A NEW SUBSPECIES OF *JALMENUS INOUS* HEWITSON (LEPIDOPTERA: LYCAENIDAE) FROM SHARK BAY, WESTERN AUSTRALIA

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Abstract

Jalmenus inous bronwynae subsp. n. is described for the first record of the genus *Jalmenus* Hübner from the Shark Bay area in Western Australia. The new subspecies is the smallest in the genus and is isolated by more than 700 km from the nearest populations of related taxa. It is recorded breeding on *Acacia ligulata* A. Cunn ex Benth, a species not previously known as a host plant for *Jalmenus*. Immature stages are attended by two species of ants within the *Iridomyrmex rufoniger* group.

Introduction

There appear to be no recent records of *Jalmenus* Hübner from the Shark Bay area in Western Australia, despite some collection effort in the area during the last 20 years. The record of *Jalmenus inous* Hewitson, from further north at Carnarvon (Waterhouse and Lyell 1914), is presumably the basis for the distribution map in Common and Waterhouse (1981). This record was doubted by Braby (2000), whose map shows *J. inous* restricted to the far southwest and including the distribution of *J. i. notocrucifer* Johnson, Hay & Bollam. Both Common and Waterhouse (1981) and Braby (2000) showed the distribution of *Jalmenus icilius* Hewitson as covering a large part of southwestern Australia. Another species, *J. clementi* Druce, occurs 150 km further north in the Northwest Cape region.

During September and November 2001, we located extensive colonies of a distinctive *Jalmenus* species in the Shark Bay area, including numerous sites at Denham, 24 km SSE of Denham and at Nanga Bay 52 km SSE of Denham. Individuals of this species were uniformly small (smaller than *J. aridus* Graham & Moulds and *J. clementi*) and had distinctive brown markings on the underside of the wings, similar to those of *J. aridus*.

The following acronyms have been used for collectors and collections: ANIC – Australian National Insect Collection, Canberra; CGMC – Private collection of C. G. Miller; DCEC – Department of Conservation and Environment collection, Perth; MTQ – Museum of Tropical Queensland collection, Townsville; QM – Queensland Museum collection, Brisbane; PSV – P.S.Valentine; PSVC – Private collection of P. S. Valentine, Townsville; SJJ - S.J.Johnson; WAM – West Australian Museum collection, Perth.

***Jalmenus inous bronwynae* subsp. n.**

(Figs 1-6, 11)

Types. Holotype ♂, WESTERN AUSTRALIA: labelled 'Denham WA 25°55'S 113°31'E, em 6 Oct 2001, S.J.Johnson' (registered type No: 67396, in WAM).

Paratypes: 13 ♂♂, 7 ♀♀, same data as holotype except dated 29 Sept 2001 (1 ♂), 30 Sept 2001 (5 ♂♂, 1 ♀), em 3 Oct 2001 (1 ♂, 1 ♀), em 4 Oct 2001 (1 ♂, 1 ♀), em 6 Oct 2001 (1 ♂, 2 ♀♀), em 9 Oct 2001 (2 ♂♂, 1 ♀), em 12 Oct 2001 (2 ♂♂, 1 ♀); 8 ♂♂, 1 ♀, 4 km north west Denham, WA, 25°54'S 113°32'E, SJJ, 26 Sept 2001 (5 ♂♂), 29 Sept 2001 (2 ♂♂), em 14 Oct 2001 (1 ♀), em 17 Oct 2001 (1 ♂); 2 ♂♂, 24 km SSE Denham, WA, 11 Oct 2001, PSV (all MTQ); 1 ♂, 1 ♀, same data as holotype except em 3 Oct 2001 (1 ♀), em 6 Oct 2001 (1 ♂); 1 ♀, 4 km north west Denham, WA, 25°54'S 113°32'E, em 15 Oct 2001, SJJ (all QM); 1 ♂, Denham, WA, em 2 Oct 2001, SJJ, Conservation WA 7819; 1 ♀, Denham, WA, em. 4 Oct 2001, SJJ, Conservation WA 7823; 1 ♀, Denham, WA, em 4 Oct 2001, SJJ, Conservation WA 7824 (all DCEC); 47 ♂♂, 24 ♀♀, Denham, WA, 25°55'26"S 113°31'45"E, 9 Oct 2001 (4 ♂♂), 10 Oct 2001 (14 ♂♂, 1 ♀), 11 Oct 2001 (1 ♀), em 11 Oct 2001 (6 ♂♂, 3 ♀♀), em 12 Oct 2001 (3 ♂♂), em 13 Oct 2001 (2 ♂♂, 1 ♀), em 14 Oct 2001 (4 ♂♂, 2 ♀♀), em 15 Oct 2001 (2 ♂♂, 4 ♀♀), em 16 Oct 2001 (3 ♂♂, 2 ♀♀), em 17 Oct 2001 (2 ♀♀), em 18 Oct 2001 (1 ♂, 2 ♀♀), em 19 Oct 2001 (2 ♀♀), em 20 Oct 2001 (1 ♂, 1 ♀), em 21 Oct 2001 (1 ♀), em 23 Oct 2001 (3 ♂♂, 1 ♀), em 24 Oct 2001 (2 ♂♂, 1 ♀), 10 Oct 2001, Genitalia slide 023 (1 ♂), em 23 Oct 2001, Genitalia slide 024 (1 ♂), PSV; 3 ♂♂, 1 km NE Denham, WA, 25°55'16"S 113°31'45"E, 10 Oct 2001, PSV; 8 ♂♂, 24 km S Denham, WA, 26°06'14"S 113°38'51"E, 11 Oct 2001, PSV (all PSVC); 8 ♂♂, Denham, WA, 25°55'26"S 113°31'45"E, 10 Oct 2001 (4 ♂♂), 11 Oct 2001 (1 ♂), em 16 Oct 2001 (1 ♂), em 18 Oct 2001 (2 ♂♂), PSV (all ANIC); 3 ♂♂, Denham, WA, 20°55'26"S 113°31'45"E, 10 Oct 2001, PSV; 1 ♂, 4 km north west Denham, WA, 25°54'S 113°32'E, 26 Sept 2001, SJJ (all CGMC); 2 ♂♂, 4 km north west Denham, WA, 25°54'S 113°32'E, 26 Sept 2001, SJJ; 1 ♀, Denham, WA, 25°55'26"S 113°31'45"E, em 15 Oct 2001, PSV (all WAM).

