia preps T28, T88), 16 females, Cathu State Forest, N of Eungella Nat. Park, top of range, 600 m, 21.i.1990, M.S. & B.J. Moulds; 1 male, (genitalia prep. TAM129), AU.QL.CUC, Cathu S.F., 0.7 km up range 20°48.869'S 148°31 .362'E, 645 m, 22.xii.2008, Hill, Marshall, Moulds, Owen; 1 male, (genitalia prep. T75), Mt Charlton, NW of Mackay, 19.i.1978, A. Hillier; 26 males (two genitalia preps T84, T87), 9 females, Palm Tree Creek , 5 km NW of Kuttabul, 25.xii.1989, M.S. & B.J. Moulds; 1 male, Ilbilbie, S of Mackay, 22.xii.1987; M.S. & B.J. Moulds; 2 males (genitalia preps T72, TAM55), 30 km S of Sarina, 26.xi.1986, M.S. & B.J. Moulds; 1 male (genitalia prep. T46), 1 female, Blackdown Tableland, Expedition Range, 5-6.xii.1979, M.A. Schneider, G. Daniels; 1 male (molecular voucher AU.QL.BDF.04) Blackdown Tablelands N.P., 23º47.747'S 149 º03.958'E, 869 m, 25.xii.2008, Hill, Marshall, Moulds, Owen; 2 males, 2 females, AU.QL.GUD, Blackdown Tablelands N.P., 23º50.726'S 149º05.358.E, 801 m, 25.xii.2008, Hill, Marshall, Moulds, Owen; 1 male (genitalia prep. T47), Yeppoon, 4.i.1978, R. Eastwood; 5 males (one genitalia prep. T33), Yeppoon, 10.i.1989, R. Eastwood; 2 males (genitalia preps T89, TAM96), Yeppoon, 6.ii.2004, 14.ii.1991, A. Walford-Huggins; 1 male (genitalia prep T80), Castle Rock, Byfield, N of Yeppoon, 29.iii.1992, M.F. Braby; 2 males (one genitalia prep. T53), 3 females, St Helens, Maryborough, 19.ii.1989, R. Eastwood; 1 male (genitalia prep. TAM75), Kroombit Tops (Upper Kroombit Ck), 45 km SSW Calliope, 9-19.xii.1983, G. Monteith, G. Thompson; 1 male (genitalia prep. TAM77), Kroombit Tops (Lower Kroombit Ck), 45 km SSW Calliope, 9-19.xii.1983, G. Monteith, G. Thompson; 2

males, Coominglah Rg, 20 km N of Monto, 6.i.1975, M.S. Moulds; 1 male (genitalia prep. TAM8), Nth Stradbroke Is., 26.ii.1983, J. North; 2 males, 1 female, Dunwich, North Stradbroke Is., 27°30'S 153°24'E, 27.iii.1993, 5 m, G. Daniels; 10 males (one genitalia prep. TAM14), 7 females, Doolandella, Brisbane, 12.i.1985, M.S. & B.J. Moulds; 12 males (one genitalia prep. T18), 1 female, Southport, 28.xi.1997, R.B. Lachlan; 1 male (genitalia prep. T15), St Lucia, Brisbane, 7.i.1975, M.S. Moulds; 1 male (genitalia prep. T14), St Lucia, Brisbane, 10.x.1982, J. North; 1 male (genitalia prep. T16), Redland Bay, 10.i.1993, R. Eastwood; 1 female, Amiens St[ate] For[est], NW of Stanthorpe Qld, 28°33'39"S 151°47'05"E, 900 m, 12.i.2004, G. Daniels (**MSM**). NEW SOUTH WALES: 2 males (one K294784, K63611 and genitalia prep. TAM172), 1 female, Clermont, i.[19]29, Dr. K.K. Spence; 1 male (K294879 and genitalia prep. T6), Cudgen Nat. Res., 10.i.2000, B.J., K.A. & E. Day; 1 male (K294865 and genitalia prep. T1). Wilson R. bridge, nr Bluff Pt picnic area, 31º17'S 152º42'E, 6.i.1999, B.J. Day (**AMS**). 1 male (genitalia prep. TAM9), 3.6 km due N of Tyalgum, 28°19'29.45"S 153°12'44"E, 90 m, 19.ii.2011, R.B. Lachlan; 1 male, 2 females, Broken Head, S of Byron Bay, 10.i.1981, P.S. Valentine; 3 males, Kyogle, 28.i.1975, W. Rixon; 1 male, Lismore, 23.i.1966 G.R. Brown; 4 males, (one genitalia prep. T17), Urunga, 23.i.1971, M.S. Moulds; 3 males (one genitalia prep. TAM12), Port Macquarie, 10.i.1972, M.S. Moulds; 1 male, Coffs Harbour, 12.i.1972, S. Devine; 14 males, 3 females, Forster, 6.i.1972, M.S. Moulds; 1 male (genitalia prep T13), Avoca Beach, nr Gosford, 7.xii.1985, S. Hunter & A.J. Johnson; 1 male, Springwood, 12.i.1966, R. Fisher; 2 males (one genitalia prep. T91), Avalon Beach, Sydney, 24.i.1961, M.S. Moulds; 15 males (one genitalia prep. TA15), Narrabeen, Sydney, 24.xii.1971, M.S. Moulds (**MSM**). 1 male, Conjola, 28.xii.1950, RD, Collection A.N. Burns (**NMV**). 1 male, 1 female, 10 km NE of Lowmead, 31.xii.1974, G.B. Monteith [male gen. examined but not dissected] (**QM**).

Distribution and habitat (Fig. 50). Eastern Queensland from Cathu State Forest (on the Clarke Range north of Eungella but unknown from Eungella itself) and the Mackay district south to the NSW border, and eastern New South Wales south to Lake Conjola on the NSW South Coast. In Queensland most records are from within 70 km of the sea, including on Stradbroke Island, but there is an isolated population on the Blackdown Tableland some 150 km inland from Rockhampton, and another above the escarpment at Carnarvon Gorge. Other inland localities in Queensland include Kroombit Tops (Ewart 1986), the Monto district, Highfields (near Toowoomba) and Amiens (NW of Stanthorpe), and there are three old specimens in the AMS supposedly from Clermont but that locality requires confirmation. It is the common *Tamasa* species around Brisbane and the Gold Coast inland to Ipswich. All records from NSW are from coastal districts to the foothills of the Great Dividing Range.



FIGURES 50–51. *Tamasa tristigma*. (50) distribution; (51a) male genitalia in lateral view; (51b) same in ventral view.

Adults have been taken from late September to April but are usually most common during December, January and February. The species is found in open forest, often inhabiting *Casuarina* (especially in the more southern parts of its range), but also in suburban gardens in warmer climates. Emery *et al*. (2005) found adults favouring *Acacia glareicola* in western greater Sydney.

Goding & Froggatt (1904) incorrectly record this species from 'Northern Territory, S.A.' presumably based on two specimens misidentified in the MMUS. Statements by subsequent authors that *T. tristigma* occurs in either the Northern Territory or South Australia stem from Goding & Froggatt (1904). Specimens tentatively identified as this species by Ewart (1993, 2005) from Cape York Peninsula are here described as *T. capensis* **sp. nov.**

Redescription of adult. *Male* (Figs 1, 27, 51). Brown with fine black markings, in life sometime with a slight greenish tinge and if teneral often with a silver velvety appearance. *Head* with three black spots on each anterior margin (one on supra-antennal plate, one against eye and one in between), and a black central marking encompassing ocelli. Postclypeus with a blackish band either side of a pale midline not reaching anteclypeus. Rostrum passing apices of hind coxae but not reaching to distal margin of opercula in the male. Eyes in life black, or dark brown if teneral. *Pronotum* with keyhole marking V-shaped with its base touching pronotal collar and either open or closed adjacent to head; a black spot near ends of anterior arms of cruciform elevation; scutal depressions black; a narrow black edging against anterior of pronotal collar broken at midline, and a black spot on lateral angles. *Mesonotum* with scutal depressions black and another similar black spot at ends of cruciform elevation anterior arms; a pair of shot black fascia close together anterior of cruciform elevation and reaching almost to between sublateral sigilla. *Forewings* usually with three infuscated spots, one at wing apex and one each on crossveins r and r-m, often smallest on r-m and rarely absent on r-m; basal cell hyaline; basal membrane grey. *Hindwings* with a grey plaga. *Legs* yellowish brown, all tibiae and tarsi black at their distal ends; fore femora black along row of femoral spines and usually an ill-defined black lateral fascia; fore coxae with a black linear fascia dorsally. *Opercula* pale yellow to muddy yellow, sometimes pale brown tending blackish basally; not quite meeting. *Timbals* with four long ribs spanning timbal membrane, ribs 1 and 2 joined dorsally, rib 3 almost joined to 1 and 2, and sometimes a very short anterior fifth rib. *Timbal covers* (Fig. 49) brown; broadly triangular, projecting half way or more across timbal cavity. *Abdomen* with tergites more or less uniformly brown except for tergite 8 that is usually paler than others and has a prominent black anterior band. Sternites brown with blackish overtones variable in extent; sternite VIII brown, usually light brown or yellowish brown, often with a little black at apex and sometimes hints of black at base. *Genitalia* (Fig. 51) with uncus short, the apical clasping projections small. Theca distinctively ornamented bearing a subapical ventral keel, and a flared apex that carries minute cilia around its upper perimeter and often a pointed spine at its lower left corner variable in size from small to very large in the population at Goodnight Scrub in SE Queensland. The internal reproductive system is figured by Moulds (2012). Considerably variable in size; length of forewing 23.1–31.0 mm but usually 26–28 mm.

Female. Similar to male. Abdominal segment 9 brown dorsally merging to pale yellowish on lower half or more and with a variable black subdorsal stripe never reaching distal margin but often extending along anterior margin. Ovipositor sheath not reaching beyond anal styles and dorsal beak. Considerably variable in size; length of forewing 22.0–31.0 mm but usually 26–28 mm.

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 51). Closely similar in colour and markings to *T. burgessi* from which it differs in having a rostrum that reaches a little beyond the apices of the hind coxae, whereas in *burgessi* the rostrum passes far beyond the hind coxae (in males to about the level of the distal margin of the tympanum cavity).

This is the only *Tamasa* species found in or around Brisbane and in NSW, apart from the smaller *T. lindsayi* **sp. nov.** found on North Stradbroke and Moreton Islands and the Sunshine Coast northward, and the much larger *T. rainbowi* restricted to the Border Ranges and north-eastern corner of NSW. *Tamasa tristigma* differs from *T. lindsayi* that in some localities are sympatric (e.g. Yeppoon and North Stradbroke Island) by the males having clearly developed timbal covers that project halfway or more across the timbal membrane (Fig, 49), whereas in *T. lindsayi* they are undeveloped and present only as a marginal ridge that does not project forward across the timbal membrane (Fig. 32). Females differ only in their larger *average* size, forewing often above 25 mm but never more than 25 mm in *T. lindsayi*. *Tamasa tristigma* clearly differs from *T. rainbowi* in its much smaller size, its brown colour rather than green, and lack of forewing submarginal infuscations.

Song. A detailed analysis of the song has been published by Young & Josephson (1983) and further notes on the song are provided by Ewart (1986). Ewart (2001) did a detailed study of song behaviour in a large population of *T. tristigma* near Caloundra in south-eastern Queensland. He found the dusk chorus varied with the season, discrete during spring and autumn (November and April), as an uninterrupted continuation of the day call during midsummer (much of January into February), and in between spring/midsummer and midsummer/autumn, just as a marked increase in intensity of day call.

Males usually sing exposed on tree trunks, often in loose aggregations when population numbers are high. Singing occurs at dawn, throughout much of the day when populations are high, and usually concludes at dusk.

Biology. A study of temperature tolerances in 22 Australian cicada species by Heath *et al*. (2022) found that *T. tristigma* had a minimum flight temperature (the temperature needed for flight) of around 21ºC; a maximum voluntary tolerance temperature (the upper temperature where thermoregulation takes precedence over other activities) of around 37ºC, and heat torpor (near death) temperature of around 43ºC. The minimum flight temperature was one of the highest recorded for the species studied, equalled only by *Burbunga queenslandica*. The maximum voluntary tolerance temperature and heat torpor were typical of the other Australian species studied.

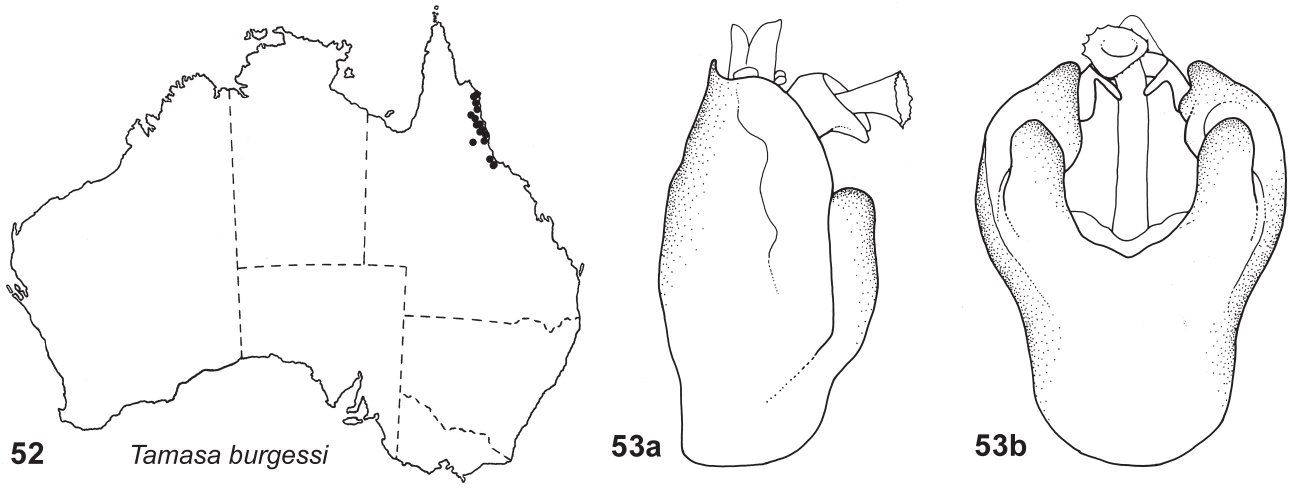
Tamasa burgessi Distant, 1905

Type material. *Syntype* male of *Abricta burgessi*, previously examined (Moulds 2012) (in **NHMUK**). Described from an undisclosed number of males taken at Ripple Creek, near Ingham in northern Queensland (Distant 1905).

Other material examined. QUEENSLAND: 1 female, Kuranda District, 2.ii.1995, J. Bugeja, CY 1024-11, ANIC database No. 20 005099; 1 male, Millstream Falls. near Ravenshoe, 27.xii.1967, R. Dobson, CY 1042-11, ANIC database 20 005117 (**ANIC**). 2 males, Rifle Creek, Mt Molloy, 16°39’58”S 145°19’40”E, 3.iii.2004, L.W. Popple; 1 male, same location as previous, 6.i.2008, D. Emery & L. Popple; 1 male (one genitalia prep T29), 1 female, Mission Beach, 26.xii.1972, M.S. Moulds (**DE**). 1 male (genitalia prep. TAM103), Trinity Beach, Cairns, 25,i,1981, J. Olive; 1 male (genitalia TAM105), Forty Mile Scrub, 18 03’32”S 144 51’52”E, 14.i.2004, J.C. Olive (**JO**). 1 male (genitalia prep. TAM87), Cape Flattery township, 14°57’45”S, 145°18’35”E, 20.ii.2019–1.iii.2019, L.W. Popple, [lpop]128-0024; 3 males (one genitalia prep. TAM47), 2 females, Cape Flattery township, 14°57’45”S, 145°18’35”E, 29.i-5.ii.2021, L.W. Popple & M.J. Grixti, [lpop]111-0026 to 111-0029, 130-0001; 3 males (two genitalia preps TAM115, TAM123), Myall Beach, 16°06’S 145°27’E, 6.iii.2004, L. & W. Popple, [lpop]111-0005 to 111-0007; 1 male, Mount Carbine, 16°32’S 145°08’E, 17.i.2019, W. H. W. Lum, [lpop]111-0023; 2 males, 1 female, 2, Rex Highway 8km NE. of Julatten, 16°33’40”S, 145°22’03”E, rainforest, 6.i.2008, L. Popple & D. Emery, [lpop]111-0020 to 111-0022; 2 males, 1 female, Carrington St, Atherton, 17°17’41”S 145°27’04”E, 16.xii.2007–11.i.2008, L. Popple & A. McKinnon, [lpop]111-0011 to 111-0013; 1 male, Carrington Falls, 17°19’51”S 145°26’49”E, 31.xii.2007, L. Popple, & A. McKinnon, [lpop]111-0014; 3 males, Top of Herberton Range, 17°20’32”S 145°25’02”E, 19-20.xii.2007, L. Popple & A. McKinnon, [lpop]111-0015 & 111-0017; 1 female, Herberton district, 17°23’22”S 145°21’02”E, 3.i.2007, L. Popple & A. McKinnon, [lpop]118-0001; 1 male, Herberton district, 17°23’22”S 145°21’02”E, 28.xii.2007, L. Popple & A. McKinnon, [lpop128-0002]; 2 females, Herberton district, 17°23’22”S 145°21’02”E, 26.xii.2010, L. Popple & A. McKinnon, [lpop]118-0003 & 118-0004; 1 male, Rooty Creek, Black Mountain Road, 16°41’26”S 145°30’53”E, 13.i.2019, L.W. Popple, [lpop]118-0005; 1 male (genitalia prep. TAM53), 25 km SW of Mount Garnet, 17°49’12”S 144°57’17”E, 11.i.2021, L.W. Popple, [lpop]118-0007; 1 male (genitalia prep. TAM114), Cattana Wetlands, Smithfield, 16 40’49”S 145 42’12”E, 13.ii.2022, Syzigium, L. Popple & A. McKinnon, [lpop]111-0030; 1 male, 1 female, Croc. Farm, Cairns, 8.i.2000, R. MacSloy, [lpop]111-0001 & 111-0002; 1 male, 1 female, Eubenangee Swamp via Innisfail, R. Stoodley, M. Barnett, [lpop]111-0003 & 111-0004; 1 female, Thornton Beach, 16°10’S 145°26’E, 7.iii.2004, L. & W. Popple, [lpop]111-0007; 2 males (one genitalia prep. TAM116), 1 female, Clump Pt via Mission Beach, QLD, 17°51’26”S 146°07’02”E, 2.i.2008, L. Popple & A. McKinnon, [lpop]111-0017 to 111-0019 (**LWP**). 1 male (genitalia prep. TAM18), Cape Flattery, 24.xii.1989, R.I. Story; 2 males (genitalia preps T49, TAM4). 17 km S of McIvor River, 9.i.1982, G. & A. Daniels; 5 males (one genitalia prep. TAM16), 4 females, Isabella Falls, Bald Hills Stn, 30 km N of Cooktown, 13.ii.1982, M.S. & B. J. Moulds; 1 male (genitalia prep T64), Cooktown, 10.i.1992, D.A. Lane; 1 male (genitalia prep. T60), Archer Point, near Cooktown, 7.i.1973, M.S. Moulds; 1 male (genitalia prep. TAM5), Cape Tribulation, Turpentine Rd, 16°10.13’S 145°24.70’E, 17.xii.2009, Todd Gilligan; 1 male (genitalia prep. T74), Daintree River, 1.i.1967, M.S. Moulds; 11 males (one genitalia prep. TAM13), 2 females, Smithfield, Cairns, 3.ii.2019, S.A. Cowan; 1 male (genitalia prep. T35), Mt Molloy, 29.xii.1978, Walford-Huggins; 1 male (genitalia prep. TA13), Julatten, 21.i.1981, M.S. & B.J. Moulds; 1 male (genitalia prep. T24), Kuranda, 15.i.1988, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM6), Kuranda, Victor Pl., 16 48.923’S 145 38.550’E, 9-18.xii.2011, Hill, Marshall, Moulds; 1 male (genitalia prep. TAM15), Barron Falls lookout, 27.i.1989, J. & M. Bugeja; 1 male (genitalia prep. TAM28), Lock Creek, Davies Ck Rd, Lamb Rge, Mareeba Dist., 25.xii.1976, M.S. & B.J. Moulds; 2 males (genitalia preps T26, TAM92), Atherton, 14.xi.1989, D.A. Lane; 1 male (genitalia prep TA21), Atherton, 20.iii.1887, D.A. Lane; 1 male (genitalia prep T22), 2 km W of Atherton, 7.i.1990, D.A.

Lane; 1 male (genitalia prep. TAM93), Tinaroo Falls Dam, Atherton Tableland, 12.ii.1986, D. Lane; 24 males (two genitalia preps TA22, T23), 21 females, Lake Euramoo Creator, Tinaroo Dam, nr Atherton, 1.i.1988, M.S. & B.J. Moulds; 1 male, Yungaburra, 700 m, 17°15'54"S 145°35'50"E, 4.ii.2022, R.B. Lachlan; 9 males (one genitalia T50), 2 females, Herberton, 30.xii.1987, M.S. & B.J. Moulds; 6 males (one genitalia prep. TA11), 9 females, Wondecla, nr Herberton, 6.i.1990, M.S. & B.J. Moulds; 2 males (genitalia preps TAM11, TAM89), Military Reserve, Cardstone Rd, via Tully, 17°53'25"S 145°48'39"E, 15.i.2022, D.A. Lane; 1 male (genitalia T27), 15 km WNW of South Johnston, 5.i.1986, Fay & Halfpapp; 1 male (genitalia prep. T20), Polly Ck, Seymour Rg, nr Garradunga, 15.i.1990, M.S. & B.J. Moulds: 7 males (two genitalia preps TA8, TA9), 5 females, Innisfail, 23.ii.1982, M.S. & B.J. Moulds; 6 males (one genitalia prep. TA10), 7 females, Etty Bay, near Innisfail, 27.i.1981, M.S. & B.J. Moulds; 14 males (one genitalia prep T29), 13 females, Mission Beach, 26.xii.1972, M.S. Moulds; 1 male (genitalia prep. TAM7), Cardstone, 6.i.1995, Dennis Kitchin; 9 males (one genitalia prep. T34), 11 females, Bluewater Creek, N of Townsville, 19°10'35"S 146°33'00" 4.i.2001, M.S. & B.J. Moulds; 1 male (genitalia prep. TA20), 3 females, Townsville, 23.xii.1987, T.A. Moulds; 12 males, 3 females, Townsville, 27.xii.1993, M.S. & B.J. Moulds; 11 males (one genitalia prep T21), 11 females, Townsville, 26.i.1988, M.S. & B.J. Moulds 1 male, (genitalia prep. TAM94), Mt Stuart, nr Townsville, 24.xii.1991, M.F. Braby; 1 male, 1 female (molecular voucher 05.AU.QLD.BWC.04), Bluewater Ck, ~30 km N of Townsville, 19°10.734'S 146°32.952'E, 20 m, 11.i.2005, Hill, Marshall, Moulds (**MSM**).

