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A NEW SPECIES OF *OGYRIS* ANGAS (LEPIDOPTERA: LYCAENIDAE) FROM SOUTHERN ARID AUSTRALIA

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Abstract

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Ogyris subterrestris sp. nov. is described with the nominal subspecies *O. s. subterrestris* ssp. nov. from northwestern Victoria and the subspecies *Ogyris subterrestris petrina* ssp. nov. from near Kalgoorlie, Western Australia. Adults, male and female genitalia, and first instar larvae are figured and characters to distinguish adults and larvae of *Ogyris subterrestris* from *O. idmo* Hewitson are discussed.

Introduction

The genus *Ogyris* Angas, is an Australasian genus in the tribe Ogyrini (Eliot, 1973; Edwards, 1996). There are 15 described species in the genus, 12 occurring in Australia and three in Papua New Guinea. Of the Australian species, the larvae of ten are known to feed on mistletoes (Loranthaceae), and one feeds on the root parasitic plants in the genera *Choretrum* and *Leptomeria* (Santalaceae). The remaining species is *Ogyris idmo* (Hewitson), the largest and one of the rarest species in the genus. The life history of this species is unknown but the larvae are presumed to be predatory on ants (Field, 1997). Many species of *Ogyris* have an obligatory associated with ants whereas the others have a facultative relationship. For species in which the life history is known, these associations are presumed to be mutualistic. By day the larvae shelter with the ants in crevices, under bark or underground, emerging at night with ants in attendance, to feed. The larvae will usually pupate in these same or sheltered sites nearby.

Populations of *O. idmo* show differing wing colours and patterns, and morphologically (wing shape, antennal segments) it is a very variable species. It has been collected from western Victoria, southern South Australia, and southwestern Western Australia, from Cape Arid National Park to near Geraldton. Few specimens have been recorded outside Western Australia since 1950 but recently the species has been locally common near Perth, and at Cape Arid National Park (Field, 1990, 1992) and it has been rediscovered in South Australia (Hunt et al., 1998). Specimens from Mildura (Victoria), Broken Hill (New South Wales) and near Kalgoorlie (Western Australia), initially incorporated within the *O. idmo* complex, are here described as a new species of *Ogyris* with two new subspecies.

Material examined is stored in Museum Victoria, Melbourne (NMV), South Australian Museum, Adelaide (SAM), Australian National Insect Collection, CSIRO, Canberra (ANIC), Australian Museum (AM), Natural History Museum London (BMNH) and the private collections of the author (RPFC), R. Hay (RHC), M. Moore (MMC), and B.H. Vardy (BHVC).

Key to females of *Ogyris idmo* (Hewitson) group

1. Upperside of forewing with 2 black bars at proximal end of postmedian cream patch and with subapical region to distal end of postmedian cream patch dark brown.....*O. subterrestris* sp. nov. ... 2
— Upperside of forewing with black patch at proximal end of postmedian cream patch and with subapical region to distal end of postmedian cream patch black.....*O. idmo* ... 3

2. Upperside of forewing with postmedian cream patch regular, oval, often faint and small; upperside of hindwing with central blue patch extending anteriorly to M_1 and reaching base..... .....*O. subterrestris subterrestris* ssp. nov. (figs 1, 2)

— Upperside of forewing with postmedian cream patch irregular, distinctly divided by M_3 forming a small faint cream patch distally between M_3 and CuA_1; upperside of hindwing with central blue patch not extending anteriorly to M_1 and not reaching base..... .....*O. subterrestris petrina* ssp. nov. (figs 5, 6)

3. Upperside of wings brown with broad basal area bright blue or bluish-purple and extending to postmedian cream patch on the forewing.....4

— Upperside of wings brown with broad basal area purple but not extending to postmedian cream patch on the forewing.....*O. idmo idmo* (figs 9, 10)

4. Upperside of wings with broad basal area bluish-purple..... .....*O. idmo halmaturia* (figs 13, 14)

— Upperside of wings with basal area bright blue..... .....*O. idmo* (Mt Ragged form) (figs 17, 18)