Description. Male (Figs 1-2). Wingspan 21.25 mm (n = 70). Upperside of forewing brown-black with iridescent greenish-blue central area; a faint black bar at end of cell. Upperside of hindwing similar to forewing but projection at end of CuA_2 and a black tornal spot edged orange. Underside pale brown with variable white suffusion; 3 subbasal, 4 submedian and 3 median spots darker brown, edged white; a variable, curved postmedian band with pair of spots above CuA_2 offset medially and spot above 1A+2A crescent shaped; serrated subterminal band with space between postmedian and subterminal bands variably suffused with white; black tornal spots edged orange.

Female (Figs 3-4). Wingspan 22.2 mm (n = 51). Upperside similar to male but termen of forewing slightly more convex, black bar at end of cell and tornal spot more pronounced and central areas of both wings iridescent purplish-blue. Underside similar to male but with basal 2 spots of postmedian band crescent shaped.

Male genitalia (Fig. 11). Vinculum and tegumen ring oval; saccus small and rounded; uncus undeveloped; brachia of gnathos evenly curved and tapering to long, pointed, inwardly curved and heavily sclerotised tips; valvae broad basally, tapering to blunt apices bearing numerous long setae.

Etymology. The new subspecies is named after the late wife of the first author, in acknowledgement of her devoted support over many years.

Life history

Host plant (Fig. 10). *Acacia ligulata* A. Cunn ex Benth. (Fabaceae).

Egg (Fig. 7). White, mandarin-shaped, with a reticulated pattern of ridges giving rise to spines more pronounced dorsally; 0.5 mm wide. Eggs laid in clusters of up to 100 on the base of the host plant and attended by ants.

Final instar larva (Fig. 8). Pinkish-white; 12-14 mm long. Prothoracic plate brown with narrow white central stripe. Thoracic segments produced dorsally and crowned with numerous black spots extending to lateral white line. Abdominal segments with broad, reddish-pink dorsal heart broadly edged whitish, extending to prominent narrow white lateral line edged reddish. Lateral spiracles white, edged dark reddish-pink. Prominent dorsolateral eversible organs and dorsal nectary organ. Anal plate reddish-brown. During daylight hours most larvae shelter at the base of the host tree or in dead leaves or detritus beneath the host tree.

Pupa (Fig. 9). Brown, densely covered with black spots and blotches; length 10-12 mm. Located under loose bark at the base of the tree or in dead leaves and detritus beneath the host tree wherever the attendant ants had access to the ground.