Distribution and habitat (Fig. 52). North-eastern Queensland from Cape Flattery south to Townsville and Magnetic Island. It is found in coastal districts throughout its range, throughout much of the Atherton Tablelands, and through inland districts south from Mt Carbine and west to Mount Garnet and Forty Mile Scrub. Adults are found from November to March. It is often a common species where it is occurs in a wide variety of tropical bushland, often in swampy areas, in coastal areas and rainforest interfaces and tropical gardens.



FIGURES 52–53. *Tamasa burgessi*. (52) distribution; (53a) male genitalia in lateral view; (53b) same in ventral view.

Redescription of adult. *Male* (Figs 28, 48, 53). Similar in colour and markings to *T. tristigma* but often a little paler particularly in the vicinity of Townsville. *Eyes* in life variable, usually blackish but also grey, in various shades of brown and olive green. Rostrum passing far beyond hind coxae to or beyond distal margin of tympanal cavities. *Pronotum* with keyhole marking usually open at its posterior end and not touching pronotal collar; a narrow black edging against anterior of pronotal collar continuous between, but not including, lateral angles, often slightly broken at midline and often completely absent in specimens from the vicinity of Townsville; lateral angles with a black spot. *Mesonotum* with a dark brown marking filling, or almost filling, the space between anterior arms of the cruciform elevation that thereafter projects anteriorly reaching between the submedian sigilla but through its length with a narrow pale midline. *Forewings* with three infuscated spots, one at wing apex and one each on crossveins r and r-m, always smallest on r-m than r, and rarely absent on r-m. *Legs* yellowish, mid and fore tibiae and tarsi with dark brown or black at their distal ends; fore femora black along row of femoral spines and usually an ill-defined dark brown lateral fascia; fore coxae with a black linear fascia dorsally. *Opercula* pale yellow to muddy yellow, usually with black suffusion basally extending along inner margins to varying degrees. *Timbals* as for *T. tristigma*.

Timbal covers (Fig. 48) projecting about half way across timbal membrane. *Abdomen* with tergites more or less uniformly brown except for slightly paler tergite 2 and tergite 8 that is more than half black on anterior half or so, and sometimes also with hints of black laterally. Sternites black including sternite VIII.

Genitalia (Fig. 53) with pygofer distinctively shaped, in ventral view very broad on upper half, narrow on lower half. Uncus very short, with small lateral extensions on lower rim directed downwards and inwards to restrain theca. Theca gently curved with a funnel-shaped apex finely serrated around its perimeter. Length of forewing 21.6–32.2 mm but usually 25–29.

Female. Similar to male. Abdominal segment 9 yellowish brown with dark brown to blackish lateral suffusion and blackish markings in lower lateral region. Ovipositor sheath terminating at level of anal styles and dorsal beak. Length of forewing 22.3–29.4 mm.

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 53). Differs from all other *Tamasa* species in its very long rostrum that passes far beyond the hind coxae, in males reaching to about the distal margin of the opercula.

***Tamasa capensis* sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:216767B9-5631-4655-8D70-76D31E8372BC

Etymology. Based on the distribution of this species that is distributed through much of the northern half of Cape York Peninsula that is colloquially known as 'The Cape'.

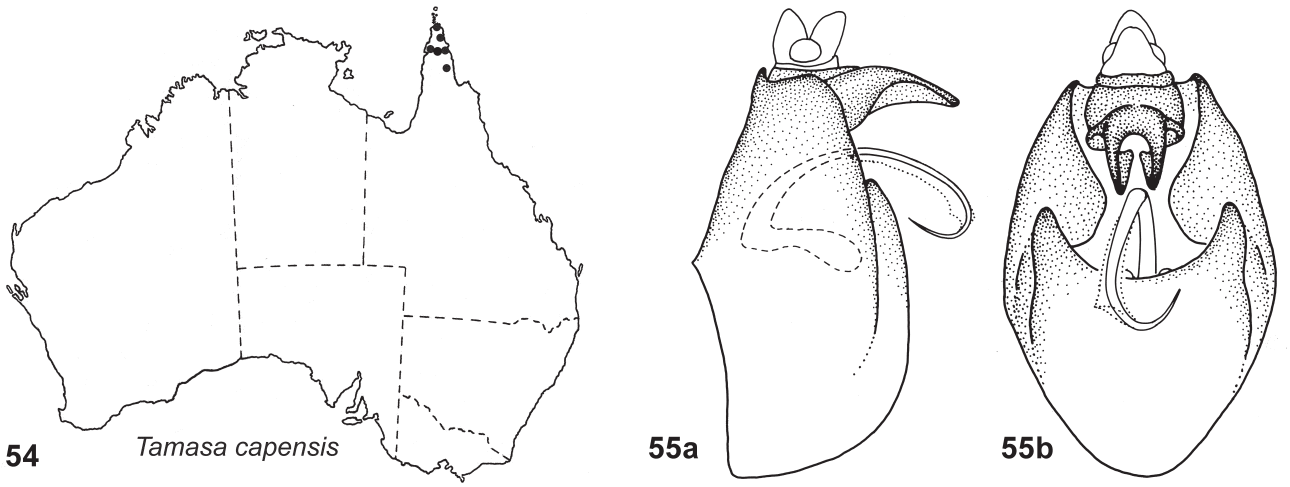
Types. *Holotype* male, McIlwraith Rg, Leo Creek track, 300 m, NE of Coen, N. Qld, 7.i.1988, M.S. & B.J. Moulds , QM Reg. No. T262425 (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male (K294781, genitalia prep. TAM 171), C. York, x.[19]07, Elgner, H. Ashton Coll. (**AMS**). 2 males (one genitalia prep. T40), 1 female, same data as holotype; 1 male (genitalia prep. T58), Iron Range, 14.iii.1983, G. Wood; 3 males (one genitalia prep. TAM113), 1 female, Iron Range, 26.xii.1983, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM143), Iron Range, 2.i.1973, M.S. Moulds (**MSM)**. 11 males (one genitalia prep. TAM119), 11 females, ~14 km S of Heathlands-Southern Bypass Rd jct., northern Cape York Peninsula, 11.849°S 142.640°E, 16.i. to 1.ii.1992, vine scrub, A. E[wart], Reg. Nos T262427–T262448; 7 males (one genitalia prep. TAM120), 8 females, ~0.4 km WSW Heathlands Ranger Stn, northern Cape York Peninsula, 11.754°S 142.577°E, 20-31.i.1992. A. E[wart], Re. Nos T262449–T262463; 2 males, 1 female, Heathlands Ranger Stn, northern Cape York Peninsula, 11.752°S 142.581°E, 16.i. to 1.ii.1992. A. E[wart] Reg. Nos T262464–T262466 **(QM)**.

Other material examined. QUEENSLAND: 1 male, Batavia Downs, 12°40'S 142°40'E, P. Zborowski, ANIC database No. 20 006023 (**ANIC**). 1 female, Andoom, nr Weipa, 5-8.ii.1975, G.B. Monteith (**MSM)**. 2 males, West Claudie R., Iron Range, 3-10.xii.1985, 50 m, rainforest, G. Monteith & D. Cook, Reg. Nos T262467, T262468; 1 female, ~6 km N of Heathlands-Southern Bypass Rd jct., northern Cape York Peninsula, 11.715°S 142.694°E 18.i.1992, rainforest, A. E[wart], Reg. No. T262426 (**QM**).

Distribution and habitat (Fig. 54). Cape York Peninsula, Queensland, from Punsand Bay (D. Meier) and Bamaga near the northern extremity of the Peninsula to the McIlwraith Range north-east of Coen and west to Weipa. Intermediate localities include Heathlands and Iron Range. Adults have been found from October to March but are likely to occur also in latter months during the wet season and are found in dry vine tickets, open tropical woodland and rainforest interfaces. The species tentatively identified as *Tamasa tristigma* by Ewart (1993, 2005) from Heathlands (excluding specimens from near Captain Billy Landing) is this species. Ewart also analyses the song of two specimens from Heathlands, both of which are here considered to be this species.

Adult description. *Male* (Figs 26, 33, 55). Similar in colour and markings to *T. tristigma. Head* with an extra black spot lateral of lateral ocelli. Rostrum reaching or passing a little beyond apices of hind coxae. *Pronotum* with keyhole marking closed at its posterior end and touching or almost touching pronotal collar; a narrow black edging against anterior of pronotal collar continuous between lateral angles, and no black spot on lateral angles. *Mesonotum* with a dark brown marking filling, or almost filling, the space between anterior arms of the cruciform elevation that thereafter projects anteriorly in a tapering spike reaching between the submedian sigilla. *Forewings* with three infuscated spots, one at wing apex and one each on crossveins r and r-m, often smallest on r-m and rarely absent on r-m. *Legs* pale yellowish brown, without distinct black markings. *Opercula* pale yellow to muddy yellow, becoming black on inner half or so; not quite meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 33) ridged

but without anterior development. *Abdomen* clearly wider than thorax; tergites more or less uniformly brown except for tergite 8 that is variably black on anterior half or so, and usually with hints of black laterally on tergites 2–7; sternites light to mid brown with a variable diffused black midline, usually particularly blackish on sternite VII; sternite VIII entirely dark brown or black. *Genitalia* (Fig. 55) with pygofer tending rounded in ventral view. Uncus well developed and deeply bifurcated, in lateral view slender and tapering to a blunt point. Theca slender; strongly recurved distally in a sweeping arc near 180°, and terminating in a long, slender, projection that tapers to a sharp point with the gonopore ventral at its base although the lightly sclerotised gonopore region sometimes turned lateral or even dorsal.



FIGURES 54–55. *Tamasa capensis* **sp. nov.** (54) distribution; (55a) male genitalia in lateral view; (55b) same in ventral view.

Female. Similar to male. Abdominal segment 9 yellowish brown with light brown suffusion laterally. Ovipositor sheath projecting very slightly beyond anal styles and dorsal beak.

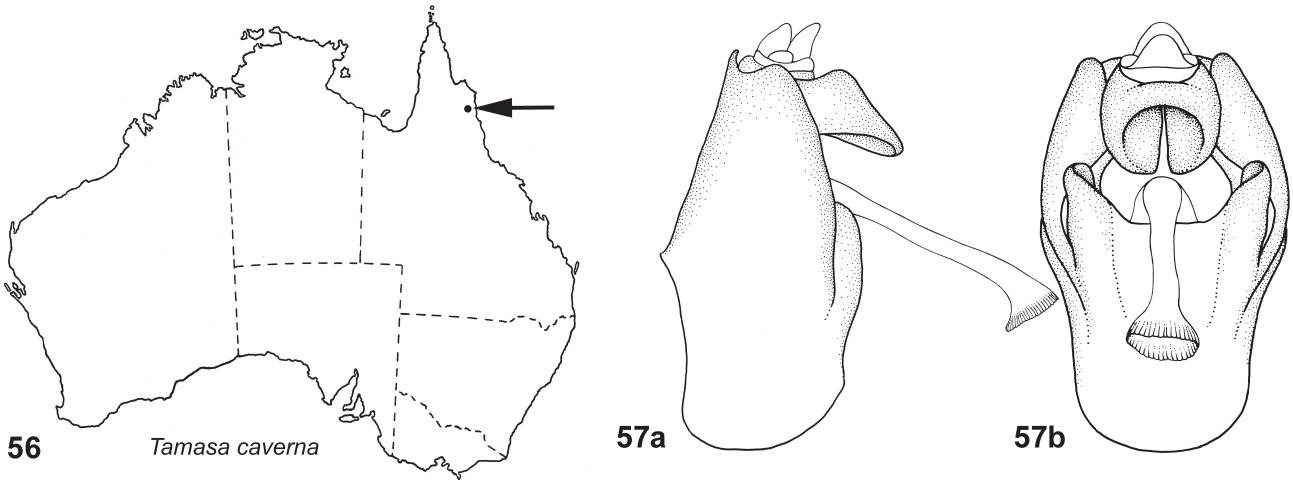
Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 14.3–16.8 (16.0); female (including ovipositor) 13.3–16.8 (14.7). *Length of forewing*: male 19.8–24.5 (22.7); female 19.3–24.5 (21.8). *Width of head* (including eyes): male 5.1–5.9 (5.44); female 4.6–6.6 (5.52). *Width of pronotum* (across lateral angles): male 5.3–6.7 (6.09); female 4.8–6.8 (5.88).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 55). Similar to *T. ewarti* **sp. nov.**, *T. tristigma* and *T. burgessi*. Sympatric only with *T. ewarti* in the vicinity of Heathlands in the far north of Cape York Peninsula, and the McIlwraith Range south of Iron Range. Differs from *ewarti* in its light brown colour (*ewarti* is green in life) and in having males in which the abdomen is much wider than the thorax. Males and females differs from both *tristigma* and *burgessi* in having the narrow black edging against anterior of pronotal collar continuous between lateral angles and a shorter rostrum that only reaches or barely passes the apices of the hind coxae.

Tamasa caverna Moulds & Olive, 2014

Type material. *Holotype* male, Black Mountain near Cooktown, Nth Qld, 12.i.2003, J. Olive. Examined. (**QM**). ***Other material examined*** (as in original description). *Paratypes* as follows, QUEENSLAND: 1 male, Black Mountain near Cooktown, 12.i.2003, J. Olive (**AM**). 1 male,, Black Mountain near Cooktown, 12.i.2003, J. Olive; 1male, 1 female, Black Mountain, 15°39’06”S 145°12’55”E 11, 11.i.2004, J.C. Olive; 3 males, Black Mountain near Cooktown, 23.i.2014, J. Olive & S. Orr; 1 male, Black Mountain near Cooktown, 24.i.2014, J. Olive (**JO**). 1 male, Black Mountain via Cooktown, 4.i.2001, R. Morgan (**LWP**). 1 male (genitalia prep. T79), Black Mountain, south of Cooktown, 15°39.1’S 145°13.2’E, 11.i.2004, J. Olive; 1 male, 1 female (female specimen, 04.QLD.STO.11, voucher for molecular sample), Black Mountain, S of Cooktown, 15°39.1’S 145°13.2’E, 12.i.2004, Cooley, Hill, Marshall, Moulds (**MSM**).

Distribution and habitat (Fig. 56). Known only from Black Mountain south of Cooktown in northern Queensland where males are found among large granite boulders (Moulds & Olive 2014). Its distribution may extend to similar granitic boulder screes in the Melville and Bathurst Ranges north of Cooktown. There are records for January only but based on emergence times of other species adults are likely to be encountered throughout much of the summer wet season, December to February, and possibly beyond.



FIGURES 56–57. *Tamasa caverna*. (56) distribution; (57a) male genitalia in lateral view; (57b) same in ventral view.

Redescription of adult (Figs 11, 21, 37, 57). The species is described in detail by Moulds & Olive (2014). Length of forewing 32–36 mm.

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 57). Distinguished from most *Tamasa* species by its larger size (forewing 32–36 mm), and in having the head about as wide as lateral margins of pronotal collar. In these features it is similar to *T. gigas* **sp. nov.** but differs in its smaller size (forewing less than 37 mm) and the males in having four long timbal ribs instead of five, plus tergite 3 is brown laterally instead of black. It is the only *Tamasa* species found among the boulders of Black Mountain.

Song. The song is described together with an oscillogram by Moulds & Olive (2014). Males rest and sing from within caverns between boulders, usually clinging to the undersides of boulders.

Tamasa doddi (Goding & Froggatt, 1904)

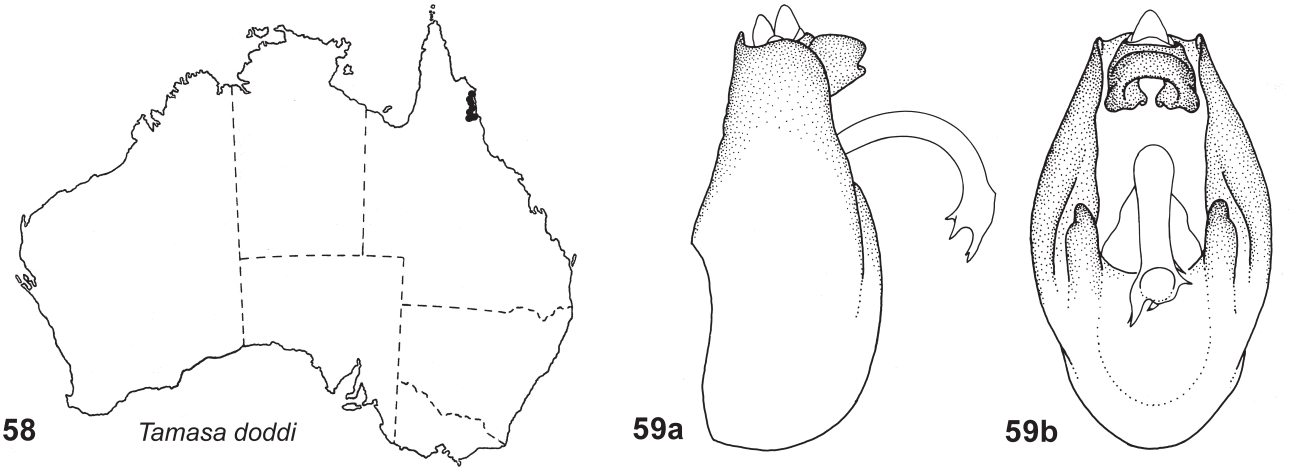
Type. *Syntype* male bearing labels as follows: (1) Tibicen doddi, G. & F. Kuranda N. Queensland (handwritten); (2) Townsville, Qld. (Townsville crossed out) Kuranda Jan 04 (handwritten), P. Dodd. (printed); (3) Type (handwritten and underlined red); (4) On permanent loan from MACLEAY MUSEUM University of Sydney (printed); (5) ANIC Database No. 20 011342 (printed). (In ANIC). Examined. This is the only recognised syntype from 11 males and 5 females from Kuranda listed in the original description. A female specimen in ANIC similarly labelled but from Cairns cannot be a syntype because the type locality is Kuranda.

Other material examined. QUEENSLAND: 1 male, CY1017-11, ANIC Database No. 20 005092, Barron R., Cairns, 15.i.1993, J. Bugeija (**ANIC**). 1 male (genitalia checked but not dissected), Green Forest Rd, Kuranda, 7-28.ii.203, R. Rogons; 2 males, Rifle Creek, Mt Molloy, 16°39’58”S 145°19’40”E, 3.iii.2004, L.W. Popple (**DE**). 3 males (one genitalia prep. TAM81), 2 females, Trinity Park, 25.xii.2008, 22.ix.2010, 13.xii.2010, 10.i.2012, J. Olive; 1 male (genitalia prep. TAM112), Trinity Beach, 21.ii.1981, J. Olive; 5 males (one genitalia prep TAM76), 4 females, Stanton Rd, Smithfield, Cairns, 7.iii.1981, 25,26,31.i.1981, 1.ii.1981, J. Olive; 1 male (genitalia prep. TAM80), 2 females, Gordonvale, 25,27.xii.1980, J. Olive (**JO**). 2 males, Rifle Creek, Mount Molloy, 16°40’00”S 145°19’41”E, 6.i.2008, L.W. Popple & D. Emery, [lpop]128-0022 & 128-0023; 2 males, Rifle Creek, Mount Molloy, 16°40’00”S, 145°19’41”E, 3.iii.2004, L.W. Popple, [lpop]128-0009 & 128-00010; 1 male, 1 female, Clacherty Rd, Julatten, 16°34’45S, 145°21’42E, 27–30.xii.2013, L. Popple & A. McKinnon, at light [lpop]128-0025 & 128-0026; 1 male (genitalia prep. TAM 38), 3 females, Kingfisher Park, Julatten, 16°36’41”S 145°20’23”E, 2-5.iii.2004, L.W.

Popple, [lpop]128-0005 to 128-008; 4 males, 7 females, 19 Butler Dr, Kuranda, 16°48'S 145°38'E (GPS), 16°48'20S 145°38'14E, 16–31.xii.2006, D.C.F. Rentz, [lpop]128-0011 to 128-0021; 1 male, 1 female, Wrights Lookout, Barron Gorge National Park, 16°50'47"S 145°38'35"E, 11.i.2020, L.W. Popple and A.E. McKinnon, [lpop]128-0028 & 128-0029; 2 males (one genitalia prep TAM72), 2 km E of Edmonton, 17 01'S 145 45'E, 1.iii.2004, L.W. & W. Popple, [lpop]128-0003 & 128-0004 (**LWP**). 1 female, McIvor River, N of Cooktown, 4.i.1981, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM 58), Cooktown, 17.ii.1982, M.S. & B.J. Moulds; 3 males (two genitalia preps T61, TAM60), 7 females, Mt Hartley, nr Rossville, S of Cooktown, 1.i.1984, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM 57), 5 females, Gap Creek, Mt Finlayson Rg S of Cooktown, 2.i.1984, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM 61), Woobadda R., Bloomfield, 13.i.1988, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM 65). 6 km SW [of] Mt Carbine, 29.xii. 1995, M.D. Lane; 1 male (genitalia prep. TAM 66), Rifle Creek, Mt Molloy, 9.i.1992, L.R. Ring; 1 male (genitalia prep. TAM 63), Black Mt. road, near Julatten, 28.i.1977, A. & M. Walford-Huggins; 1 male (genitalia prep. TAM 59), Cape Tribulation, 18-20.xii.1986, H. & A. Howden; 1 male (genitalia prep. T 12) Alexandra Bay, Cape Tribulation, 7.xii.1978, B. Brunet; 1 female (molecular voucher 05.AU.. QLD.SHF.07), near Shiptons Flat, 15º46.258'E 145º13.526'E, 168 m, 14.i.2005, Hill, Marshall, Moulds, Olive; 1 male (genitalia prep. TAM 68), Danbulla State Forest, Tinaroo, Atherton Tabl., 700 m, 13.i.1980, A. Hiller; 1 male (genitalia prep. TAM 62), 19 Butler Dr, (Top of the Range), Kuranda, 16º48'S 145º38'E, 335 m, 15-30.xii.2003, D.C.F. Rentz; 1 male (genitalia prep. T 11), Kuranda, 9.i.1977, David Lane; 1 male (genitalia prep. TA 18), Kuranda, 18.i.1973, A. & M. Walford-Huggins; 1 male (genitalia prep. TA 1), Kuranda, 16.i.1976, Wendy Walsh; 2 females (molecular vouchers 04.QLD.KUR.03 and 06), Kuranda, 367 m, 16°49'02"E 145°37' 09'E, 9.i.2004, Cooley, Hill, Marshall, Moulds; 1 male (genitalia prep. TA 4), Barron R., Myola Rd, Kuranda, 16.i.1988, J. Hasenpusch; 1 male (genitalia prep. TAM74), Clohesy River, 12 km SW Kuranda, 10.i.2000, M.D. Lane; 1 male (genitalia prep. TAM 70), James Cook University, [canopy] crane site, 16º06'11.53"E 145º27'13.08", 53 m, 6-8.ii.1919, D.C.F. Rentz; 1 male (genitalia prep. TA 6), Kamerunga, Cairns, 18.i.1977, M.S. & B.J. Moulds; 1 male (genitalia prep. TA 7), Kamerunga, Cairns, 7.xii.1975, A. & M. Walford-Huggins; 1 female (molecular voucher 05.AU.QLD.KAM.02, Kamerunga, Cairns, 16°52.586'S 145°41.116'E, 58 m, 11.i.2005, Hill, Marshall, Moulds; 2 males (genitalia preps TAM97, TAM107), 6 km East Gordonvale, 14.i.1996, M.D. Lane (**MSM**).