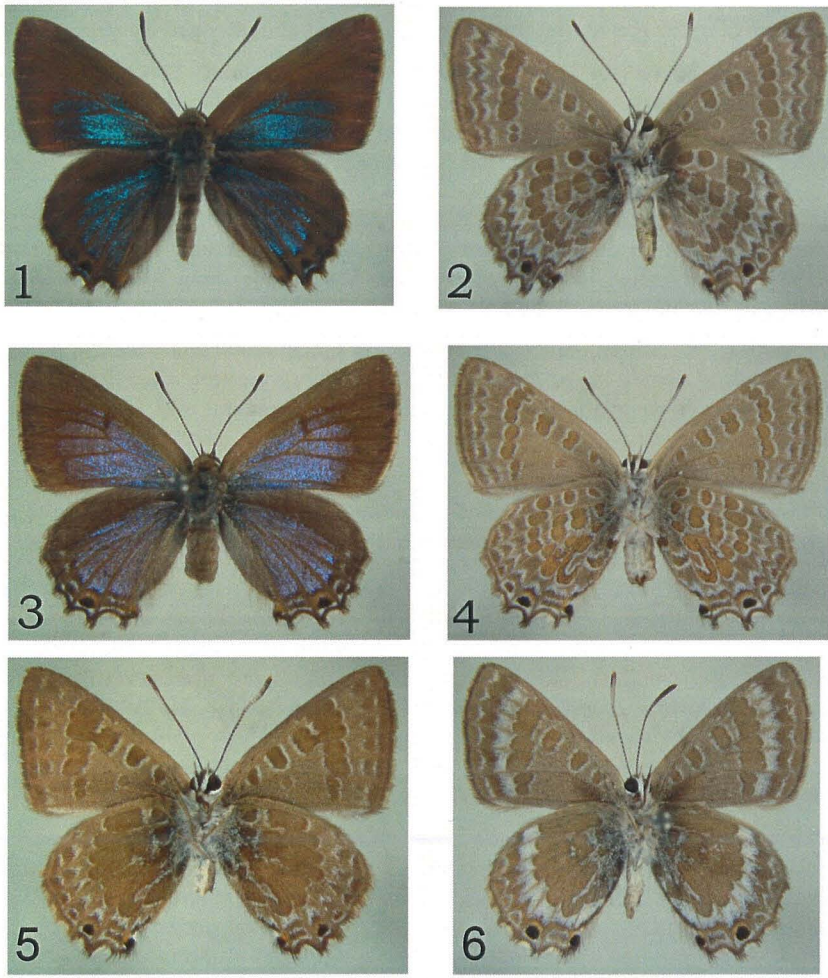
Attendant ants. Two species of ants were found in attendance with the immature stages but identification of either beyond *Iridomyrmex rufoniger* group has not been possible (S. Shattuck, personal communication).

Discussion

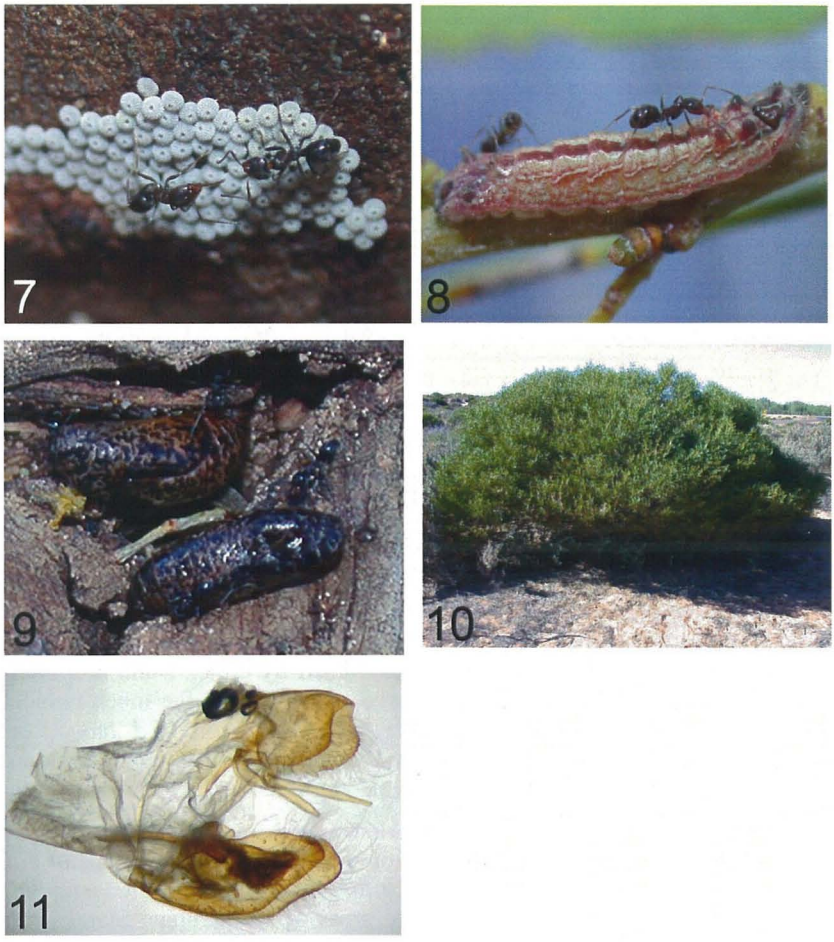
The most characteristic feature of *J. i. bronwynae* is its small size. A comparison of wingspans of related species within the genus (Table 1) shows it to be the smallest. Wingspan measurements were done only on field collected adults or emergences from field collected pupae. No environmental causes could be found to explain the small size. The host plant was abundant throughout the Peron Peninsula, with almost all plants possessing prolific fresh growth available for larval feeding.