Distribution and habitat (Fig. 58). North-eastern Queensland from the Springvale Station (near Laura) and the McIvor River (north of Cooktown) south to Gordonvale, both in coastal districts including Fitzroy Island and on the Atherton Tablelands between Mount Carbine and Tolga. The northern record from Springvale Station near Laura was identified as *T. burgessi* in Burwell *et al*. (2017), but is this species (L. Popple pers. comm.). There are records for December, January and February. Adults inhabit rainforest, rainforest intergrades and tropical gardens.

Redescription of adult. *Male* (Figs 8, 19, 46, 59). Markings mostly similar to those of *T. tristigma*. Dark brown in life, sometimes with green tinges and often with infuscation only at the wing apex; after death body gradually fading to lighter brown. Rostrum passing hind coxae, reaching to about mid-length of the opercula or slightly beyond. Eyes in life black through brown to red. *Pronotum* with keyhole marking usually open at its posterior end and not touching pronotal collar; usually a narrow black edging against anterior of pronotal collar broken dorsally and laterally reaching a black spot on lower lateral angles, sometimes indistinct and sometimes absent. *Mesonotum* with a parallel pair of black fasciae anterior of cruciform elevation. *Forewings* usually infuscated only at apex, sometimes also on crossvein r (as in some northern population (e.g. Cooktown and Daintree), and rarely also on both r and r-m (e.g. Mt Hartley population). *Legs* light brown, usually without black markings except between fore femoral spines. *Opercula* light brown merging to black distally, sometimes almost entirely black, usually with a jet black narrow rim; almost meeting. *Timbal covers* (Fig. 46) angular, protruding on basal half about half way across timbal cavity. *Abdomen* with tergites tending uniformly brown except for tergite 8 black on anterior half or so, pale brown on remainder; rarely with some black sublaterally. Sternites black except for brown sternite II, often with dense covering of fine white pubescence; sternite VIII often uniformly dark brown or black, but sometimes pale yellow to brown either with or without hints of black. *Genitalia* (Fig. 59) with pygofer more or less oval in ventral view, the distal shoulder well developed but broadly rounded. Uncus short, with very short distal protrusions on lower rim. Theca strongly curved with apex bearing usually three robust spines, one of which is clearly largest, but variable from one to four spines. Individuals from the Atherton Tablelands tend on average to be a little smaller than those from coastal districts. Length of forewing 28.5–36.7 mm.



FIGURES 58–59. *Tamasa doddi*. (58) distribution; (59a) male genitalia in lateral view; (59b) same in ventral view.

Female. Similar to male. Abdominal segment 9 brown with a black subdorsal band not reaching distal margin and usually one or two small blackish markings laterally. Ovipositor sheath terminating at level of anal styles and dorsal beak. Length of forewing 28.0–36.1 mm.

Distinguishing features. Closely similar to *Tamasa rentzi* **sp. nov.** from which it is best distinguished by the male genitalia that have a theca that is curved in an arc and terminates in usually three or four robust spines one of which is always larger than the others (Fig. 59). In contrast that of *T. rentzi* is broadly S-shaped and terminates in a simple square-cut apex unlike in any other *Tamasa* species (Fig. 83). *Tamasa doddi* often has forewing infuscation confined to the wing apex but *T. rentzi* nearly always has additional infuscated spot on crossvein r (rarely absent), and sometimes also on both r and r-m. *Tamasa doddi* is on average a smaller insect (forewing 28.0–36.7 mm) compared to *T. rentzi* (32.4–39.4). Their distributions are separate but almost overlap, *T. doddi* occurring from Laura to Gordonvale including Atherton Tablelands and Fitzroy Island whereas *T. rentzi* occurs from Gordonvale to Etty Bay, but at Gordonvale *T. doddi* is found east of the town and *T. rentzi* in rainforest west of the town.

Biology. Adults often carry red ectoparasitic larval mites (*Caeculisoma mouldsi* Southcott, fam. Erythraeidae) that attach to the wing veins (Fig. 8) and *Leptus torresianus* Southcott that attach to the legs.

.

Tamasa dolabra sp. nov.

zoobank registration: urn:lsid:zoobank.org:act:7910B9F8-81D6-4695-97A4-63090E6D1B88

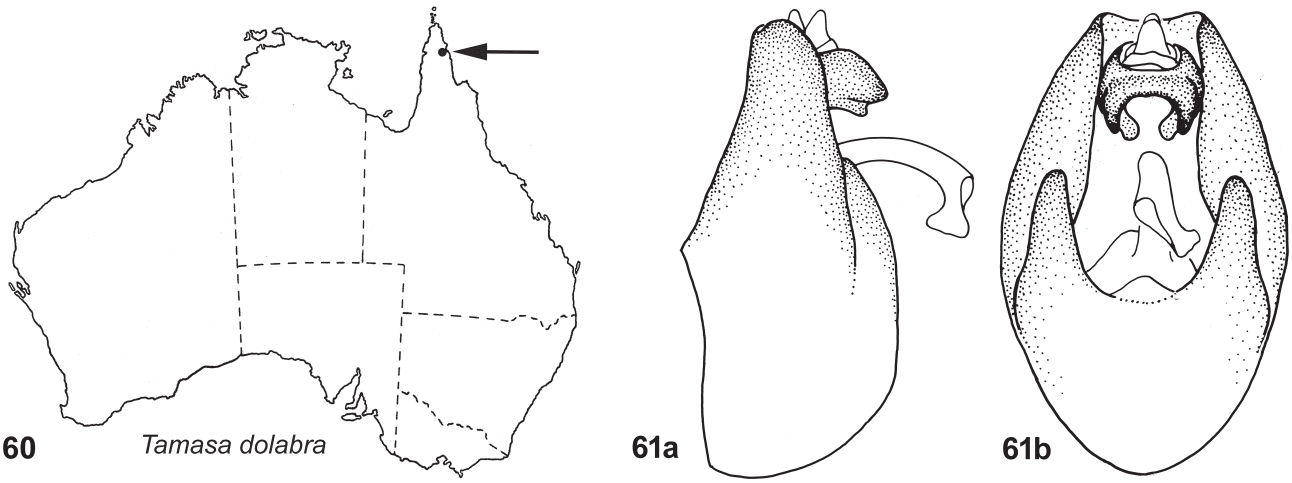
Etymology. From the Latin *dolabra* meaning axe or hatchet and referring to the hatchet-like appendage at the thecal apex.

Types. *Holotype* male (genitalia prep. TAM134; molecular voucher 07.AU.QL.CLA.08), AU.QL.CLA, Iron Range, old Claudie R. x-ing, 4 km N of main road jct, 9.i.2007, 7 m, 12°42.900’S 143°17.169’E, K. Hill, D. Marshall, M. Moulds (**QM**). *Paratypes*: none.

Distribution and habitat (Fig. 60). Far northern Queensland where it is known only from the holotype taken at Iron Range (see above for details).

Adult description. *Male* (Figs 24, 34, 61). Green with brown highlights, bearing fine black thoracic markings, but after death gradually fading to light brown. *Head* with a small black marking adjacent to postclypeus, and one about mid-length on anterior margin extending to but not reaching lateral ocellus. Postclypeus green, with a little black dorsally extending ventrally as a broken band either side of midline not reaching anteclypeus. Rostrum reaching to slightly beyond apices of hind coxae. *Pronotum* with keyhole marking open at both ends (but this is likely variable), its anterior end with its black margin expanded a little laterally; a narrow black edging against anterior of pronotal collar broken dorsally; pronotal collar green with a brown spot on lateral angles. *Mesonotum* with a variable pair of short black fasciae on midline anterior of cruciform elevation extended laterally to join the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* with weak infuscation at wing apex,

with a small infuscation on crossvein r (although its likely sometime absent in a longer series), and no infuscation on r-m. *Legs* green with black at distal ends of mid and fore tibiae and both ends of mid and fore tarsi (weak at proximal ends) , and as faint linear markings on fore femora and coxae. *Opercula* pale yellowish brown on basal half or so becoming black apically but without a narrow black edging; almost meeting. *Timbals* with four long ribs spanning timbal membrane. *Timbal covers* (Fig. 34) green, with black upper margin; very small but with distinct anterior projection. *Abdomen* with tergites brown with green along distal margin except for mostly green tergite 2; tergite 8 brown with greenish yellow distal quarter or so. Sternites dark brown with a narrow green distal margin on sternites 3–6; sternite VIII predominantly black with narrow yellowish lateral margins. *Genitalia* (Fig. 61) with pygofer distal shoulder broadly rounded Uncus short, broad, with a short projecting ventral lobe in lateral view. Theca curved in an arc, terminating in a long hatchet-like sclerotised projection extending beyond gonopore.



FIGURES 60–61. *Tamasa dolabra* **sp. nov.** (60) distribution; (61a) male genitalia in lateral view; (61b) same in ventral view.

Female. Unknown.

Measurements. Range and mean (in mm) for 1 male (holotype). *Length of body* (including head): 18.7. *Length of forewing*: 25.1. *Width of head* (including eyes): 6.6. *Width of pronotum* (across lateral angles): 6.8.

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 61). Differs from *T. capensis* **sp. nov.**, the only other *Tamasa* found at Iron Range in its green colour in life compared to the brown of *T. capensis*. Males differ from *T. capensis* (apart from in genitalia) in having an abdomen about as wide as the thorax rather than much wider as in *T. capensis*. It is possible that *T. dolabra* **sp. nov.** also occurs at the McIlwraith Range where the closely similar *T. timothyi* **sp. nov.** and *T. ewarti* **sp. nov.** occur. It is distinguishable from both in the male genitalia that have a very short uncus and a theca with a distinctive projection resembling an axe head in shape.

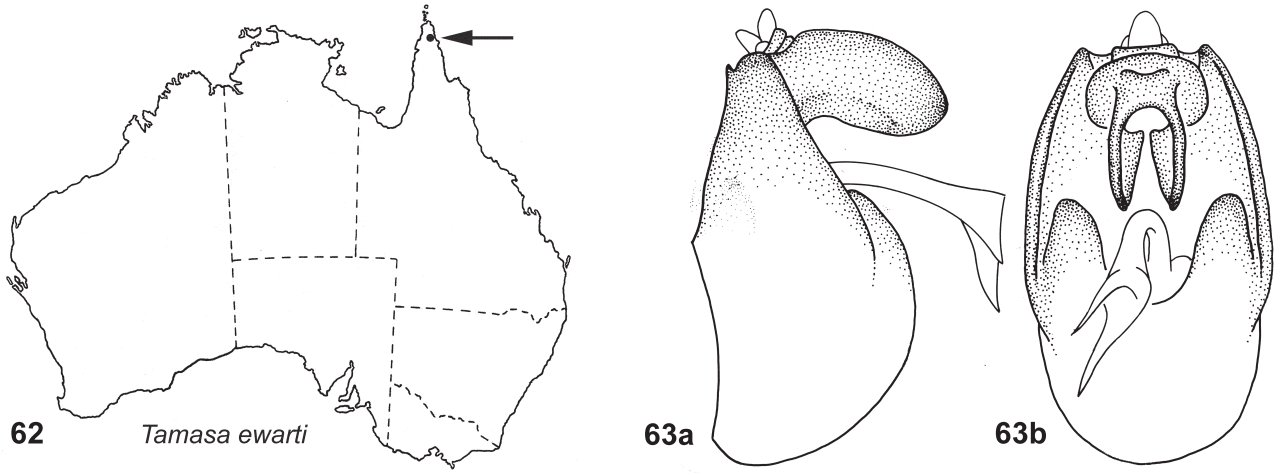
***Tamasa ewarti* sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:32D78695-DA13-4B09-B21B-B19F8B533EB8

Etymology. Named for Prof. Anthony (Tony) Ewart in recognition of his enormous contribution to our knowledge of Australian cicadas.

Types. *Holotype* male (genitalia prep. TAM121), Capt Billy Landing, ~33 km NE of Heathlands Ranger Stn, northern Cape York Peninsula, Queensland, 11.631°S 142.855°E, 21.i.1992, dune vegetation, A.E[wart], QM Reg. No. T262469 (**QM**). *Paratype* as follows: QUEENSLAND: 1 male (genitalia prep. TAM124), Elliot Falls, ~45 km NW of Heathlands Ranger Stn, northern Cape York Peninsula, 11.385°E 142.413°S, 18.ii.1992, A. E[wart], Reg. No. T262470 (**QM**).

Distribution and habitat (Fig. 62). Far north-east of Cape York Peninsula, Queensland, where it is known only from Elliot Falls (45 km NW of Heathlands Ranger Station), and the sand dunes near Captain Billy Landing. At Captain Billy Landing adults were encountered in windswept shrubs and *Casuarina* communities growing on coastal dunes (Ewart 1993).



FIGURES 62–63. *Tamasa ewarti* **sp. nov.** (62) distribution; (63a) male genitalia in lateral view; (63b) same in ventral view.

Adult description. *Male* (Figs 25, 36, 63). In either brown or green forms with markings similar to those of *T. tristigma. Head* with an extra black spot lateral of lateral ocelli. Rostrum passing a little beyond apices of hind coxae. *Pronotum* with keyhole marking open at its posterior end and almost touching pronotal collar; a narrow black edging against anterior of pronotal collar continuous between lateral angles, and no black spot on lateral angles. *Mesonotum* with a dark brown marking filling, or almost filling, the space between anterior arms of the cruciform elevation that thereafter projects a little way anteriorly along midline. *Forewings* with two or three infuscated spots, one at wing apex and one each on crossveins r, often smallest or sometimes missing on r-m. *Legs* pale yellowish brown, without distinct black markings. *Opercula* pale yellow to muddy yellow, becoming black on inner half or so; not quite meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 36) very small, with minimal anterior development. *Abdomen* with tergites more or less uniformly brown, slightly paler on tergite 2, and tergite 8 darker on anterior half or so and paler on posterior. Sternites dark brown to black with distal margins variably pale yellowish; sternite VIII entirely dark brown to blackish. *Genitalia* (Fig. 63) with pygofer tending rounded in ventral view. Basal lobes very broad and distally broadly rounded. Uncus large, in lateral view very broad, without taper and apically broadly rounded, deeply bifurcated in dorsal view. Theca gently curved, and terminating in two large triangular lobes directed downwards.

Female unknown.

Measurements. Range and mean (in mm), 2 males. *Length of body* (including head): 16.6–17.7 (17.15). *Length of forewing*: 25.4–25.8 (25.6). *Width of head* (including eyes): 6.2–6.4 (6.3). *Width of pronotum* (across lateral angles): 6.9–7.1 (7.0).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 63). Similar in outward appearance to *T. capensis* **sp. nov.**, *T. tristigma* and *T. burgessi*. Sympatric only with *T. capensis* **sp. nov.** (in the vicinity of Heathlands in the far north of Cape York Peninsula). Differs from *capensis* (apart from in male genitalia) in having males in which the abdomen is similar in width to the thorax rather than being much wider. Differs from both *tristigma* and *burgessi* in having the narrow black edging against anterior of pronotal collar continuous between lateral angles, and males in having much reduced timbal covers that have minimal anterior development (Fig. 36) rather than projecting about half way across the timbal membrane.

***Tamasa gigas* sp. nov.**

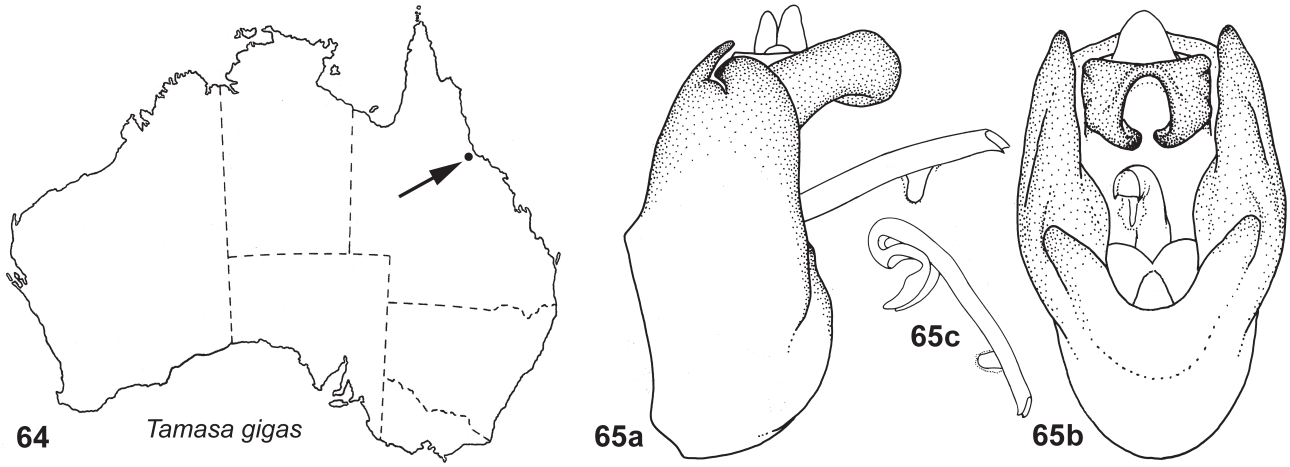
zoobank registration: urn:lsid:zoobank.org:act:889C01C6-FF70-4BD4-8A0D-B0B269CAB477

Etymology. From the Greek meaning giant, large, and pertaining to the large size of this species, the largest *Tamasa* known.

Types. *Holotype* male, Paluma, Qld, 29.i.1981, M.S. & B.J. Moulds (**QM**).

Paratypes as follows: QUEENSLAND: 1 male (genitalia prep. TAM48), Mt Spec, Paluma Ra., 5-7.i.1965, J.G. Brooks (**MSM**). 1 female, Birthday Creek via Paluma, 4.i.1973, B. Cantrell (**QM**).

Distribution and habitat (Fig. 64). North-eastern Queensland where it is known only from Paluma, from just two specimens taken in January. Adults inhabit rainforest transition margins.



FIGURES 64–65. *Tamasa gigas* **sp. nov.** (64) distribution; (65a) male genitalia in lateral view; (65b) same in ventral view; (65c) dissected aedeagus in lateral view.

Adult description. *Male* (Figs 23, 45, 65). In subtle shades of green and brown with fine black markings; after death gradually fading to light brown. *Head* with a black spot on anterior margin near postclypeus and two very small black spots posterior of it plus one near lateral posterior corner of vertex; a bold black mark encompassing ocelli almost divided along midline. Postclypeus light brown with black ill-defined band either side of a pale midline not reaching anteclypeus. Rostrum passing apices of hind coxae but not reaching to distal margin of opercula. *Pronotum* with keyhole marking parallel-sided, variable in definition but distinct on posterior half, joining with linear black paramedian fissure; black along anterior dorsal margin; lateral of paramedian fissures brown irregularly ringed black; pronotal collar green with a black spot on lateral angles. *Mesonotum* with scutal depressions black and a short black fascia on midline anterior of cruciform elevation. *Forewings* with an ill-defined black infuscation at apex and prominent infuscations overlaying crossveins r and r-m. *Legs* light brown except for black along row of femoral spines and vaguely on fore coxae. *Opercula* light brown, sometimes becoming blackish towards apices; slightly overlapping. *Timbals* with five well defined long ribs spanning timbal membrane. *Timbal covers* (Fig. 45) brown with a broad black upper margin; broadly triangular, projecting half way or more across timbal membrane. *Abdomen* with tergites brown except for black sublaterally on tergite 3 and tergite 8 black on anterior half or more, otherwise pale green or light brown if discoloured. Sternites dark brown with blackish overtones variable in extent but most extensive on sternites 6 and 7; sternite VIII pale green with a black apex. *Genitalia* (Fig. 65) with pygofer distal shoulders protruding and slightly turned backwards. Uncus robust, slightly downturned distally in lateral view and without anterior projections. Theca slender, almost straight, with a simple backward sloping apex and a prominent keeled lobe ventrally at about three quarters length.

Female. Similar to male. Abdominal segment 9 light greenish brown with black along anterior margin and a narrow subdorsal black band on each side not reaching distal margin. Ovipositor sheath not extending beyond the anal styles.

Measurements. Range and mean (in mm) for 2 males, 1 female. *Length of body* (including head): male 25.1–25.4 (25.25); female (including ovipositor) 25.0. *Length of forewing*: male 39.8–41.6 (40.7); female 38.2. *Width of head* (including eyes): male 8.9–9.1 (9.0); female 8.9. *Width of pronotum* (across lateral angles): male 10.2–10.8 (10.5); female 10.0.

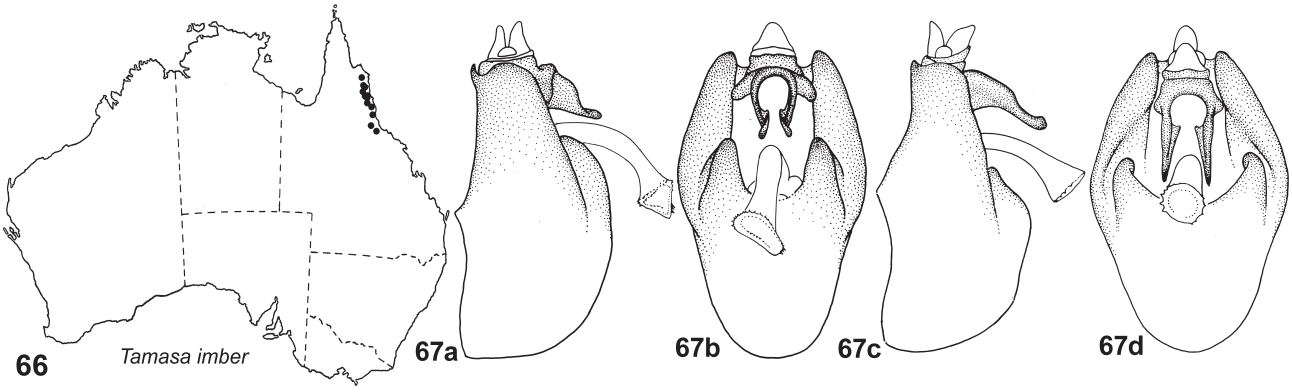
Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 65). This is the largest *Tamasa* species, distinctly coloured and marked on the thorax, and unlikely to be confused with other species. It is known only from Paluma where the only other *Tamasa* species is the much smaller *T. imber* **sp. nov.** (forewing 21–29 mm) compared to the much larger *T. gigas* **sp. nov.** (forewing 38.2–42 mm).

***Tamasa imber* sp. nov.**
zoobank registration: urn:lsid:zoobank.org:act:2D3BE517-57BA-473F-9D8A-B1D138315FA3

Etymology. From the Latin *imber* meaning rain, shower, storm, and referring to the Wet Tropics habitat of this species.

Types. *Holotype* male (genitalia prep. TAM82), Shiptons Flat, Cooktown, Qld, 11.ii.2021, J. Olive (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male, Paluma, ix-xii.1981, D.W. Frith, CY 1030-11, ANIC database No. 20 005105; 1 female, Paluma District, 24.i.1995, J. Bugeja, CY 1028-11, ANIC database No. 20 005103; 1 male, Paluma District, 22.i.1995, J. Bugeja, CY 1029-11, ANIC database No. 20 005104 (**ANIC**). 1 male (genitalia checked but not dissected), Carrington, Atherton, 17°14.856'S 145°26.997'S, OV-16-30.xii.2007, L. Popple (**DE**). 1 male (genitalia prep. TAM110), Tolga Scrub via Atherton28.i.2009, C.E. Myer, S.S. Brown, R.P. Weir & C.G. Miller **(JO)**. 1 male (genitalia prep. TAM136), top of Herberton Range, 17°20'32"S 145°25'02'E, 19-20.xii.2007, Woodland, L. Popple, A. McKinnon; 2 males (genitalia preps TAM161, TAM163), Carrington St, Atherton, 17°17'41"S 145°27'04"E, 13.xii.2006–3.i.2007, L. Popple & A. McKinnon, [lpop]122-0003, 122-0004; 7 males (genitalia preps TAM150, TAM156, TAM155, TAM158, TAM159, TAM160, TAM162), Carrington St, Atherton, 17°17'41"S, 145°27'04"E, 16.xii.2007–11.i.2008, L.W. Popple & A.E. McKinnon, [lpop]122-0014, 122-0016, 122-0017, 122-0018, 122-0020, 122-0023, 122-0026; 1 male (genitalia prep. TAM138), Carrington St, Atherton, 17°17'41"S 145°27'04"E, 16.xii.2007-11.i.2008, Popple & McKinnon; 1 male (genitalia prep. TAM137), Carrington Falls, 17°19'51"S, 145°26'49"E, 1.i.2018, L.W. Popple & A. McKinnon, [lpop]122-0046; 2 males (genitalia preps TAM52, TAM79), Carrington Falls, 17°19'51"S 145°26'49"E, 31.xii.2007, L. Popple & A. McKinnon, [lpop]122-0040 & 122-0041; 1 male (genitalia prep. TAM148), Carrington St, Atherton, 17°17'41"S, 145°27'04"E, 16.xii.2007–11.i.2008, L.W. Popple & A.E. McKinnon, [lpop]122-0032; 1 male (genitalia prep. TAM151), Carrington St, Atherton, 17°17'41"S 145°27'04"E, 13.xii.2006–3.i.2007, L. Popple & A. McKinnon, [lpop]122-0002; 3 males (genitalia preps TAM152, TAM153, TAM154), 19 Butler Dr, Kuranda, Qld, 16°48'S 145°38'E (GPS), 1–15.xii.2006, D.C.F. Rentz, [lpop]122-0008, 122-0009, 122-0010; 1 male, Paluma, 9.i.2001, R. Morgan, [lpop]120-0001; 1 female, Paluma Range, 23.xi.2001, G. Svenson, mv lamp (**LWP**). 1 male (genitalia prep. TAM50), McIvor River, N of Cooktown, 4.i.1981, M.S. & B.J. Moulds; 2 males (genitalia preps T44, TA85), Shiptons Flat nr Cooktown, 26.i.1993, C. Pratt; 1 male (genitalia prep. TAM24), Atherton, 30.iii.1989, D.A. Lane; 1 male (genitalia prep. TAM83), Atherton, 23.i.2024, D.A. Lane; 1 male (genitalia prep. TAM84), Atherton, 27.i.2024, D.A. Lane; 2 males (genitalia preps TAM99, TAM111), 3 km NW of Tolga, nr Atherton, 26.i.1981, M.S. & B.J. Moulds; 1 male (genitalia prep. T70), AU.QLD.SAN, Equestrian Dr., Tolga, near Atherton, 17°11.891'S 145°27.244'E, 757 m, 17.i.2005, Hill, Moulds, Marshall, Olive; 1 male (genitalia prep. TAM166), Tolga, 6.i.2025, G. Sankowsky; 2 males (genitalia preps T42, TAM101), Mt Windsor Tableland, NW of Mossman, 6.i.1981, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM19), Julatten, 12.i.1979, Walford-Huggins; 2 males (genitalia prep. T38, TAM35), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 1-15.xii.2003, D.C.F. Rentz; 1 male (genitalia prep. T66), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 1-15.xii.2006, D.C.F. Rentz; 1 male (genitalia prep. TAM1), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 16-31.i.2010, D.C.F. Rentz; 1 male (genitalia checked but not dissected), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 1-15.i.2026, D.C.F. Rentz; 1 male (genitalia prep. TAM21), Kuranda, Black Mtn Rd, 17,xi,1979, M. Cermak; 2 males (genitalia preps TAM20, TAM23), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 5-15,x.2008, D.C.F. Rentz; 1 male (genitalia prep. TAM33), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 15-31.i.2005, D.C.F. Rentz; 2 males (genitalia preps TAM22, TAM34), 19 Butler Dr, Kuranda, Top of the Range, 16°48'S 145°38'E, 335 m, 15-30.xii.2003, D.C.F. Rentz; 4 males (3 genitalia preps TAM145–TAM147), 1 female, 19 Butler Dr., Kuranda16°48'S 145°38'E' 16-30.i.2026, D.C.F. Rentz; 1 male (genitalia prep. T52), Copperload Dam, Whitfield Range, Cairns, 28.i.1973, A. & M. Walford-Huggins; 1 male (genitalia prep. T67), Whitfield Range, Cairns, 28.i.1973, A. & M. Walford-Huggins; 1 male (genitalia prep. T71), Atherton, 7.iii.1991, D.A. Lane; 2 males (genitalia prep. TAM44, TAM46), 1 female, Yungaburra, 700 m, 17°15'54"S 145°35'50"E, 20,31.i.2022, 5.ii.2022, R.B. Lachlan; 1 male (genitalia prep. T55), 7 km S Herberton, 18,i.1979, R.I. Storey; 4 males (one genitalia prep. T32), nr Mt Fox, SW of Ingham, 550 m, 6.xii.1986, edge of rainforest & Eucal. grandus, J. Young; 1 male (genitalia TAM131), Military Reserve, Cardstone Rd, via Tully, 17°53'25"S 145°48'39"E, 15.i.2022, D.A. Lane; 2 males (genitalia preps TAM139, TAM140), Wallaman Range, W of Ingham, 29.i.1987, J. Young; 2 males (one genitalia prep. TAM141), 3 females, Paluma Rg, 20.xii.1989, L. Ring; 1 male (genitalia prep. T41), Paluma, 12.i.1993, E.W.J. Adams; 2 males (genitalia preps T51, TAM56), Paluma, 9-13.i. 1989, R.I. Story (**MSM**).

Distribution and habitat (Fig. 66). North-eastern Queensland from the McIvor River (north of Cooktown) south to Paluma, in both coastal districts and higher altitudes. Some notable intermediate localities include Shiptons Flat (south of Cooktown), through much of the Atherton Tableland including around Julatten, Kuranda, Tolga, Atherton, Carrington Falls, Yungaburra, Millaa Millaa, Herberton, and further south at Mt Fox inland from Ingham, and Tully Military Reserve. Adults inhabit rainforest and are found from October to March.



FIGURES 66–67. *Tamasa imber* **sp. nov.** (66) distribution; (67a) male genitalia in lateral view, asymmetrical thecal apex; (67b) same in ventral view; (67c) male genitalia in lateral view, symmetrical thecal apex; (67d) same in ventral view.

Adult description. *Male* (Figs 5, 6, 13a-b, 40, 67). Variable from predominantly pale blue, to pale blue and light brown in varying proportions (unknown in green or an entirely brown forms), all forms with black thoracic markings considerably variable in extent, and after death all gradually fading to brown with black markings. *Head* typically with four small black spots, all variable in size and shape, one on anterior margin near postclypeus, one near back of eye and two in between, and also with a large black mark encompassing ocelli also variable in size and shape. Eyes in life brown or black. Postclypeus pale blue or greenish blue, with an ill-defined black band either side often reaching dorsal surface but not to anteclypeus. Rostrum to apices of hind coxae or just beyond. *Pronotum* with keyhole marking wide on anterior half and typically with the black margin also expanded a little laterally, and usually open at its anterior end but variable; a narrow black edging against anterior of pronotal collar usually continuing laterally and sometimes broken dorsally; pronotal collar typically bluish green, with or without a black spot on lateral angles. *Mesonotum* with submedian sigilla always outlined black but lateral sigilla variable from almost entirely black to barely tinted; with a variable pair of short black fasciae on midline anterior of cruciform elevation extended laterally to meet with the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* with a black infuscation at apex and usually small infuscations overlaying crossveins r and r-m, but sometimes missing on r-m. *Legs* pale bluish except for black at distal ends of mid and fore tibiae and often both ends of mid and fore tarsi, and usually as linear markings on fore femora and coxae. *Opercula* pale blue to whitish with a narrow black edging of variable length and sometimes lightly infuscated towards apices; meeting or almost meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 40) pale green to pale blue with a black upper margin, reaching less than half way across timbal membrane. *Abdomen* with tergites pale brown to varying degrees with bluish green often confined to distal margins except for usually predominantly greenish or blue tergites 1 and 2, and predominantly black tergite 8; sometimes with small black patches laterally. Sternites brown with a broad black midline usually encompassing all of sternite VII; sternite VIII pale green or yellowish, with a distinct dark brown to black midline that is sometimes broadest at base but variable in shape and often dominating. *Genitalia* (Fig. 67) with distal shoulder of pygofer well developed but broadly rounded. Uncus with two slender finger-like extensions of the ventral lobes variable in length but always very long. Theca curved and distally trumpet-like with the apex evenly rounded to broadly asymmetrical.

The genitalia are distinctive but there is some variation in the shape of the thecal apex and length of the uncal lobes (Fig. 67). Those with a symmetrical opening to the theca and long uncal lobes are widely distributed through lowland districts including localities such as McIvor River and Shiptons Flat, Thornton Beach near Daintree and Eubenangee Swamp via Innisfail, but also on the Atherton Tablelands and south to Mt Fox and Paluma. Those with an asymmetrical opening to the theca and shorter uncal lobes have a more restricted distribution occurring on the Windsor Tableland, Julatten, around Kuranda and nearby Whitfield Range but also at Atherton and Yungaburra.

At Atherton and nearby Tolga both variants occur and intermediates are common, and likewise at Yungaburra and Kuranda intermediates are also found. While it is possible these variants represent two species with areas of interbreeding, in the absence of more compelling evidence they are all treated here as conspecific.

Female (Figs 13c-d). Similar to male. Abdominal segment 9 pale bluish and brown in varying amounts, with a bold subdorsal black band not reaching distal margin but often extending to cover much of dorsal surface but usually not the lateral stigma. Ovipositor sheath barely projecting beyond the level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 15.5–19.3 (17.6); female (including ovipositor) 16.5–19.3 (17.8). *Length of forewing*: male 21.2–28.6 (25.8); female 22.7–27.6 (25.4). *Width of head* (including eyes): male 6.0–7.4 (6.7); female 6.2–7.4 (6.9). *Width of pronotum* (across lateral angles): male 6.3–7.5 (6.9); female 6.3–7.6 (6.9).

Distinguishing features. Closely similar to *T. kurandae* **stat. rev.** that has colour forms similar to those of *T. imber* **sp. nov.**, except that no brown individuals of *T. imber* are known. Males are best distinguished by sternite VIII (the last ventral segment, under the genitalia) that has a black or blackish midline of variable shape and length and sometimes broadest basally, a feature absent in *T. kurandae*. Further, the male genitalia are clearly different in the length of the uncal lobes, those of *T. imber* are very long finger-like structures, whereas those of *T. kurandae* are very short lobe-like structures, sometimes visible without dissection. Females are best identified by association with males collected together with the females.

Tamasa imber might also be confused with *T. lanei* **sp. nov.**, especially when discoloured. Males differ in having the timbal covers projecting far less than half way across the timbal membrane (Fig. 40), whereas in *T. lanei* they extend about half way across (Fig. 42). On average *T. imber* is a smaller species with the forewing never longer than 29 mm, whereas many individuals (not all) of *T. lanei* have a forewing longer than 29 mm.

Also closely similar to *T. pearsoni* **sp. nov.**, although their distributions are distinct. *Tamasa imber* differs in its blue to brown colour morphs rather than the bluish green of *T. pearsoni*. Males also differ in their timbal covers that are angular in shape (Fig. 40) rather than evenly rounded (Fig. 38).

Tamasa kirramae **sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:2379BBED-07B7-49D0-B4D6-F6C93C278F67

Etymology. Named for the type locality from where the only known specimen was found.

Types*. Holotype* male (genitalia prep. T78), Kirrama State Forest, 24 km WNW of Kennedy, Queensland, 28.i.1981, M.S. & B.J. Moulds.(**QM**). *Paratypes*: none.

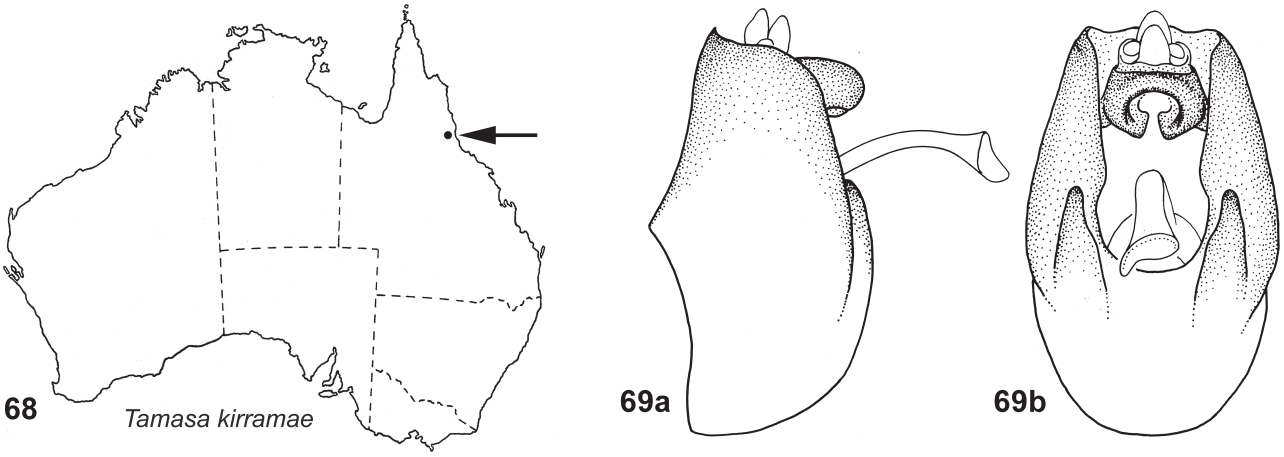
Distribution and habitat (Fig. 68). North-eastern Queensland where it is known only from the Kirrama Range (24 km WNW of Kennedy, north of Cardwell). The holotype male, taken in rainforest in January, is the only known specimen.

Adult description. *Male* (Figs 30, 44, 69). Dark brown with fine black markings. *Head* with four black spots each side, one adjacent to eye, one on vertex between postclypeus and eye, one larger one adjacent to eye partly divided, and one near hind margin, plus a black mark encompassing ocelli. Rostrum reaching a little beyond apices of hind coxae. *Pronotum* with keyhole marking closed at both ends and outlined with a narrow black edging even in thickness; a narrow black edging against anterior of pronotal collar broken dorsally and not reaching lateral angles; lateral angles with a dark brown spot. *Mesonotum* with a pair of short black fasciae on midline anterior of cruciform elevation extended laterally to meet with the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* infuscated at apex, and on crossveins r and r-m. *Legs* light brown with distal ends of mid and fore tibiae and tarsi black and on fore femora between femoral spines and as narrow longitudinal fore femoral blackish stripes. *Opercula* light brown basally merging to black on remainder, and with a jet black narrow rim; almost meeting. *Timbal covers* (Fig. 44) angular, protruding on basal half about half way across timbal cavity. *Abdomen* with tergites uniformly brown with black markings, a black spot dorsally and mid laterally on tergite except for tergite 2, black across anterior half or more of tergites 3 and 8, and as a small black parch sublaterally on tergites 4–7. Sternites black except for lateral extremities of sternite I and partly brown sternite VIII. *Genitalia* (Fig. 69) with pygofer distal shoulders broadly rounded. Uncus short and lacking distal protrusions on lower rim. Theca curved in an arc and terminating in an asymmetrical rounded opening.

Female. Unknown.

Measurements. Range and mean (in mm) for 1 male (holotype). *Length of body* (including head): 21.4. *Length of forewing*: 33.5. *Width of head* (including eyes): 8.4. *Width of pronotum* (across lateral angles): 9.1.

Distinguishing features. Closely similar to *T. doddi* and *T. rentzi* **sp. nov.** Differs from both in having a strongly infuscated spot at the forewing at the apex and on cross veins r and r-m, unlike in *T. doddi* and *T. rentzi* that lack infuscations on r and r-m or if present then barely so. The male genitalia (Fig. 69) differ in the shape of the theca that curves in an even arc and terminates in an asymmetrical funnel-shaped apex, unlike in *T. rentzi* that curve upwards towards the apex with a simple circular opening, and from *T. doddi* whose thecal apex bears one to four strong spines.



FIGURES 68–69. *Tamasa kirramae* **sp. nov.** (68) distribution; (69a) male genitalia in lateral view; (69b) same in ventral view.

Tamasa kurandae (Goding & Froggatt, 1904) stat. rev., comb. nov.

Synonymy

Tibicen kurandae Goding & Froggatt, 1904: 605–606 (type loc. Kuranda).
Abricta kurandae (Goding & Froggatt): Distant. 1906: 131.
Tibicen kurandae Goding & Froggatt: Distant (1907, 1914); Ashton (1921); Burns (1957); Metcalf (1963); Sanborn (2013).

Types. *Syntype* male and female, each bearing labels as follows: (1) Tibicen kurandae, G. & F. Kuranda N. Queensland (handwritten); (2) Townsville, Qld. (Townsville crossed out) Kuranda Feb 04 (handwritten), P. Dodd. (printed); (3) Type (handwritten and underlined red); (4) On permanent loan from MACLEAY MUSEUM University of Sydney (printed); (5) ANIC Database No. 20 011350 (male) and ANIC Database No. 20 011351 (female). Examined, in **ANIC**.

The current handwritten labels attached to the *Tibicen kurandae* syntypes are those of George Masters, added during a reorganisation of the collection when he was Curator (Horning 1988). A male and a female (labelled Kuranda, Nth. Qld., January, 1904. Dodd) were recognised as types by Hahn (1962), the first published catalogue of Macleay Museum insect type specimens. In 1969, under a mutual agreement between the University of Sydney (then owner of the Macleay collections) and the Australian National Insect Collection, Canberra, arrangements were made to transfer all Macleay invertebrate types to the ANIC for safe keeping where they now reside. Among the transfers are the syntypes mentioned above.

Distant (1907) placed *Tibicen kurandae* Goding & Froggatt, 1904 into junior synonymy with *Tamasa tristigma* (Germar, 1834) where it has remained ever since (Distant 1914; Ashton 1921; Burns 1957; Metcalf 1963; Moulds & Cowan 2002; Sanborn 2013). *Tibicen kurandae* was ‘described from many examples collected by Dodd’. Examination of the only two recognised syntypes, a male and female in ANIC, revealed that they are two different species.

Lectotype designation. The male syntype of *Tibicen kurandae* has a very long rostrum reaching to the distal margin of the opercula that clearly identifies it as conspecific with *T. burgessi* Distant, 1905, the most common and widespread *Tamasa* species in northern Queensland that is distributed from Cape Flattery (north of Cooktown) to Townsville. *Tibicen kurandae* Goding & Froggatt, 1904, being the older name, has priority over *Tamasa burgessi* Distant, 1905. Thus, if the male syntype of *Tibicen kurandae* is chosen as lectotype then the species currently known as *T. burgessi* would become *Tamasa kurandae*, an unfortunate name change for a common, well-known species distributed far beyond Kuranda.

The female syntype is almost certainly a specimen of the small blue/brown *Tamasa* species that is abundant around Kuranda. There are two small *Tamasa* species found around Kuranda whose females are similar. The syntype female has a forewing length of 23.9 mm, there is no spot on the lateral angles of the pronotal collar, the keyhole marking on the pronotum is strongly defined and expanded on its lateral anterior half, and abdominal segment 9 is brown dorsally with a large black lateral marking encompassing the stigma. These are all attributes of the common blue/brown *Tamasa* that in combination largely distinguish it from the other small *Tamasa* found at Kuranda described above as *T. imber* **sp. nov.** While I would normally be reluctant to designate a female as a primary type, it seems sensible here to choose the female syntype for the sake of retaining stability in the use of the name *burgessi* for the common widespread north Queensland *Tamasa,* and applying the name *kurandae* to a species that is common at Kuranda and with a relatively small distribution confined to parts of the Atherton Tablelands.

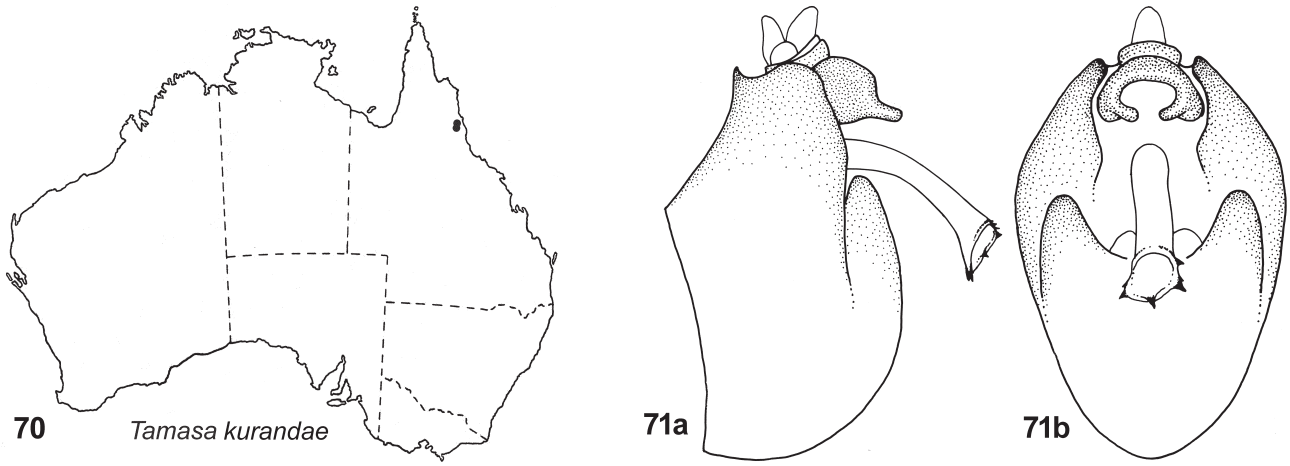
Thus, the female syntypes detailed above is here designated as the lectotype to clarify the identity of *Tibicen kurandae* Goding & Froggatt, 1904.