The underside pattern of *J. inous* is known to be variable in both the presence and arrangement of bands and intensity of white suffusion (Common and Waterhouse 1981, Braby 2000). A similar variation in underside pattern (Fig. 9) and white suffusion (Fig. 10) was also present in an occasional specimen of *J. i. bronwynae*. This polymorphism is more pronounced in certain populations of *J. i. inous* and *J. icilius* in southern Western Australia and, to date, a genetic basis for it has not been discovered.

With the exception of *J. clementi,* the male genitalia are of little diagnostic value in *Jalmenus* species (Peters 1970) and those of *J. i. bronwynae* (Fig. 11) do not differ significantly from those of *J. i. inous, J. i. notocrucifer* and *J. icilius*.



Figs 1-6. Upperside and undersides of *Jalmenus inous bronwynae* subsp. n. (1) male upperside; (2) male underside; (3) female upperside; (4) female underside; (5) male underside showing variant bands; (6) male underside showing variant white suffusion.



Figs 7-11. Life history stages, host plant and male genitalia of *Jalmenus inous bronwynae* subsp. n. (7) egg mass; (8) final instar larva; (9) pupa; (10) *Acacia ligulata*; (11) male genitalia.

Table 1. Wingspans of *Jalmenus* spp. from Western Australia.

Taxon	N	Mean (mm)	SD	Median	Sample localities
J. inous inous ♂	21	26.9	2.0	28	Mundaring Weir
J. inous inous ♀	21	31.6	3.3	33	Mundaring Weir
J. i. notocrucifer ♂	19	27.4	1.6	27	Yellowdine
J. i. notocrucifer ♀	15	29.2	2.6	29	Yellowdine
J. i. bronwynae ♂	70	21.3	1.1	21	Shark Bay
J. i. bronwynae ♀	51	22.2	1.8	22	Shark Bay
J. icilius ♂	16	23.5	1.0	23.5	Lake Douglas *
J. icilius ♀	17	27.3	2.0	28	Lake Douglas *
J. clementi ♂	16	22.4	0.5	22	Learmonth
J. clementi ♀	6	24.8	0.4	25	Learmonth

*For *J. icilius*, the localities were Lake Douglas (Kalgoorlie) and Wurarga Dam (40 km west of Yalgoo). The authors had limited access to *J. aridus* specimens but Braby (2000) gave wingspans of 25 mm and 24 mm for male and female respectively.

Recent published depictions of the distributions of *Jalmenus* spp. in Western Australia are inaccurate because Dunn and Dunn (1991) did not include data from the Waterhouse collection, which is the most important historical collection of Australian butterflies. Examination of material in the Waterhouse collection by us, at the Australian Museum, Sydney, revealed three historical specimens identical to *J. i. bronwynae* from the Peron Peninsula. These specimens were not examined by either Dunn and Dunn (1991) or Braby (2000) and this may have contributed to the much reduced distribution map for *J. inous* in the latter work. The record of *J. inous* from Carnarvon to the north, referred to in Waterhouse and Lyell (1914) and regarded as doubtful by Braby (2000), is also represented by specimens in the Waterhouse collection but they belong to *J. icilius,* not *J. inous*.

Our records show a significant disjunction to the nearest populations of *J. i. notocrucifer* or *J. i. inous* of 730-900 km. The host plant *Acacia ligulata* occurs widely in the desert and semiarid areas of all mainland States, from the coast of central Western Australia in a broad band across the southern half of the continent to central western New South Wales (Chapman and Maslin 1992). It is commonly known as Sandhill Wattle, Dune Wattle or Umbrella Bush and it is surprising that such a common and widespread plant has not been recorded previously as a host for *Jalmenus*. The characteristic shape of *A. ligulata* plants provides excellent shelter for adults of *J. i. bronwynae* against the strong seasonal onshore winds and they fly predominantly in the lee of the plants.

The attendant ants belong to a group commonly encountered attending the immature stages of many *Jalmenus* spp. (Eastwood and Fraser 1999). Given the widespread distribution of the larval food plant and the attendant ants, a more extensive distribution of *J. i. bronwynae* seems likely.

Acknowledgements

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