Other material examined. QUEENSLAND: 1 male (genitalia prep. TAM26), 19 Butler Dr, Kuranda, Top of the Range, 16°48’S 145°38’E, 335 m, 1-15.xii.2003, D.C.F. Rentz (**DE**). 1 male (genitalia prep. TAM169), Kuranda, 17.i.[19]88, J. Booy (**JO**). 1 male (genitalia prep. TAM118), Carrington St, Atherton, 17°17’41”S, 145°27’04”E, 16.xii.2007–11.i.2008, L.W. Popple & A.E. McKinnon, [lpop]122-0025; 2 males (genitalia preps TAM135, TAM167), Black Mountain Rd, Kuranda SF, 16°42’27”S 145°32’05”E, 13.i.2019, L. Popple & A. McKinnon, [lpop]122-0050 and [lpop]122-0053; 2 males (one genitalia prep. TAM41), 2 females, start of Surprise Creek track, Barron Gorge NP, 16°50’47”S 145°38’35”E, 11.i.2020, L.W. Popple & A.E. McKinnon, at light, [lpop]122-0057 to 122-0060 (**LWP**). 1 male (genitalia prep. TAM2), Black Mt. road, near Julatten, 28.i.1977, A. & M. Walford-Huggins; 1 male (genitalia checked but nor dissected), 1 female, 19 Butler Dr, Kuranda, Top of the Range, 16°48’S 145°38’E, 335 m, 1-15.xii.2026, D.C.F. Rentz; 2 males (genitalia checked but nor dissected), 2 females, 19 Butler Dr, Kuranda, Top of the Range, 16°48’S 145°38’E, 335 m, 15-30.i.2026, D.C.F. Rentz; 1 male (genitalia prep. T39), Kuranda, 16.i.1977, Wendy Walsh; 1 male (genitalia prep. TAM149), Kuranda, 1-14.ii. 1975, W. Walsh; 2 males (genitalia prep TAM32, TAM164 and molecular voucher 07.Au.QL.MAK.03), 6 Victor Place, Kuranda, 16°48.923’S 145°38.550’E, 395 m, 4.i.2007, Hill, Marshall, Moulds, Humphrey; 1 male (genitalia prep. TAM31), Kuranda, 10.i.1977, David Lane; 1 male (genitalia prep. T63), Kuranda, 11.i.1980, Graham Wood; 1 male (genitalia prep. TAM3), Davies Ck Rd, nr Mareeba, 8.i.1980, Graham Wood; (**MSM).**

Distribution and habitat (Fig. 70). Atherton Tablelands of north-eastern Queensland from Julatten to Kuranda and Atherton. It is an uncommon species with most records from around Kuranda and, as in other localities, nearly all records are from individuals attracted to UV light. Records from Atherton are from the southern edge of town in the vicinity of Carrington Road and Scrubby Creek. The only other confirmed locality is Davies Creek Rd near Mareeba. Adults inhabit rainforest and rainforest intergrades, and are found from December to mid-February.

Redescription of adult. *Male* (Figs 2–4, 14a, 41, 71). Brown in varying shades or brown with blue highlights and sometimes predominantly pale blue (unconfirmed in a green form), all with black thoracic markings variable in extent, and after death all gradually fading to brown with black markings. *Head* typically with four small black spots, but all considerably variable in size, shape and presence, and also with a large black mark encompassing ocelli also variable in size and shape. Eyes in life blackish. Postclypeus pale blue to greenish blue or light brown, with an ill-defined black band either side reaching dorsal surface but not to anteclypeus. Rostrum to apices of hind coxae or just beyond. *Pronotum* with keyhole marking wide on anterior half and typically closed with the posterior end slightly expanded; a narrow black edging against anterior of pronotal collar usually continuing laterally and sometimes broken dorsally; pronotal collar pale bluish to brown sometimes with a green tinge, with or without a black spot on lateral angles. *Mesonotum* with submedian sigilla always outlined black but lateral sigilla variable from almost entirely black to barely tinted; a variable pair of parallel, short, black fasciae on midline anterior of cruciform elevation that often extended laterally to join with the black scutal depressions, and a black spot near ends of anterior arms of

cruciform elevation. *Forewings* with black infuscation at apex, and overlaying crossveins r and r-m. *Legs* pale bluish to pale brown except for black at distal ends of fore and mid tibiae and distal ends of fore and mid tarsi, and usually as linear markings on fore femora and coxae. *Opercula* pale blue to whitish, sometimes with a narrow black edging often restricted to outer base and sometimes hints of black infuscation; meeting or almost meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 41) pale blue or brown with black upper margin, reaching less than half way across timbal membrane. *Abdomen* with tergites brown with pale blue distal margins except for often predominantly pale blue tergite 2, and predominantly black tergite 8; sometimes with small black patches laterally. Sternites yellowish brown with a variable broad black midline which encompasses all of sternites VI and VII and sometimes broken at about sternite III; sternite VIII pale yellowish, sometimes with hints of black across base. *Genitalia* (Fig. 71) with distal shoulder of pygofer well developed but broadly rounded. Uncus very short, with small lateral extension on lower rim directed forwards and inwards to restrain theca. Theca gently curved with a funnel-shaped apex bearing usually 3–4 short, evenly spaced, spines on its perimeter. Length of forewing 22.1–26.9 mm.



FIGURES 70–71. *Tamasa kurandae* **stat. rev.** (70) distribution; (71a) male genitalia in lateral view; (71b) same in ventral view.

Female (Figs 3, 14b). Similar to male in either turquoise blue or brown forms although females are often darker than males. Abdominal segment 9 pale bluish and brown in varying amounts, with a bold subdorsal black band not reaching distal margin but often extending to cover much of dorsal surface and the lateral stigma. Ovipositor sheath barely projecting beyond the level of anal styles and dorsal beak. Length of forewing 22.8–26.5 mm.

Distinguishing features. The brown form resembles the sympatric *T. burgessi* and *T. doddi* but clearly differs from *T. burgessi* in its shorter rostrum (to apices of hind coxae or just beyond rather than far beyond) and from *T. doddi* in its smaller size (forewing never more than 27 mm long).

The blue form is closely similar to that of *T. imber* **sp. nov.** Males are best distinguished by sternite VIII (the last ventral segment, under the genitalia) that lacks a black midline (rarely with black suffusion either side at base), whereas that of *T. imber* has a black or blackish midline of variable shape and extent but often broadest basally. Further, the male genitalia are clearly different in the length of the uncal lobes, those of *T. kurandae* **stat. rev.** are very short lobe-like structures, whereas those of *T. imber* are very long finger-like structures, sometimes visible without dissection. Females are best identified by association with males collected together with the females.

Tamasa kurandae might also be confused with *T. lanei* **sp. nov.** or *T. pearsoni* **sp. nov.**, when discoloured. Males differ from both in lacking a black or blackish midline on sternite VIII. Further, males also differ from *T. lanei* in having the timbal covers projecting far less than half way across the timbal membrane (Fig. 41), whereas in *T. lanei* they extend about half way across (Fig. 42). On average *T. kurandae* is a smaller than *T. lanei* with the forewing never longer than 28 mm, whereas many individuals (not all) of *T. lanei* have a forewing longer than 28 mm. Males also differ from *T. pearsoni* (apart from having a different distribution) in their timbal covers that are angular in shape (Fig. 41) rather than evenly rounded (Fig. 38).

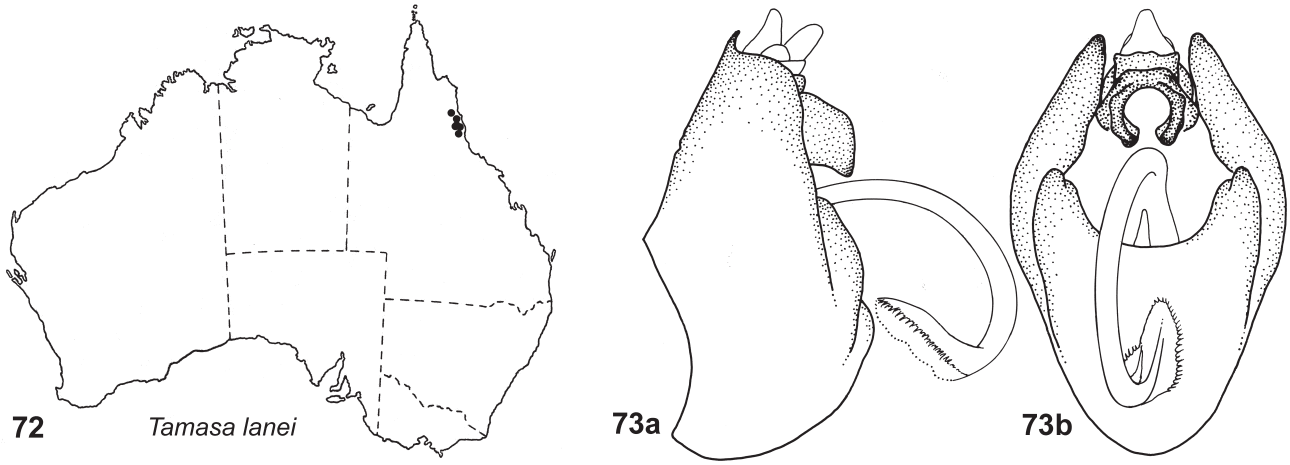
***Tamasa lanei* sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:E05F73AE-8ADC-422B-9FCA-0AF42D98E6C4

Etymology. Named for David Lane who has collected numerous cicadas over the years, many of which have been import records including undescribed species, and whose research and field work relating to Lepidoptera, particularly Saturniidae, has contributed significantly to our understanding of Australian insects.

Types. *Holotype* male (genitalia prep. TAM90), 4 Victor Pl, Kuranda, Qld, 16°48.923'S 145°38.550'E, 9-18.xii.2011, Hill, Marshall, Moulds (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male, Mission Beach Dist, 27.i.1995, J. Bugeja, CY 1039-11, ANIC database No. 20 005114 (**ANIC**). 6 males (one genitalia checked but not dissected), Windfarm N Ravenshoe, 17°35'27"S 145°31'43"E, 7.i.2008, D. Emery & L. Popple (EME0121-001–006); 6 males, 10 km E Ravenshoe, 17°32'40''S 145°30'58''E, 16.i.2009, D. Emery (EME0121-007–012) (**DE**). 1 male (genitalia prep. TAM109), Ravenshoe, 30.xi.1987, J. Booy (**JO**). 2 males (genitalia preps TAM 49, TAM168), Alice River, nr Eubenangee Swamp 17°24'31:S 145°58'54"E, 27.xii.2021, L.W. Popple, 131-0001 to 0002; 2 males, 4 females, Malanda Falls, 17°21'S, 145°35'E, 1.iii.2004, L. Popple, mv lamp, [lpop]121-0001 to 121-0006; 2 males (1 genitalia prep. TAM 37), 2 females, Jubb Rd, Millaa Millaa, 17°28'57"S 145°36'48"E, 1.i.2008, Rainforest, L. Popple & A. McKinnon, [lpop]121-0007 to 121-0010; 2 males, Ravenshoe Wind Farm, 17°15'57S 145°29'00E, Parkland, 7.i.2008, L. Popple & D. Emery, [lpop]121-0012 & 121-0013; 2 males, Louise St, Atherton, 17°15'57"S, 145°29'00"E, 19.xii.2007, Parkland, L. Popple, A. McKinnon, [lpop]121-0014 & 121-0015; 1 male, Gadgarra Road, Lake Eacham,17°16'18"S 145°38'39"E, 21.iii.2020, L. Popple & A. McKinnon, [lpop]121-0016 **(LWP)**. 5 males (one genitalia prep. T45), Mt Windsor Tableland, NW of Mossman, 6.i.1981, M.S. & B.J. Moulds; 10 males (one genitalia prep. T48), 13 females, Mount Spurgeon, NW of Mossman, near summit, in eucalypt-sheoak, 28.xii.1976, M.S. & B. J. Moulds; 1 male (genitalia prep. T81), Kuranda, 16.x.1987, J. Hasenpusch; 1 male (genitalia prep. TAM132, molecular voucher 07.AU.QL.KRI.01), powerline cut on hill, E of Kuranda, 16°49.959'S 145°39.560'E, 401 m, 2.i.2007, D. Marshall & K. Hill; 1 male (genitalia prep. T30), 3 km NW of Tolga, nr Atherton, 26.i.1981 M.S. & B. J. Moulds; 1 male (genitalia prep. T19), Atherton, 16.xi.1979, M.S. & B.J. Moulds; 1 male (genitalia prep. T92), Atherton, 29.xi.1979. M.S. & B.J. Moulds; 1 male (genitalia prep. T37), Tinaroo Falls Dam, near Atherton, 29.x.1987, D.A. Lane; 1 male (genitalia prep. T78), Lake Eacham, 30.i.2023, A.J. Emmott; 1 male, 1 female, Lake Eacham, ca 760 m, Chambers Lodges, 14-19.ii.2026, D.C.F. Rentz, Stop 2; 1 male (genitalia prep. TAM91), Yungaburra, 700 m, 17°15'54"S 145°35'50"E, 29.xii.2020, R.B. Lachlan; 1 male (molecular voucher 05.AU.QLD.JOP.10), 7 females, Marragalla Rd, ~10 km SW of Malanda, 17º25.188'S 145º32.530'E, 852 m, 17.i.2005, Hill, Marshall, Moulds, Olive; 1 male (genitalia prep. TAM40), Fig Tree Close, via Malanda, 5.ii.2023, D.A. Lane; 8 males (three genitalia preps T43, TAM128, TAM130), 6 females, Mt Fisher, 8 km SW of Millaa Millaa, 21.xi.1979, M.S. & B.J. Moulds; 2 females, nr Mt Fisher, 21.xi.2016, B. Hacobian; 1 male (genitalia prep. TAM100), upper Barron Gorge, near Cairns, 1.xii.1987, G. Wood; 1 male (genitalia prep. T56), Innisfail, i.1990, J. Hasenpusch; 1 male (genitalia prep. T59), Poly Ck, Seymour Rg, nr Garradunga, 23.ii.1990, J. & S. Hasenpusch; 1 male (genitalia prep. TA2), Poly Ck, Seymour Rg, nr Garradunga, 15.i.1991, J. & S. Hasenpusch; 2 males, 3 females, Poly Creek, Garradunga, nr Innisfail, 10.i.1989, J. Hasenpusch; 16 males, 16 females, same locality but 15.i.1990, M.S. & B.J. Moulds; 4 males, 7 females, same locality, 9.i.1994, M.S. & B.J. Moulds; 1 male (genitalia prep. TA12), Etty Bay, nr Innisfail, 28.i.1982, M.S. & B.J. Moulds; 1 male (genitalia prep. TAM98), Laceys Creek State Forest, near Mission Beach, 17°52'S 146°04'E, 13.i.1985, G. & A. Daniels; 1 male (genitalia preps TAM127), Military Reserve, Cardstone Rd, via Tully, 17°53'25"S 145°48'39"E, 15.i.2022, D.A. Lane; 2 males (one genitalia prep. T85), 1 female, Garners Beach, E of El Arish, 20.xi.1988, R. Eastwood (**MSM**).

Distribution and habitat (Fig. 72). The wet tropics of north-eastern Queensland from the Windsor Tableland and Mt Spurgeon south to Tully Military Reserve (D.A. Lane). It is found in both coastal districts such as the Barron River Gorge near Cairns, base of the Seymour Range near Innisfail (J. Hasenpusch), Etty Bay, Mission Beach and El Arish, and at higher altitudes up to 1000 m, where it is widespread across the Atherton Tablelands. It is often a locally common species, adults occurring from October to March. Adults inhabit rainforest, rainforest intergrades and tropical gardens.



FIGURES 72–73. *Tamasa lanei* **sp. nov.** (72) distribution; (73a) male genitalia in lateral view; (73b) same in ventral view.

Adult description. *Male* (Figs 10, 12, 17a-c, 42, 73). Typically brown at lower altitudes but predominantly green with some brown highlights across the Atherton Tablelands (rarely turquoise blue instead of green), all forms bearing fine black thoracic markings. *Head* with variable black spots but nearly always one adjacent to postclypeus and one near back of eye, and black surrounding ocelli of variable extent. Eyes in life variable from deep green (often partly with a bluish tinge) to brown. Postclypeus brown or green, usually with a little black dorsally, and sometimes ventrally. Rostrum reaching to or slightly beyond apices of hind coxae. *Pronotum* with keyhole marking more or less V-shaped and but often closed at both ends; usually with a narrow black edging against anterior of pronotal collar usually broken dorsally; pronotal collar green and rarely with a distinct black spot on lateral angles. *Mesonotum* with a variable pair of short black fasciae on midline anterior of cruciform elevation usually joined laterally to the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* typically with distinct infuscation at wing apex and overlaying crossveins r and r-m, but sometimes these much reduced and missing from r-m (e.g. most from Seymore Range near Innisfail and El Arish), while in contrast some have more extensive infuscation, at the extreme occurring at the wing apex, on crossveins r, r-m, m, m-cu and at the extremities of veins forming apical cells (particularly from the vicinity of Mount Fisher near Millaa Millaa, Fig. 17c). *Legs* brown or green except for black at distal ends of mid and fore tibiae and both ends of mid and fore tarsi, and usually as linear markings on fore femora and coxae. *Opercula* pale yellowish brown sometimes with a green tinge, with a variable amount of black suffusion apically, sometimes small but sometimes extensive, and with a narrow black edging; almost meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 42) brown or green, usually with black upper margin extending onto upper sternite; projecting about half way across timbal membrane. *Abdomen* with tergites brown with green along distal margin except for mostly green tergite 2; tergite 8 black except for partly brown and green distal quarter or so. Sternites glossy black or mostly so; sternite VIII pale yellowish brown with a black midline of variable shape and extent but usually broadest basally. *Genitalia* (Fig. 73) with pygofer distal shoulder broadly rounded. Uncus short, without a projecting ventral lobe in lateral view. Theca slender, curved in an arc, terminating in a large backwardly-turned pad-like lobe. The pad-like termination of the theca is variable to the extent it is turned backwards, often as illustrated but in others the theca is far less curved so the pad appears to be only slightly turned back, the latter common in the Mt Fisher population but also occurring elsewhere in some individuals.

Female (Fig. 17d). Similar to male. Abdominal segment 9 light brown dorsally not reaching apex, otherwise green with a black subdorsal band merging laterally with a black anterior margin and sometimes other variable black markings laterally. Ovipositor sheath terminating at level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 17.4–23.3 (20.1); female (including ovipositor) 17.7–21.9 (19.7). *Length of forewing*: male 25.9–33.8 (29.8); female 26.4–32.8 (28.8). *Width of head* (including eyes): male 7.0–8.4 (7.7); female 6.7–8.5 (7.6). *Width of pronotum* (across lateral angles): male 7.2–9.2 (8.1); female 7.0–8.7 (7.9).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 73).

Closely similar to ***T. lewisensis*** sp. nov. from which it is distinguishable only by the male theca, or by locality as ***T. lanei*** is not found on Mt Lewis, the only known locality for ***T. lewisensis***.

Tamasa lanei **sp. nov.** might also be confused with *T. imber* **sp. nov.** and *T. kurandae* **stat. rev.** that in part have the same distribution, are also green or greenish when discoloured, and occur sympatrically with *T. lanei*, in having larger timbal covers that project half way across the timbal membrane (Fig. 42).

The population from Mt Fisher, with its far more extensively infuscated wings with additional infuscations overlaying crossveins m and m-cu and at the extremities of the veins forming the apical cells, looks somewhat different from other *T. lanei* but the male genitalia are typical of *T. lanei*. Further, within these populations are some individuals in which the infuscations are much reduced so that they resemble typical *T. lanei*.

Tamasa lewisensis sp. nov.

zoobank registration: urn:lsid:zoobank.org:act:DAEAD70E-7B28-4C6B-BAC2-1551D2DF0D6F

Etymology. Named for the type locality from where all known specimens have been found.

Types. *Holotype* male, nr Mt Lewis, SW of Mossman, N. Qld, 10.xii.1974, M.S. Moulds (**QM**). *Paratypes* as follows: QUEENSLAND: 1 female, Mt Lewis, rainforest c.3000', 3.xii.1958, at tin working site, Britton & Misko, CY 1043-11, ANIC database No. 20 005018 (**ANIC**). 1 female, Mt Lewis, 8.i.1975, 30.xi.1975, A. & M. Walford-Higgins (**DE**). 2 females, Mt Lewis,15.i.1988, D. Kitchin **(JO).** 5 females, AWC Brooklyn , Mt Lewis, (east clearing), light trap, 1.xii.2022, 16°35'43"S 145°17'06"E, L. Popple & & McKinnon, LPOP121-0016, -0017, -0019 -0020, -0021 **(LP)**. 1 male, Mt Lewis, via Julatten, 26.i.1990, J. Hasenpusch; 1 male, 4 females, Mt Lewis, 30 km in near end of road, W of Mossman, 16.i.1977, 28,29.xii.1989, M.S. & B.J. Moulds; 5 females, 25 km along Mt Lewis Rd, SW of Mossman, 8,16.i.1977, 25.xii.1980, M.S. & B.J. Moulds; 13 females, Mt Lewis, 16°30'S 145°16'E, 7,9.i.1994, D. Kitchin & T. Jack; 1 female, Mt Lewis, 16°30'S 145°16'E, 29.xii.1992, D. Kitchin; 4 females, Mt Lewis via Julatten, 5.i.1994, M.S. & B. J. Moulds; 1 male, 1 female, Mt Lewis, 25.i.1976, 14.xii.1985, A. & M. Walford-Higgins; 1 female, Mt Lewis, 8.i.1975, 30.xi.1975, A. & M. Walford-Higgins; 1 female, Mt Lewis, 13 miles, 3400', 8.xi.1975, A. & M. Walford-Higgins; 1 male, 2 females, Mt Lewis, 3600', 25.i.1976, A. & M. Walford-Higgins; 1 female, Mt Lewis, 3000', 3,xii,1975, A. & M. Walford-Higgins; 1 female, Mt Lewis, SW of Mossman, 10.xii.1974, M.S. Moulds; 2 females, Mt Lewis, nr Julatten, 1000 m, 5.i.1992, G. Wood; 3 males (one genitalia prep. T25), 1 female, Mt Lewis, 1 km short of end of rd, 2.i.1989, J. Hasenpusch; 1 male (genitalia prep T77), eastern foothills of Mt Lewis, 20 km SW of Mossman, 8.i.1978. A. Hiller; 1 male, 1 female, Mt Lewis, 3.i.1997, [no collector] (**MSM**).

Distribution and habitat (Fig. 74). Known only from Mount Lewis, north-eastern Queensland, between 900 and 1100 m, and is the only *Tamasa* species found on Mt Lewis. There are records from November to January but adults are likely to occur also later in the wet season. The species inhabits upland rainforest where adults prefer the canopy.

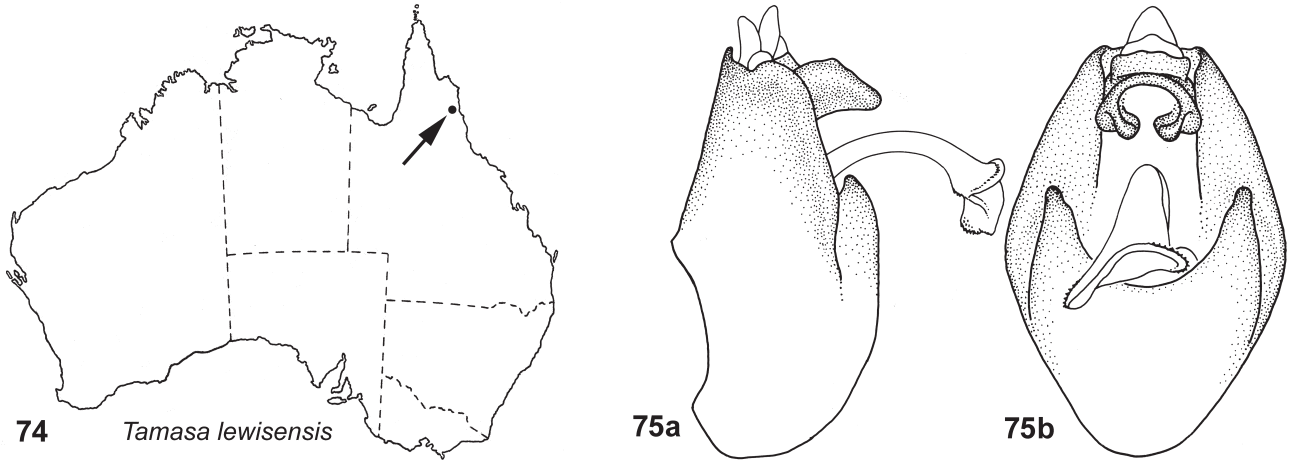
Adult description. *Male* (Figs 16a, 43, 75). Green with brown highlights bearing fine black thoracic markings, except for brown and black abdomen; after death gradually fading to brown. *Head* with variable black spots but nearly always one adjacent to postclypeus, one elongate beside eye, and one elongate in between, and also variably black around ocelli. Postclypeus green, usually with a little black dorsally, and sometimes ventrally. *Rostrum* reaching to or slightly beyond apices of hind coxae. *Pronotum* with keyhole marking more or less V-shaped but often closed at both ends; with a narrow black edging against anterior of pronotal collar broken dorsally; pronotal collar green and lacking a black spot on lateral angles. *Mesonotum* with a variable pair of short black fasciae on midline anterior of cruciform elevation usually joined laterally to the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* typically with distinct infuscation at wing apex and overlaying crossveins r and r-m, rarely absent on r-m. *Legs* green except for black at distal ends of mid and fore tibiae and both ends of mid and fore tarsi (often extensive), and usually as linear markings on fore femora and coxae. *Opercula* yellow to pale yellowish brown with a variable amount of black suffusion apically, and with a narrow black edging; almost meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 43) brown, usually with black upper margin extending onto upper sternite; projecting about half way across timbal membrane. *Abdomen* with tergites largely brown with variable amounts of black suffusion on anterior half or so; a large pale green pubescent patch laterally on tergite 3 and a narrow green distal margin to most tergites; tergite 8 black except for partly brown and green distal third or so. Sternites glossy black or mostly so; sternite VIII pale yellowish brown with a black midline of variable shape and

extent but usually broadest basally. *Genitalia* (Fig. 75) with pygofer distal shoulder broadly rounded. Uncus short, without a projecting ventral lobe in lateral view. Theca slender, curved in an arc, terminating in an asymmetrical trumpet-shaped apex.

Female (Fig. 16b). Similar to male. Abdominal segment 9 light brown dorsally not reaching apex, otherwise a mixture of pale brown and pale green and with a black subdorsal band merging laterally with a black anterior margin and sometimes other variable black markings laterally. Ovipositor sheath terminating at level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 9 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 21.2–22.6 (22.1); female (including ovipositor) 17.8–22.2 (20.4). *Length of forewing*: male 32.4–35.5 (33.5); female 29.9–34.7 (32.1). *Width of head* (including eyes): male 8.0–8.5 (8.2); female 7.2–8.4 (7.8). *Width of pronotum* (across lateral angles): male 8.4–8.9 (8.7); female 7.3–9.0 (8.1).

Distinguishing features. Differs from the closely similar *T. lanei* **sp. nov.** in the male theca that ends in an asymmetrical trumpet-shaped opening, whereas that of *T. lanei* terminates in a large backwardly-turned pad-like lobe. They are also separable by locality as *T. lewisensis* **sp. nov.** is the only *Tamasa* species found on Mt Lewis.



FIGURES 74–75. *Tamasa lewisensis* **sp. nov.** (74) distribution; (75a) male genitalia in lateral view; (75b) same in ventral view.

***Tamasa lindsayi* sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:519443EC-3D77-49F0-BDAF-75292B749580

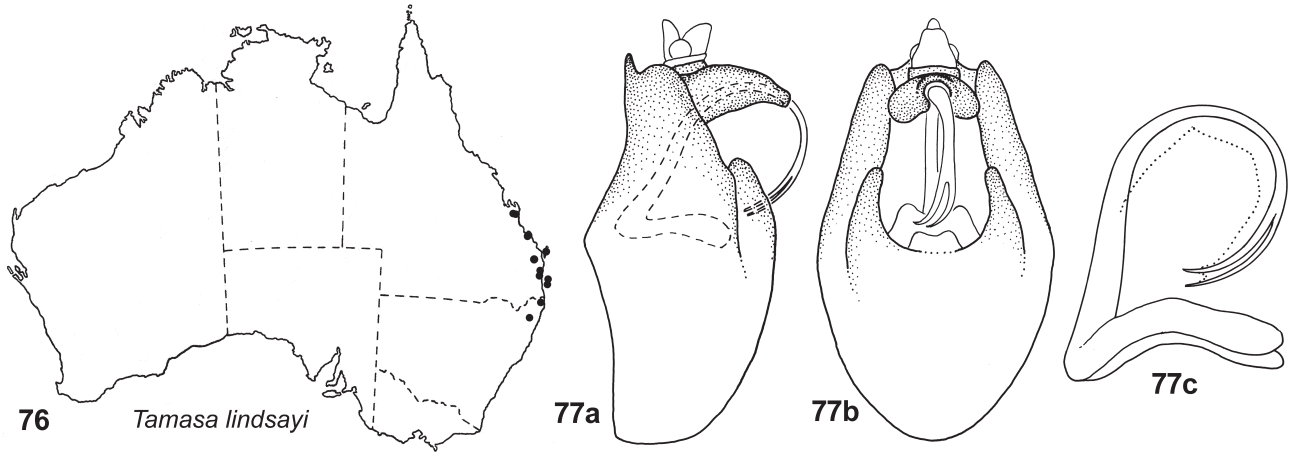
Etymology. Named for Dr Lindsay Popple whose field work and research have contributed enormously to our knowledge of Australian cicadas. Many of his images and specimens are documented in this paper.

Types. *Holotype* male (genitalia prep. TAM42), Blaksley Lagoon, North Stradbroke Island, 27°34'S 153°25'00E, Queensland, 8.ii.2004, L.W. Popple & C. Moeseneder, [lpop]113-0009 (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male, 6.2 km N Yeppoon, C.Q., dense scrub behind frontal dunes, A.E., 9 Feb 2002, 23°04.66'S 150°45.77'E; 3 males, 1 female, N. Stradbroke, adjacent to 18 Miles Swamp, 10-11.i.1981 [A. Ewart]; 1 male, west of Teewah, 15.xii.1978, [A. Ewart]; 3 males, 2 females, Brown Lake, N. Stradbroke, 19.iii.1983, [A. Ewart]; 1 male, Harrys Hut, Cooloola NP, Q, 26-27.i.90, A. Ewart (**AE**). 3 males, 4 females, Yeppoon, 3-6.ii.1970, H.E. Evans, ANIC database Nos 20 006001-20 006007; 3 females, Yeppoon, 3-6.ii.1970, H.E. Evans, CY 1025-11 to CY 1027-11, ANIC database Nos 20 005100 to 20 005102 (**ANIC**). 1 female, Brown Lake, North Stradbroke Is., 26-27.ii.1983, G. Daniels (**DE**). 5 males (one genitalia prep. TAM104), 2 females, Hinz Avenue, Farnborough, 23 04'36"E 150 45'05"E, 1.i.2023, Banksia sp., L.W. Popple & A.E. McKinnon; 2 males (one genitalia prep TAM45), Noosa, 9.iii.2002, L. Popple & R. MacSloy, [lpop]113-0001 & 113-0002; 3 males, 1 female, Coolum, 9.iii.2002, L. Popple & R. MacSloy, [lpop]113-0003 & 113-0006; 1 female, North Stradbroke Island, 27°29'58"S, 153°25'36"E, 17.iii.2007, L.W. Popple, [lpop]113-0010 (**LWP**). 1 male (genitalia prep. TAM126), 6 km N of Yeppoon, 27.ii.2000, T.M.S. Hanlon; 1 female, Yeppoon, 9.i.1989, R. Eastwood; 1 male (genitalia prep, TAM 125), Wallaville, 8.i.1973, G. Sankowsky; 5 males (genitalia preps T57, T69, TAM17), 2 females, Deepwater NP, S of Agnus Water, Middle Rock, 29.x.1999, G. Williams; 1 male (genitalia prep. T62), Stradbroke Is., 1.iii.1980, J. North; 1 female, Dunwich,

Nth Stradbroke Is., 26.ii.1983, J. North; 1 male, Nth Stradbroke Is., 26.ii.1983, J. North; 1 female, Brown Lake, Stradbroke Is., 25.ii.1982, J. North; 2 males, 1 female, Brown Lake, North Stradbroke Island, 27°29'S 153°25'E, 12.iii.1988, 14.ii.1991, G. Daniels; 1 male, 1 female, Brown Lake, North Stradbroke Is., 26-27.ii.1983, G. Daniels **(MSM)**. NEW SOUTH WALES: 1 male (genitalia prep. TAM106), Mt Ramomie, 24 km west of Grafton, Emg. 22.i.2011, C.E. Meyer **(JO)**. 2 males (one genitalia prep. TAM117), Cabbarita Beach via Kingscliff, 11.i.2003, L. Popple & R. MacSloy, [lpop]113-0007 & 113-0008 (**LWP**). 1 male, Eurimbula Creek via Round Hill Head, 15.xii.1976, G.B & S.R. Monteith (**QM**).

Distribution and habitat (Fig. 76). South-eastern Queensland from Yeppoon south to North Stradbroke Island, and the far north-eastern corner of New South Wales. From the vicinity of Yeppoon it is known from Farnborough some 8 km north of Yeppoon and from near sand dunes 6 km north of Yeppoon. Further south it is recorded from Wallaville but most records are from North Stradbroke Island and the Sunshine Coast in the vicinity of Noosa and Coolum, but it also occurs on Fraser Island. Localities in NSW include and Mt Ramornie (24 km W of Grafton), and Kingscliff and nearby Cabbarita Beach just south of Tweed Heads. The species that is determined as '*Tamasa* species near *tristigma*' by Moss (1990) from Moreton Island is almost certainly this species.

There are records from October to March. Adults are closely associated with banksia heathland, especially growing near sand dunes.



FIGURES 76–77. *Tamasa lindsayi* **sp. nov.** (76) distribution; (77a) male genitalia in lateral view; (77b) same in ventral view; (77c) dissected aedeagus in lateral view.

Adult description. *Male* (Figs 29a, 32, 77). Similar in colour and markings to *T. tristigma*. *Head* with eyes in life brown to pale olive. Rostrum reaching to apices of hind coxae. *Pronotum* with keyhole marking narrow on posterior half, much and usually rounded wider on anterior half , its posterior end usually not quite touching pronotal collar; a narrow black edging against anterior of pronotal collar continuous between lateral angles; pronotal collar light brown to pale green often with a black spot on lower lateral angles fused with the black posterior edging of the pronotum. *Mesonotum* with a variable pair of short black fasciae on midline anterior of cruciform elevation often fused with black scutal depressions, and a black spot at ends of anterior arms of cruciform elevation. *Forewings* with three infuscated spots, a weak one at wing apex and one each on crossveins r and r-m always small but usually distinct. *Legs* yellowish brown; mid and fore tibiae and tarsi with black at their distal ends; fore femora with black femoral spines and usually an ill-defined dark brown lateral fascia; fore coxae usually with a blackish linear fascia dorsally. *Opercula* pale yellowish; widely separated. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 32) undeveloped, as a ridged edge not developed forward. *Abdomen* with tergites in shades of brown except for slightly paler tergite 2 and tergite 8 that is variably black on anterior half or so, and usually with hints of black laterally on tergites 2–7. Sternites black except sternite VIII yellowish brown with black suffusion apically. *Genitalia* (Fig. 77) with pygofer distal shoulder rounded. Uncus tapering towards apex in lateral view and without lateral projections on lower rim. Theca slender, curved through more than 180 degrees and apically deeply divided.

Female (Figs 9, 29b). Similar to male. Abdominal segment 9 pale yellow tending pale green with extensive black suffusion dorsally extending to anterior lateral margin. Ovipositor sheath terminating at level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 14.8–16.9 (16.0); female (including ovipositor) 15.1–17.4 (16.5). *Length of forewing*: male 20.4–24.5 (22.9); female 19.7–24.2 (22.5). *Width of head* (including eyes): male 5.3–6.3 (6.02); female 5.7–6.4 (6.05). *Width of pronotum* (across lateral angles): male 5.4–6.7 (6.25); female 5.6–6.5 (6.11).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 77). This is the only *Tamasa* species found in south-eastern Queensland south of Yeppoon and north-eastern NSW, apart from *T. tristigma* and the much larger and distinctive *T. rainbowi* restricted to the Border Ranges and far north-eastern NSW. *Tamasa lindsayi* **sp. nov.** differs from *T. tristigma* that in some localities are sympatric (e.g. Yeppoon and North Stradbroke Island) by the males having timbal covers that are undeveloped and present only as a marginal ridge that does not project forwards across the timbal cavity (Fig. 32), whereas in *T. tristigma* the timbal covers clearly project forwards to halfway or more across the timbal membrane (Fig.49). Females differ only in their smaller *average* size, their forewing length never more than 25 mm but often longer than 25 mm in *T. tristigma*.

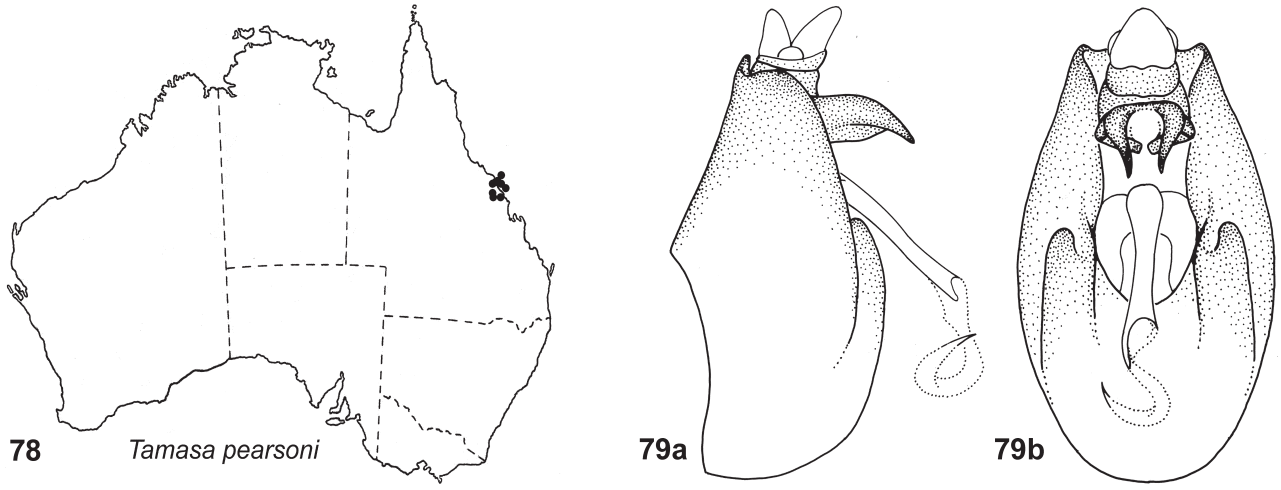
Tamasa pearsoni sp. nov.

zoobank registration: urn:lsid:zoobank.org:act:303B52E2-34A8-494C-964B-14551C6AF41C

Etymology. Named for Steven Pearson, wildlife photographer and cicada enthusiast, who has collected many of the known specimens of this species and provided many photographs.

Types. *Holotype* male, 8 Jostens Rise, Mandalay Heights, Airlie Beach, 16-28.ii.2024, S. Pearson (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male (genitalia prep. TAM170), Lindeman I., Whitsunday Grp, Mel Ward, K60557, K 294799, [plus following det. labels: Abricta willsi (Distant) ID by A.N. Burns; Tamasa tristigma D. McAlpine det. wrongly det by Burns] (**AMS**). 1 female, Josteens Rise, Mandelay, Qld., 20o11’49’’S 148o44’37’’E, 10.xii.2013, S. & A. Pearson, (EME0113-001); 2 males, 4 females, same location as previous, 10.i.2014, S. & A. Pearson (EME0113-002-007); 1 male, 1 female, same location as previous, 1–14.i.2019, S. & A. Pearson (EME0113-008 -009); 7 females, same location as previous, 20-31.xii.2021, S. & A. Pearson (EME0113-010–016); 5 males, 3 females, same location as previous, 20–27.xii.2022, S. & A. Pearson (EME0113-017–024; 1 male, same location as previous, 21.i.2026, S. & A. Pearson (EME0113-025) **(DE**). 4 females, Cathu State Forest, N of Eungella Nat. Park, top of range, 600 m, 21.i.1990, M.S. & B.J. Moulds; 1 female, nr lookout, Clark Ra., Cathu State Forest, 20°49’37”S 148°32’50”E, 17.i.1995, G. & A. Daniels; 2 males (one genitalia prep. T86), 1 female, Mt Macartney, Cathu State Forest, 20°50’06”S 148°32’24”E, 850 m, 17.i.1995, G. & A. Daniels; 2 males, 2 females, Mt Macartney, Cathu State Forest, 20°50’04”S 148°32’14”E, 850 m, 24.i.1996, G. & A. Daniels; 1 male, Cathu State Forest, 20°47”S 148°32’E, 27.i.1994, 120 m, G. & A. Daniels; 3 males, 1 female, Cathu SF, Jaxut Campsite, 20°47’93: S 148°32’48”E, 1.xii.1998, S. McEvey; 1 female, Habana, Mackay, i.1984, B. Van Moolenbrock; 4 males (two genitalia prepsT54, T83), Bakers Ck, Mackay, xii.1983, B. Van Moolenbrock; 2 males (one genitalia prep. TAM30, and one molecular voucher 08.AU.QL.JAK.08), 1 female (molecular voucher 08.AU.QL.JAK.09), Cathu S.F., at base of range, 20°48.435’S 148°31.954’E, 161 m, 21.xii.2008, Hill, Marshall, Moulds, Owen; 1 female, 92 Conway Rd, Preston, 20°23’S 148°39’E, 17.ii.2006, S. Cowan; 1 male (genitalia prep. T68), AU.QLD.AGE, Airlie Beach, 26 m, 20°16.959’S 148°44.509’E, 9.i.2005, found dead in swimming pool, S. Cowan; 1 male, AU.QLD.AGE, Airlie Beach, 26 m, 20°16.959’S 148°44.509’E, 9.i.2005, Cowan, Hill, Marshall, Moulds; 1 male (genitalia prep. TAM85), 2 females, 8 Jostens Rise, Mandalay Heights, Airlie Beach, 16-28.ii.2024, S. Pearson; 2 males, Mandalay, Airlie Beach, 2,20.i.2025, S. Pearson; 1 female, Mandalay, Airlie Beach, 12.ii.2025, S. Pearson (**MSM**). 9 males (one genitalia prep. TAM122), 3 females, Long Is. nr resort, Whitsundays, 20°19.95’S 148°51.06’E, 11.ii.1999, A.E[wart], Reg. Nos T262471–T262482 (**QM**).

Distribution and habitat (Fig. 78). Central eastern Queensland in the vicinity of Cathu, Proserpine, Mackay, Airlie Beach, Whitsunday Islands and Cumberland Islands. At Cathu it is found both at the base and top of the range but there remains no confirmed records from nearby Eungella. In Mackay it has been taken at Bakers Creek and Habana but is no doubt more widespread. Island records include Long Island and probably Hook Island in the Whitsunday Group and Lindeman Island in the Cumberland Group (south of the Whitsundays). The species recorded from Carlisle Island, Cumberland Group by Moss (1988) is also likely this species and Moss records the same species from Finch Hatton Gorge west of Mackey. Adults inhabit dry vine scrub, rainforest and rainforest interfaces and can be found from December to February with stragglers occurring as late as May.



FIGURES 78–79. *Tamasa pearsoni* **sp. nov.** (78) distribution; (79a) male genitalia in lateral view; (79b) same in ventral view.

Adult description. *Male* (Figs 15a, 38, 79). In subtle shades of green and pale brown with fine black thoracic markings but after death gradually fading to light brown. *Head* with a black spot on anterior margin near postclypeus and one adjacent to eye, and a large black mark encompassing ocelli almost divided along midline. Eyes in life brown. Postclypeus green with an ill-defined black band either side reaching dorsal surface but not to anteclypeus. Rostrum reaching apices of hind coxae. *Pronotum* with keyhole marking more or less V-shaped and usually open at its anterior end but variable; usually with a narrow black edging against anterior of pronotal collar continuing laterally; pronotal collar green and lacking a distinct black spot on lateral angles. *Mesonotum* with a variable pair of short black fasciae on midline anterior of cruciform elevation often fused with black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* with a black infuscation at apex and usually small infuscations overlaying crossveins r and r-m (rarely absent). *Legs* green except for black at distal ends of mid and fore tibiae and both ends of mid and fore tarsi, and usually as linear markings on fore femora and coxae. *Opercula* pale brown with a narrow black edging and sometimes becoming blackish towards apices; clearly not meeting. *Timbals* as for *T. tristigma*. *Timbal covers* (Fig. 38) pale green and black; barely developed, as a ridged margin to the timbal cavity but sometimes with a little anterior development. *Abdomen* tending a little wider than thorax; with tergites pale brown with green on distal half or more, partly black laterally and with black auditory capsules. Sternites black or mostly so except for sternite VIII pale green with a black midline expanded basally. *Genitalia* (Fig. 79) with distal shoulder of pygofer broadly rounded. Uncus curved and pointed and somewhat beak-like in lateral view, and without anterior projections. Theca slender, almost straight, with a long partly spiralled fleshy termination.

Female (Figs 7, 15b). Similar to male. Abdominal segment 9 light brown dorsally not reaching apex, otherwise green with a black subdorsal band merging laterally with a black anterior margin. Ovipositor sheath terminating at level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 14.8–18.1 (16.7); female (including ovipositor) 14.0–16.6 (15.8). *Length of forewing*: male 20.7–25.3 (23.1); female 19.6–25.8 (23.2). *Width of head* (including eyes): male 5.5–6.6 (6.2); female 5.6–6.4 (6.1). *Width of pronotum* (across lateral angles): male 5.5–6.9 (6.3); female 5.7–6.6 (6.3).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 79). This is the only *Tamasa* species found in central eastern Queensland between Cathu and the Whitsunday Islands apart from *T. tristigma* that is in part sympatric (e.g. at Cathu and Mackay). *Tamasa pearsoni* **sp. nov.** differs from *T. tristigma* in having males in which the timbal covers are entirely without anterior development (Fig. 38), whereas in *T. tristigma* they project about half way across the timbal membrane (Fig. 49). Both males and females differ in their smaller *average* size, the forewing never more than 26 mm long in *T. pearsoni* but often (not always) above 26 mm in *T. tristigma.*

Song. Moss (1988) records the song as soft, high-pitched and continuous and lasts for about 20 seconds, with intervals of many minutes or even hours between calls.

Tamasa rainbowi Ashton, 1912

Types. *Syntype* male, bearing labels as follows: (1) Dorrigo 21.11.[19]11, R.J.T. (handwritten); (2) ALLOTYPE (printed on red card); (3) Australian Museum K 280558 (printed on white card). Examined. *Syntype* female, bearing labels as follows: (1) Dorrigo, 20.11.[19]11, R.J.T. (handwritten); (2) HOLOTYPE (printed on red card); (3) Tamasa rainbowi Ashton TYPE (handwritten on white card); (4) Australian Museum K 280557 (printed on white card). Examined. Both in **AM**.

Other material examined. QUEENSLAND: 1 female, Binna Burra, Lamington Nat. Park, 750 m, 28º11'S 153º11'E, 14-18.i.1996, I.F.B. Common, CY 1019-11, ANIC database No. 20 005094; 1 male, Lamington N.P., ii.1983, M. Lowman, #50, subtropical R.F., 3000', CY 1021-11, ANIC database No. 20 005096 (**ANIC**). 1 female, Scenic Rim, Lamington, Duck Creek Ed, 28º12.598'S 153º06.789'E, 12.i.2009, B.M. Fjellstad; 1 male, Springbrook National Park, 28°13'27"S 153°17'06"E, 28.xii.2012, at light, L. Popple, A. McKinnon; 4 males, 2 females, Springbrook National Park, 28°13'27"S 153°17'06"E, 12.i.2013, at light, L. Popple, A. McKinnon (**LWP**). 1 male, Mt Tamborine, 24.iii.1953, C. King (**NMV**). NEW SOUTH WALES: 1 male (genitalia prep. TA42), Dorrigo, Netimba via Coramba, W. Heron; 1 male (genitalia prep. T3), Ulong, East Dorrigo, W. Heron, K49663, Australian Museum K 294899; 1 female, League Scrub Flora Reserve, Oakes State Forest, [30°36'S, 152°32'E], 20.xii.1998, G.A. Williams, Australian Museum K 294902 (**AM**). 1 male, Acacia Plateau, xii.1948, J.J. Davidson, CY 1020-11, ANIC database 20 005095; 1 male, Dorrigo, 8.i.[19]11, W.W. Froggatt Collection; 1 female, Dorrigo, ?1914, W.W. Froggatt Collection, ANIC database 20 005950 (**ANIC**). 1 female, Terania Ck, Nightcap Nat. Pk nr Lismore, 6.i.1986. G.R. Brown & L. Tarvey (**ASCU**). Tooloom Plateau, via Urbenville, 29.xii.1972, R.I. Storey; 1 male, Dorrigo Nat. Pk, 2500 ft, 19.xi.1973, M.S. Moulds; 1 male, Dorrigo N.P., Never Never Picnic Area, 18.i.2002, R. De Keyzer; 1 female, Dorrigo Nat Pk, 760 m, 31.xii.1974, D. Clyne & J. Frazier; 1 male, Whian Whian S.F., via Dunoon, 25.xi.1972, R. Storey (**MSM**).

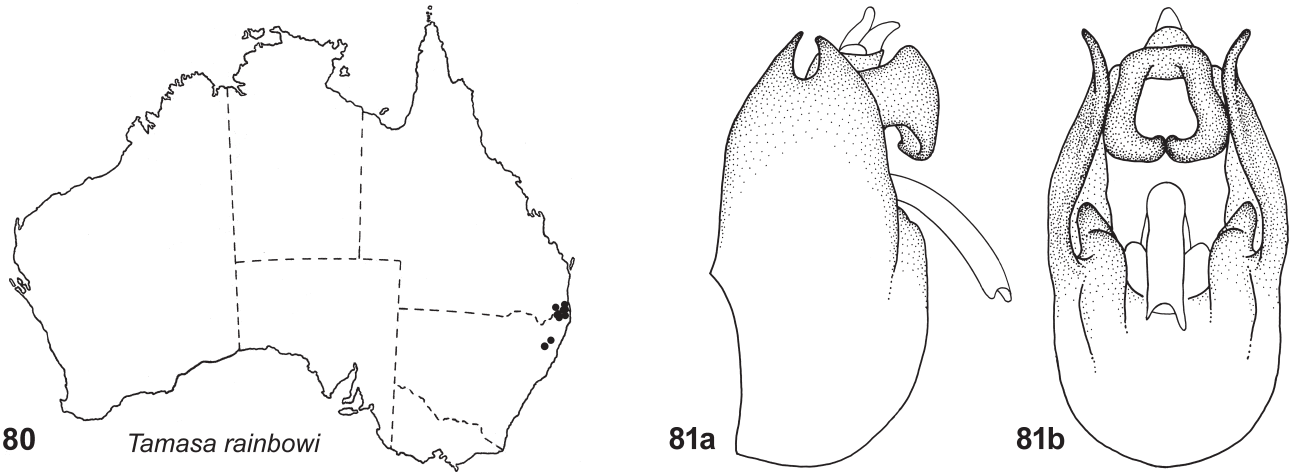
Distribution and habitat (Fig. 80). Mountain areas of south-eastern Queensland and north-eastern New South Wales between 200 and 1000 m. The most northern locality is Mt Tamborine and the most southern one the League Scrub Flora Reserve in Oakes State Forest some 30 km SW of Dorrigo. There are many intermediate localities in Queensland including O'Reillys, Binna Burra and Springbrook National Park (east of Binna Burra) and a record requiring confirmation from Cunninghams Gap (Moss 2001). In NSW some notable localities include Acacia Plateau, Tooloom Plateau, Terania Creek (near Lismore), Whian Whian State Forest (north of Lismore), and Dorrigo and its surrounds. Most records are from Dorrigo, the type locality.

Adults inhabit subtropical and temperate rainforest where they are found from early November to late March (Moulds 1990).

Redescription of adult. *Male* (Figs 22, 39, 81). In shades of green and brown with fine black thoracic markings, but after death gradually fading to light brown. *Head* with an elongate black spot on anterior margin near postclypeus, another adjacent to eye and a bold black mark encompassing ocelli. Eyes in life blackish to dark green. Postclypeus green with extensive black markings. Rostrum reaching to about apices of hind coxae. *Pronotum* green with keyhole marking tending parallel-sided, mostly ill-defined but distinct on posterior quarter; black edging against pronotal collar widely divided dorsally and not reaching lateral angles of pronotal collar; pronotal collar green with a black spot on lateral angles. *Mesonotum* green; scutal depressions black; a short black fascia on midline anterior of cruciform elevation and a black spot at ends of anterior arms of cruciform elevation. *Forewings* with black infuscation at apex, at distal ends of veins forming apical cells, distinctly so overlaying crossveins r and r-m. and usually also a little on crossveins m and m-cu. *Legs* green except for black distally on mid and fore tibiae and fore femoral spines, and usually also with pale blackish linear markings on fore femora. *Opercula* yellowish brown becoming blackish towards apices to variable degrees and narrowly edged black; almost meeting. *Timbals* with four long ribs spanning timbal membrane and one shorter anterior rib. *Timbal covers* (Fig. 39) black, broadly rounded, projecting less half way across timbal membrane. *Abdomen* with tergites for the most part variably brown except for black sublaterally on tergite 3 and almost all of tergite 8. Sternites dark brown tending black and clearly black on sternite VII to variable degrees; sternite VIII glossy black. *Genitalia* (Fig. 81) with distal shoulders of pygofer well developed, pointed and turned outwards. Uncus short but robust, strongly downturned distally in lateral view and without anterior projections. Theca slender, gently curved, with a simple bi-lobed apex. Length of forewing 36.0–41.1 mm.

Female. Similar to male. Abdominal segment 9 light brown with dark brown to blackish lateral suffusion and black markings in lower lateral region. Ovipositor sheath terminating at level of anal styles and dorsal beak. Length of forewing 37.0–39.5 mm.

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 81). This is one of the largest *Tamasa* species and its green colour and distinctively infuscated wings make it unlikely to be confused with other species.



FIGURES 80–81. *Tamasa rainbowi.* (80) distribution; (81a) male genitalia in lateral view; (81b) same in ventral view.

***Tamasa rentzi* sp. nov.**

zoobank registration: urn:lsid:zoobank.org:act:29118763-56F8-4185-AE7C-F38C7FB03158

Etymology. Named for David Rentz AM, entomologist and renowned collector of insects, whose contribution to our knowledge of Australian insects has been enormous, particularly to our understanding of the large and diverse Order Orthoptera.

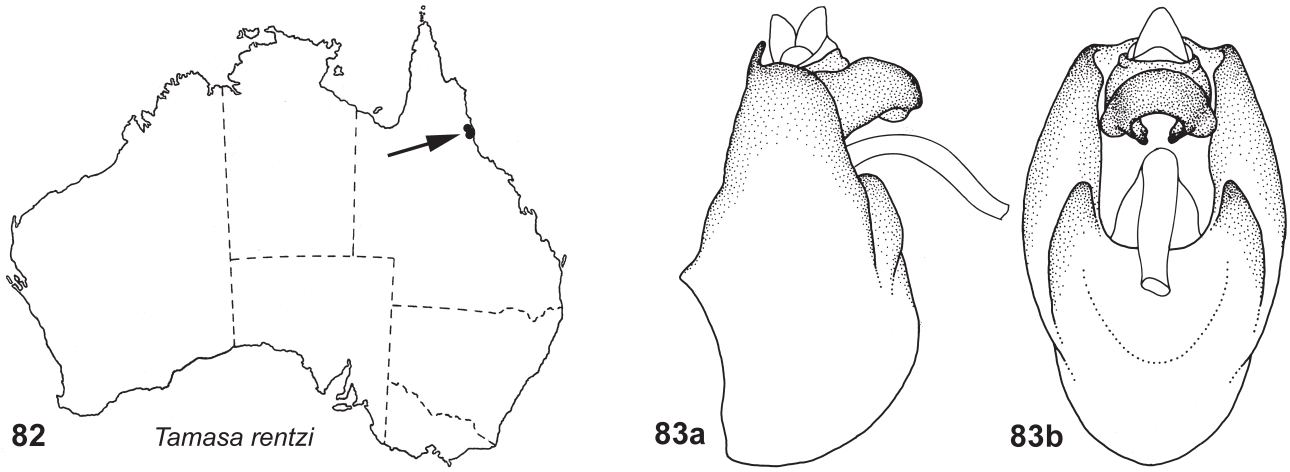
Types. *Holotype* male, Etty Bay, nr Innisfail, 23.i.1988, M.S. & B.J. Moulds (**QM**). *Paratypes* as follows: QUEENSLAND: 1 male, 1 female, Etty Bay, nr Innisfail, 16.i.1990, M.S. & B.J. Moulds (**DE**). 1male, Golden Hole, Russell River, 17°26'53"S 145°51'11"E, 2.xi.2025, L.W. Popple, lpop116-0009; 1 male, Woopen Creek, 17°28'11"S 145°52'35"E, 1.xii.2025, L.W. Popple, [on] *Hibiscus,* lpop116-001; 1 female, Woopen Creek Rd, 17°27'42"S 145°52'56"S, 1.ii.2025, L.W. Popple, lpop116-0002; 2 males, 4 females, Woopen Creek Rd (gravel pt), 17°27'23"S 145°53'16"E, 1.ii.2025, L.W. Popple, lpop116-0003 to lpop116-0008 (**LWP**). 1 male (genitalia prep. TAM 64), 10 km SE of Gordonvale, along Mulgrave R., 27,xii,1980, M.S. & B.J. Moulds; 1 male, 1 female, The Boulders, nr Babinda, 15.i.1990, M.S. & B.J. Moulds; 4 males (one genitalia prep. TA 3), 5 females, Babinda, 27,28. xii.1972; M.S. Moulds; 2 males (genitalia preps TAM67, TAM71), Bramston Beach, 17º21'S 146º01'E, 5.xii.1991, C.J. Burwell; 1 male (genitalia prep. TA 19), 1 female, Etty Bay, nr Innisfail, 27.i.1981, M.S. & B.J. Moulds; 2 males, 2 females, Etty Bay, nr Innisfail, 23.ii.1982, M.S. & B.J. Moulds; 2 males, 2 females, Etty Bay, 12.i.1984, R.B. Lachlan; 6 males (one genitalia prep. T 90), 2 females, Etty Bay, nr Innisfail, 23.i.1988, M.S. & B.J. Moulds; 13 males (one genitalia prep. TA 40), 10 females, Etty Bay, nr Innisfail, 16.i.1990, M.S. & B.J. Moulds; 3 males (one molecular voucher 05.AU.QLD.ETT.01), Etty Bay, nr Innisfail, 17º33.465"S 146º05.182'E, 50m, 11.i.2005, Hill, Marshall, Moulds; 1 female, Etty Bay, nr Innisfail, 23.i.1988, M.S. & B.J. Moulds (**MSM**). 1 male (genitalia prep. TAM108), Bellenden Ker Range, Cableway Base Stn, 100 m, 25-31.x.1981, Earthwatch/Qld Museum (**QM**).

Distribution and habitat (Fig. 82). Coastal north-eastern Queensland from Gordonvale to Etty Bay near Innisfail. At Gordonvale at the northern limit of its range, it is found along the Mulgrave River just west of the town and is not sympatric with *T. doddi* that has its southern limit mainly east of the town. It is a locally common species found from late October to February but adults are likely to occur also later in the season. Adults are found in rainforest and rainforest intergrades.

Adult description. *Male* (Figs 20, 47, 83). Markings mostly similar to those of *T. tristigma*. Dark brown in life, sometimes with green tinges and often with infuscation confined to wing apex and crossvein r; after death body gradually fading to lighter brown. Rostrum passing hind coxae, reaching to about mid-length of the opercula. *Pronotum* with keyhole marking usually open at its posterior end and not touching pronotal collar; usually a narrow black edging against anterior of pronotal collar usually broken dorsally and laterally reaching or almost a black

spot on lower lateral angles, sometimes indistinct and sometimes absent. *Mesonotum* usually with a parallel pair of black fasciae anterior of cruciform elevation; scutal depressions black. *Forewings* infuscated at apex, usually also on crossvein r (rarely absent), and sometimes also on both r and r-m. *Legs* light brown, usually without black markings except between fore femoral spines, sometimes with narrow longitudinal fore femoral black stripes. *Opercula* light brown merging to black distally, sometimes almost entirely black, usually with a jet black narrow rim; almost meeting. *Timbal covers* (Fig. 47) angular, protruding on basal half about half way across timbal cavity. *Abdomen* with tergites tending uniformly brown except for tergite 8 black on anterior half or so, pale brown on remainder; rarely with some black sublaterally. Sternites black except for usually brown sternite II, often with dense covering of fine white pubescence; sternite VIII often uniformly dark brown or black, rarely pale yellow to brown either with or without hints of black. *Genitalia* (Fig. 83) with pygofer more or less oval in ventral view. Uncus very short, with very short distal protrusions on lower rim. Theca a broadly S-shaped and terminating in a simple square-cut apex.

Female. Similar to male. Abdominal segment 9 brown with a black subdorsal band not reaching distal margin and usually one or two small blackish markings laterally. Ovipositor sheath terminating at level of anal styles and dorsal beak.



FIGURES 82–83. *Tamasa rentzi* **sp. nov.** (82) distribution; (83a) male genitalia in lateral view; (83b) same in ventral view.

Measurements. Range and mean (in mm) for 10 males, 10 females (includes smallest and largest specimens). *Length of body* (including head): male 22.7–26.7 (24.7); female (including ovipositor) 21.3–25.6 (23.6). *Length of forewing*: male 34.4–39.4 (36.6); female 32.4–37.2 (35.0). *Width of head* (including eyes): male 8.4–9.8 (9.1); female 8.0–9.5 (8.7). *Width of pronotum* (across lateral angles): male 9.2–10.8 (10.0); female 8.7–10.7 (9.5).

Distinguishing features. Differs from *T. doddi* only in the male genitalia and to some extent in its overall larger size. The male genitalia have a broadly S-shaped theca terminating in a simple square-cut apex (Fig. 83). In contrast *T. doddi* has a theca that is curved in an arc and the apical gonopore bears several spine-like lobes one of which is larger than the others (Fig. 59). *Tamasa rentzi* **sp. nov.** is usually larger than *T. doddi* that has a forewing length never exceeding 37 mm, whereas that of *Tamasa rentzi* **sp. nov.** sometimes reaches 40 mm. Nearly always there is apical infuscation plus an infuscated spot on crossvein r (rarely is r not infuscated), and rarely is there a spot on r plus r-m. Their distributions are separate but almost overlap, *T. rentzi* occurring from Gordonvale to Etty Bay whereas *T. doddi* occurs from Laura to Gordonvale including the Atherton Tablelands and Fitzroy Island, but at Gordonvale *T. rentzi* is found in rainforest west of the town and *T. doddi* east of the town.

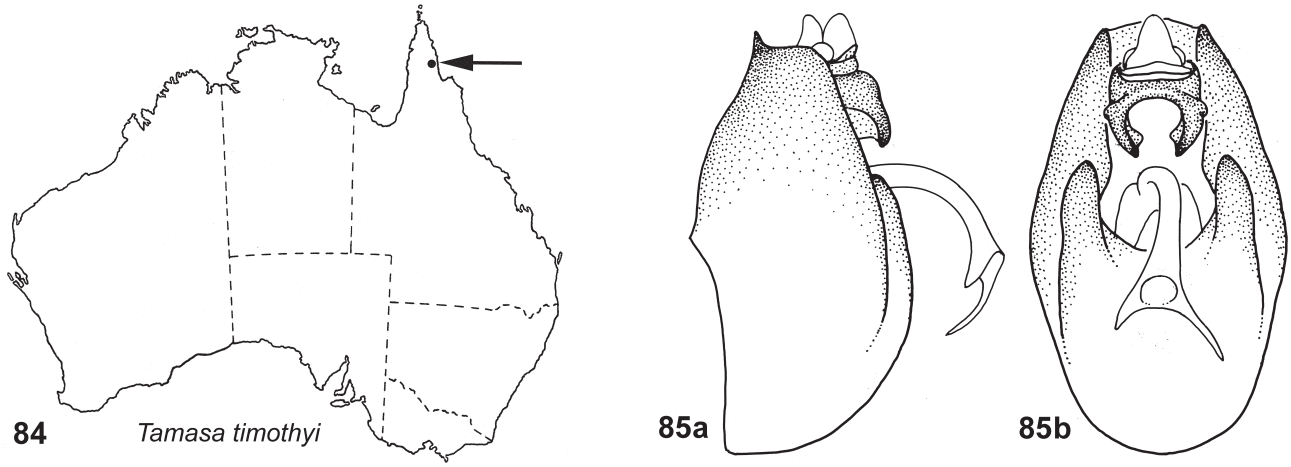
Similar also to *T. kirramae* **sp. nov.**, both in outward appearance and male genitalia. Differs in outward appearance in being weakly infuscated on crossvein r and rarely so on r-m, whereas *T. kirramae* has three distinct infuscations, one at apex and one each on r and r-m. The male genitalia differ in the shape of the theca that sweeps upwards distally but not in *kirramae*, and terminates in a simple circular opening rather than a slightly enlarged asymmetrical funnel-shaped opening.

***Tamasa timothyi* sp. nov.**
zoobank registration: urn:lsid:zoobank.org:act:543BC5AF-C6DD-4717-B7D9-3CAE2B067515

Etymology. Named for Dr Timothy Moulds, who spent much of his childhood travelling Australia with his parents in pursuit of cicadas, later to follow his successful career in biology and still collecting the occasional cicada for his dad.

Types. *Holotype* male (genitalia prep. TAM133, molecular voucher 07.AU.QL.MCW.13), AU.QL.MCW, McIlwraith Rg, NE of Coen, 13°43.247'S 143°19.458'E, 508 m, 7.i.2007, K. Hill, D. Marshall, M. Moulds (**QM**). *Paratypes* as follows: QUEENSLAND: 1 female, same data as holotype but molecular voucher 07.AU.QL.MCW.14; 1 male (genitalia prep. TAM29) Leo Ck track, approx. 300 m, McIlwraith Rg,, 11.i.1990, M.S. & B.J. Moulds; 1 male (genitalia examined but not dissected), 3 females, McIlwraith Rg, 8 km NE [of} Coen, 13°53'30"S 143°15'21"E, 13,14.i.1994, 540 m, G. & A. Daniels, R, Eastwood (**MSM**).

Distribution and habitat (Fig. 84). Far north Queensland where it is only known only from the McIlwraith Range north-east of Coen on Cape York Peninsula. The only known specimens were taken in vine forest and rainforest intergrades in January on the Leo Creek track between 300 and 540 m altitude (beyond Peach Creek, 32 km from the main road). The access track to this locality is now inaccessible and is likely to remain so for the foreseeable future.



FIGURES 84–85. *Tamasa timothyi* **sp. nov.** (84) distribution; (85a) male genitalia in lateral view; (85b) same in ventral view.

Adult description. *Male* (Figs 18, 35, 85). Green with brown highlights, bearing fine black thoracic markings, but after death gradually fading to light brown. *Head* with a small black marking adjacent to postclypeus, and one about mid length on anterior margin extending to lateral ocellus, and slightly broken near its centre. Postclypeus green, with a little black dorsally extending ventrally as a band either side of midline not reaching anteclypeus. Rostrum reaching to slightly beyond apices of hind coxae. *Pronotum* with keyhole marking open at its posterior end (but this is likely variable), its anterior end with its black margin expanded a little laterally; a narrow black edging against anterior of pronotal collar broken dorsally; pronotal collar green with a black spot on lateral angles. *Mesonotum* with a thin pair of short black fasciae on midline anterior of cruciform elevation not quite joined with the black scutal depressions, and a black spot near ends of anterior arms of cruciform elevation. *Forewings* with weak infuscation at wing apex; with a small infuscation on crossvein r (although its likely sometime absent in a longer series), and no infuscation on r-m. *Legs* green with black at distal ends of mid and fore tibiae and both ends of mid and fore tarsi (weak at proximal ends) , and as faint linear markings on fore femora and coxae. *Opercula* pale yellowish brown on basal half or so becoming black apically and partly with a narrow black edging; almost meeting. *Timbals* with four long ribs spanning timbal membrane. *Timbal covers* (Fig. 35) green, with black upper margin; very small but with distinct anterior projection. *Abdomen* with tergites brown with green along distal margin except for mostly green tergite 2; tergite 8 black with greenish distal quarter or so. Sternites dark brown with a narrow green distal margin on sternites 3–6; sternite VIII predominantly black with narrow yellowish lateral margins. *Genitalia* (Fig. 85) with pygofer distal shoulder broadly rounded. Uncus short, broad, with a short projecting ventral lobe in lateral view. Theca curved in an arc and terminating in a laterally-forked apex with the left fork short and the right longer.

Female. Similar to male. Abdominal segment 9 pale green with a bold subdorsal black band not reaching distal margin and a small black stigma. Ovipositor sheath projecting a little beyond level of anal styles and dorsal beak.

Measurements. Range and mean (in mm) for 2 males and 4 females. *Length of body* (including head): male 17.8–18.9 (18.3); female (including ovipositor) 16.0–17.0 (16.4). *Length of forewing*: male 25.2–26.6 (25.9); female 23.8–25.6 (24.7). *Width of head* (including eyes): male 6.4–7.0 (6.7); female 6.2–6.5 (6.4). *Width of pronotum* (across lateral angles): male 6.6–7.2 (6.9); female 6.4–6.6 (6.5).

Distinguishing features. Clearly differs in the male theca (requires dissection) (Fig. 85). Closely similar to *T. capensis* **sp. nov.** and *T. ewarti* **sp. nov.**, both of which are also found at the McIlwraith Range. Differs from *T. capensis* in its green colour in life compared to the brown of *T. capensis*. Males differ from *T. capensis* (apart from in genitalia) in having an abdomen about as wide as the thorax rather than much wider. Distinguished from *T. ewarti* only by the male genitalia. It is possible that *T. dolabra* **sp. nov.** from Iron Range also occurs at the McIlwraith Range that too is distinguishable from *T. timothyi* **sp. nov.** (and *T. ewarti*) only by the male genitalia

Discussion

Diversity, distribution and habitat

Until this revision *Tamasa* included just 5 species, now increased to 18 and the number of species represented by just one or very few specimens suggests there are more species awaiting discovery. Even so, the 18 species already discovered makes *Tamasa* one of the most speciose genera among Australia cicadas, surpassed or equalled only by *Macrotristria*, *Myopsalta*, *Pauropsalta*, *Popplepsalta*, *Psaltoda*, *Tryella* and *Yoyetta*. Most *Tamasa* species are remarkably similar in outward appearance but distinctly different in male genitalia.

The majority of species, 14 of the 18, are found only in the tropical north of Queensland, north from Townsville, and eight of these inhabit the rainforests of the wet tropics, mostly with small and localised distributions. The centre of diversity is the Atherton Tablelands, principally in the vicinity of Kuranda, Tolga and Atherton where five species are found through that region. Elsewhere distributions tend to be isolated, four in the far north of Cape York Peninsula, *T. caverna* known only from Black Mountain, *T. lewisensis* **sp. nov.** only from Mt Lewis, *T. kirramae* **sp. nov.** only from the Kirrama Range, *T. gigas* **sp. nov.** only from Paluma and *T. rentzi* **sp. nov.** from between Gordonvale and Etty Bay.

The four species found south of Townsville are mostly separately distributed, *T. pearsoni* **sp. nov.** from the Mackay region, *T. lindsayi* **sp. nov.** from central Queensland and the sand islands and adjacent mainland of southern Queensland to the far NE corner of NSW, *T. rainbowi* from the Border Ranges south to Dorrigo, and *T. tristigma* from SE Queensland including Brisbane and much of eastern NSW. It is notable that by far the most widely distributed species, *T. tristigma*, has the most southern distribution and is the only *Tamasa* to reach temperate latitudes as far south as Lake Conjola on the NSW South Coast.

Molecular data and phylogenetic relationships

The Barcode of Life Database (BOLD) has data for 128 *Tamasa* specimens publicly available. A maximum likelihood (ML) tree built from these 128 specimens distinguished eight species, 111 specimens of which were *T. tristigma* (Fig. 86). Importantly, the eight species distinguished in the tree on molecular evidence support the morphological differences used in distinguishing species, notably in the male genitalia, significant in separating *T. kurandae* **stat. rev.** and *T. imber* **sp. nov.** that are two sympatric species with nearly identical songs (L. Popple pers comm.) and similar physical appearance.

As only eight of the 18 *Tamasa* species are included in the tree and there is no outgroup to establish the root of the tree, and nodes supporting relationships between species are weakly supported except for one, little can be determined confidently regarding relationships. Only the sister relationship between *T. lanei* **sp. nov.** and *T. lewisensis* **sp. nov.** is strongly supported with a 93% Bootstrap, and these two species bear a close similarity in their green colour and markings, and the male genitalia show similarities in the pygofer and uncus but not in the theca. Differences in the theca are not unexpected as this structure displays considerable diversity among *Tamasa* species,

even between species that otherwise are barely distinguishable. Two other species of very similar morphology, *T. tristigma* and *T. burgessi*, are sisters in the tree although with weak support at 39%. These two species share a closely similar body morphology, markings and colour, and the male genitalia show similarities in the pygofer and uncus although again the theca is very different; nevertheless, they are likely true sisters.

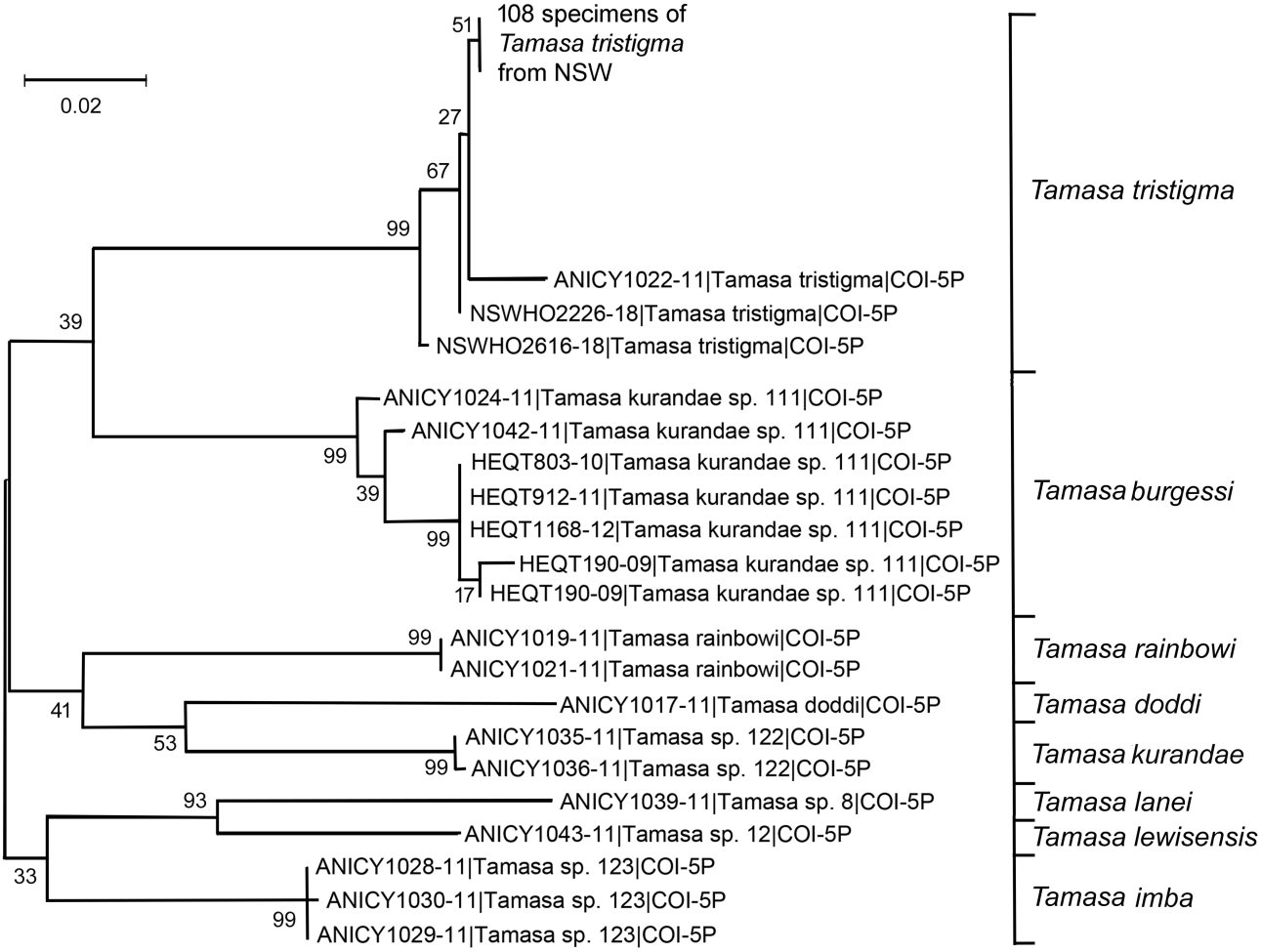


FIGURE 86. Phylogenetic tree generated from barcode sequences of 128 *Tamasa* specimens extracted from the Barcode of Life Database, accessed 26th June 2025. The evolutionary history was inferred using the Neighbour-Joining method (Saitou & Nei 1987). The optimal tree with the sum of branch length = 0.25151592 is shown. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (50 replicates) are shown next to the branches (Felsenstein 1985). The tree is drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic tree. The evolutionary distances were computed using the Maximum Composite Likelihood method (Tamura *et al.* 2004) and are in the units of the number of base substitutions per site. This analysis involved 128 nucleotide sequences. All ambiguous positions were removed for each sequence pair (pairwise deletion option). There were a total of 658 positions in the final dataset. Evolutionary analyses were conducted in MEGA X (Kumar *et al*. 2018).

While the tree does not help with broader relationships among *Tamasa* species, morphology provides some hints of such relationships. It may be that those species with the smallest timbal covers, in particular *T. capensis* **sp. nov.**, *T. ewarti* **sp. nov.**, *T. lindsayi* **sp. nov.** and *T. pearsoni* **sp. nov.**, in which the timbal covers have no or very little anterior development, share an ancestral character state and those with the largest covers, including *T. tristigma* and *T. burgessi*, exhibit a derived character state. This would be in keeping with the general trend in timbal cover development found by Moulds (2005: 413) in a broader study of Australian and exotic genera. It would also be in keeping with the rudimentary timbal covers found in *Parnkalla*, a genus that is sister to *Tamasa* (Moulds 2005; Marshall *et al*. 2018).

Potential trends in other morphological features are also noticeable. The male genitalia also imply relationships. For example, *T. capensis*, *T. pearsoni* and *T. lindsayi* not only have much reduced timbal covers but also share a long tapering uncus in lateral view clearly unlike that of other *Tamasa* species. Further, *T. capensis* and *T. lindsayi* share a similarly shaped theca and are likely sisters despite their wide geographic separation. An outlier is *T. rainbowi* with its strongly developed pygofer distal shoulders that are pointed and out-turned distally, its timbal covers that although small appear to show even anterior development rather than ventrally biased, and in the unique shape of its uncus that is short and hammer-shaped in lateral view.

Acknowledgements

For many helpful comments and corrections to the manuscript I am particularly grateful to Lindsay Popple and David Emery; both read the manuscript in its entirety and their amendments led to significant improvements. I sincerely thank the Curators of AMS (Russell Cox and Derek Smith), ANIC (Federica Turco, Olivia Evangelista de Souza and Jaime Florez Fernandez), ASCU (Peter Gillespie and Catherine Phillips), NMV (Simon Hinkley), NHMUK (Mick Webb and Diana Rendón-Mera), OUMNH (Amoret Spooner, the late Ivor Landsbury) and QM (Susan Wright and Karin Koch) for providing access to their collections including the loan of specimens, photographs or loan of type material and/or helpful discussion, without whose help this paper would have been much compromised. Likewise, I thank Robert Lachlan, John Olive and Lindsay Popple for unlimited access to specimens in their private collections that proved significant in defining species and their distributions. For considerable assistance in field work over many years, often to remote and challenging environments, I thank Barbara and Timothy Moulds, Kathy Hill and David Marshall. For donating specimens used in this study I thank Sally Cowan, Greg and Alice Daniels, Angus Emmott, Roger De Keyzer, Bart Hacobian, Jack Hasenpusch, John Olive, Rob Lachlan, Shane McEvey, Ivan Nozaic, Lindsay Popple, Steve Pearson, and the late Ross Storey. Albert Orr and Margaret Humphrey kindly provided advice on Latin nomenclature.

For photographing live adult specimens used in the colour plates in association with voucher specimens used for confirming identities, I especially thank Lindsay Popple, Angus Emmott, David Lane, Margaret Humphrey, Jack Hasenpusch, Bart Hacobian and Steve Pearson, without whose help the colour plates would not have been possible. In particular I thank Lindsay Popple for allowing me to use his library of photographs of live individuals with vouchered specimens that were pivotal in working out the identities of some colour forms. For the outstanding genitalia drawings, so important to this work, I thank Ivan Nozaic, and for preliminary working drawings and assistance in sorting specimens I am grateful to Norma Scott. For photos of live individuals in their natural habitat I am grateful to Lindsay Popple, Kathy Hill, David Marshall, Angus Emmott and Steve Pearson.

For building the molecular phylogenetic tree from BOLD data I am especially grateful to Shaun Bochow for his expertise and time. Without his help I could not have included the phylogenetic analysis. For testing the key to species, I am indebted to Sally Cowan, Margaret Humphrey, David Lane and Lindsay Popple whose suggestions helped considerably in improving the key.

Specimens were collected under permits from the Queensland Forestry Department, Atherton, in years long past, and in more recent times under permits WITK05497208, WITK06501209 from Queensland Department of Environment and Science with assistance from S. Sullivan. The Australian Wildlife Conservancy is thanked for permission to survey cicadas in Brooklyn Nature Refuge. Financial support was provided by NSF grants DEB1655891, DEB0955849, DEB0720664, DEB0529679, and DEB0089946 to C. Simon, J. Cooley, M. Villet, D. Marshall and MSM.

References

Ashton, J.H. (1912) Description of a new cicada. *Records of the Australian Museum* 9 (1), 105a–106b. https://doi.org/10.3853/j.0067-1975.9.1912.927

Ashton, J.H. (1921) A revision of the Australian Cicadidae. Part 1. *Proceedings of the Royal Society of Victoria,* (n.s.) 33, 87–107.

Burns, A.N. (1957) Check list of Australian Cicadidae. *Entomologischen Arbeiten aus dem Museum Georg Frey,* 8 (2), 609–678.

Burwell, C., Popple, L., Lambkin, C., Wright, S. & Daniels, G. (2017) *Quinkan bush blitz March 2017: Queensland Museum entomology report.* Pp. 1–67. Queensland Museum, Brisbane.
Distant, W.L. (1905) Rhynchotal notes.–XXXIII. *Annals and Magazine of Natural History,* (7) 16, 22–35. https://doi.org/10.1080/03745480509443650
Distant, W.L. (1906) *A synonymic catalogue of Homoptera. Part 1. Cicadidae.* British Museum, London. Pp. i-iii, 1–207. [Corrections, see Kirkaldy, G.W., 1906, *Entomologist,* 39, 283–287. Reply by Distant, W.L., 1907 *Entomologist* 40, 2–3. Reply Kirkaldy, G.W., 1907, *Entomologist* 40, 58–60. Facsimile reprint 1966, Johnson Reprint Corp., New York.]
Distant, W.L. (1907) Rhynchotal notes.–XLIII. *Annals and Magazine of Natural History,* (7) 20, 411–423. https://doi.org/10.1080/00222930709487361
Distant, W.L. (1914) Homoptera, fam. Cicadidae, subfam. Gaeaninae. *Genera Insectorum,* 158, 1–38, pls 1–3.
Emery, D.L., Emery, S.J., Emery, N.J. & Popple, L.W. (2005) A phenological study of the cicadas (Hemiptera: Cicadidae) in western Sydney, New South Wales, with notes on plant associations. *Australian Entomologist,* 32, 97–110.
Ewart, A. (1986) Cicadas of Kroombit Tops. *Queensland Naturalist,* 27, 50–57.
Ewart, A. (1990) Status of the Germar and Leach types of Australian cicadas (Homoptera) held at the Hope Entomological Collections, Oxford. *Australian Entomological Magazine* 17 (1): 1–5.
Ewart, A. (1993) Cicadas of the Heathlands region, Cape York Peninsula. *In:* Cape York Peninsula Scientific Expedition, Wet Season 1992 Report. *Royal Geographical Society of Queensland, Geography Monograph Series,* 3, 135–147.
Ewart, A. (2001) Dusk chorusing behaviour in cicadas (Homoptera: Cicadidae) and a mole cricket, Brisbane, Queensland. *Memoirs of the Queensland Museum* 46, 499–510.
Ewart, A. (2005) Cicadas of the Pennefather River – Weipa areas, October/November 2002, with comparative notes on the cicadas from Heathlands, Cape York Peninsula. *In:* Gulf of Carpentaria Scientific Study Report. *Royal Geographical Society of Queensland, Geography Monograph Series,* 10, 169–179.
Felsenstein J. (1985) Confidence limits on phylogenies: an approach using the bootstrap. *Evolution,* 39, 783–791. https://doi.org/10.1111/j.1558-5646.1985.tb00420.x
Germar, E.F. (1834) Observations sur plusieurs espèces du genre *Cicada*, Latr. *Revue d'Entomologique Silbermann,* 2, 49–82, pls 19–26.
Goding, F.W. & Froggatt, W.W. (1904) Monograph of the Australian Cicadidae. *Proceedings of the Linnean Society of New South Wales,* 29 (3), 561–670, pls XVIII, XIX. https://doi.org/10.5962/bhl.part.20173
Hahn, D.E. (1962) *A list of the designated type specimens in the Macleay Museum. Insecta*. Pp. ii, 184. Macleay Museum, University of Sydney, Sydney.
Heath, M.S., Heath, J.E. & Sanborn A.F. (2022). Thermal responses of some Australian cicadas (Insecta: Hemiptera: Cicadidae). *Journal of Thermal Biology,* 105 (103221), 1–6. https://doi.org/10.1016/j.jtherbio.2022.103221
Horning, W. (1988) Entomology. In: Stanbury, P. & Holland, J. (eds), *Mr Macleay's celebrated cabinet. The history of the Macleays and their museum*. Macleay Museum, University of Sydney, Sydney.
Kumar S., Stecher G., Li M., Knyaz C. & Tamura K. (2018) MEGA X: Molecular Evolutionary Genetics Analysis across computing platforms. *Molecular Biology and Evolution,* 35, 1547–1549. https://doi.org/10.1093/molbev/msy096
Marshall, D.C., Moulds, M., Hill, K.B.R., Price, B.W., Wade, E.J., Owen, C.L., Goemans, G., Marathe, K., Sarkar, V., Cooley, J.R., Sanborn, A.F., Kunte, K., Villet, M.H. & Simon, C. (2018) A molecular phylogeny of the cicadas (Hemiptera: Cicadidae) with a review of tribe and subfamily classification. *Zootaxa*, 4424 (1), 1–64 https://doi.org/10.11646/zootaxa.4424.1.1
Metcalf, Z.P. (1963) *General catalogue of the Homoptera.* Fasc. 8. Cicadoidea. Part 1. Cicadidae. vii, 919 pages. [Species index by Virginia Wade, 1964, 26 pp.] University of North Carolina State College, Raleigh, U.S.A.
Moss, J.T.St L. (1988) Cicada fauna of Carlisle Island, Queensland, with some notes on habits and songs. *Queensland Naturalist,* 29, 29–31.
Moss, J.T.St L. (1990) A survey of the cicadas of Moreton Island, Queensland. *Queensland Naturalist* 30 (3–4), 68–70.
Moss, J.T.St L. (2001) Southern Highland border area excursion. *Newsletter of the Butterfly and Other Invertebrates Club,* 20, 9–10. https://doi.org/10.5962/p.419427
Moulds, M.S. (1990) *Australian cicadas*. 217 pp., 24 pls. NSW University Press, Kensington.
Moulds, M.S. (2005) An appraisal of the higher classification of cicadas (Hemiptera: Cicadoidea) with special reference to the Australian fauna. *Records of the Australian Museum,* 57, 375–446 https://doi.org/10.3853/j.0067-1975.57.2005.1447
Moulds, M.S. (2012) A review of the genera of Australian cicadas (Hemiptera: Cicadoidea). *Zootaxa,* 3287, 1–262. http://mapress.com/zootaxa/2012/f/zt03287p262.pdf
Moulds, M.S. & Olive, J.C. (2014) A new species of *Tamasa* Distant from an unusual cave-like habitat in Australia (Cicadidae: Cicadinae: Tamasini). *Records of the Australian Museum,* 66 (5), 265–270. https://doi.org/10.3853/j.2201-4349.66.2014.1637
Sanborn, A.F. [2013] *Catalogue of the Cicadoidea (Hemiptera: Auchenorrhyncha).* Academic Press, San Diego, 1001 pp.

[Printed with publication date 2014 but published on 31st October 2013, according to Elsevier website. Copies were certainly available for sale at the Entomological Society of America meeting in Austin, Texas held 10th–13th November 2013 (A.F. Sanborn pers. comm.)].

Saitou N. & Nei M. (1987) The neighbor-joining method: a new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution,* 4, 406–425.

Stål, C. (1861) Genera nonnulla nova Cicadinorum. *Annales de la Société Entomologique de France* (4)1, 613–622.

Southcott, R.V. (1988) Two new larval mites (Acarina: Erythraeidae) ectoparasitic on north Queensland cicadas. *Records of the South Australian Museum,* 22, 103–116.

Tamura K., Nei M. & Kumar S (2004) Prospects for inferring very large phylogenies by using the neighbor-joining method. *Proceedings of the National Academy of Sciences (USA),* 101, 11030–11035.
https://doi.org/10.1073/pnas.0404206101

Young, D. & Josephson, R.K. (1983) Mechanisms of sound-production and muscle contraction kinetics in cicadas. *Journal of Comparative Physiology,* 152, 183–195.
https://doi.org/10.1007/BF00611183