Key to males of *Ogyris idmo* (Hewitson) group

1. Forewing with termen at right angles to inner margin; upperside of wings with fine black line at termen..... *O. subterrestris* sp. nov. ... 2

— Forewing with termen obtuse to inner margin; upperside of wings with narrow black band to termen..... *O. idmo* ... 3

2. Upperside of wings predominantly bluish-purple with strong bronze sheen to brown marginal areas; underside of hindwing with well defined markings, the grey patches contrasting the black-edged brown patches..... .....*O. subterrestris subterrestris* ssp. nov. (figs 3, 4)

— Upperside of wings predominantly brownish-purple without strong bronze sheen to brown marginal areas; underside of hindwing with poorly defined brown markings and without contrasting grey patches..... .....*O. subterrestris petrina* ssp. nov. (figs 7, 8)

3. Forewing termen convex..... *O. idmo halmaturia* (figs 15, 16)

— Forewing termen straight..... 4

4. Upperside of forewings brownish-purple..... *O. idmo idmo* (figs 11, 12)

— Upperside of forewings dark purple. *O. idmo* (Mt Ragged form) (figs 19, 20)

***Ogyris subterrestris* sp. nov.**

Types. See types of nominal subspecies.

Diagnosis. Females with upperside of forewing with 2 black bars at proximal end of postmedian cream patch and with subapical region distal to cream patch dark brown, males with termen at right angles to inner margin and upperside of forewing with fine black line at termen and with faint to strong bronze sheen to brown areas; first instar larvae with a pair of prominent mesothoracic dorsal spines and a pair of long, posteriorly curved dorsal spines on each of abdominal segments 6 and 7.

Remarks. The syntypic series of *O. idmo* and the holotype of *O. orontas* (Hewitson) (male), a junior subjective synonym of *O. idmo*, are held in the Natural History Museum, London. Colour images of these specimens have been examined. Although a female specimen of *O. idmo* in the Natural History Museum has the word "type" on a label, Hewitson (1862) described the species from two (female) specimens. The syntype (male) of *O. halmaturia* (Tepper) is in the South Australian Museum and has been examined. Tepper (1890) described the species from three specimens, two small specimens being the males and a larger specimen, which he believed to be the female. However, the latter was a male and the smaller specimens were male *O. otanes* (C. Felder and R. Felder). Waterhouse (1903a) synonymised part of *halmaturia* (presumably referring to the large male) with *O. idmo* and part with *O. otanes*. Waterhouse (1903b) later synonymised *halmaturia* with *otanes* and made no mention of *halmaturia* under *idmo*. Tepper's female (the large male) is the first specimen described and thus *halmaturia* can be synonymised with *idmo* but not also with *otanes*. This specimen is thus

designated the lectotype of *O. halmaturia* and is so labelled. *O. waterhouseri* (Bethune-Baker) was described, but not figured, from Victoria (Bethune-Baker, 1905) and subsequently figured, synonymised and treated as a subspecies of *O. idmo* by Waterhouse and Lyell (1914). *O. waterhouseri* has generally been treated as a junior subjective synonym of *O. i. halmaturia* (Common and Waterhouse, 1981) but both McCubbin (1971) and D'Abrera (1971) retained *waterhouseri* as a distinct subspecies. This paper recognises *waterhouseri* as a junior subjective synonym of *halmaturia*. The type series of *O. waterhouseri* could not be located but presumably consisted of one female and at least two males (based on size ranges given in the description). The original description, which highlighted the "strongly arched" termen, Waterhouse and Lyell's figuring of the species along with locality data, clearly separates. *O. waterhouseri* from *O. subterrestris* sp. nov.

Etymology. Sub- and *terrestris* (Latin), underground, referring to the larval and pupal stages thought to be completely subterranean.

Ogyris subterrestris subterrestris ssp. nov.

Figures 1–4

Types. Holotype: female, Pink Lakes, Murray-Sunset NP, 15 km N Lima, Victoria, 35°03.45'S, 142°43.13'E, 20.x.1996, R.P. Field (NMV T-17264).

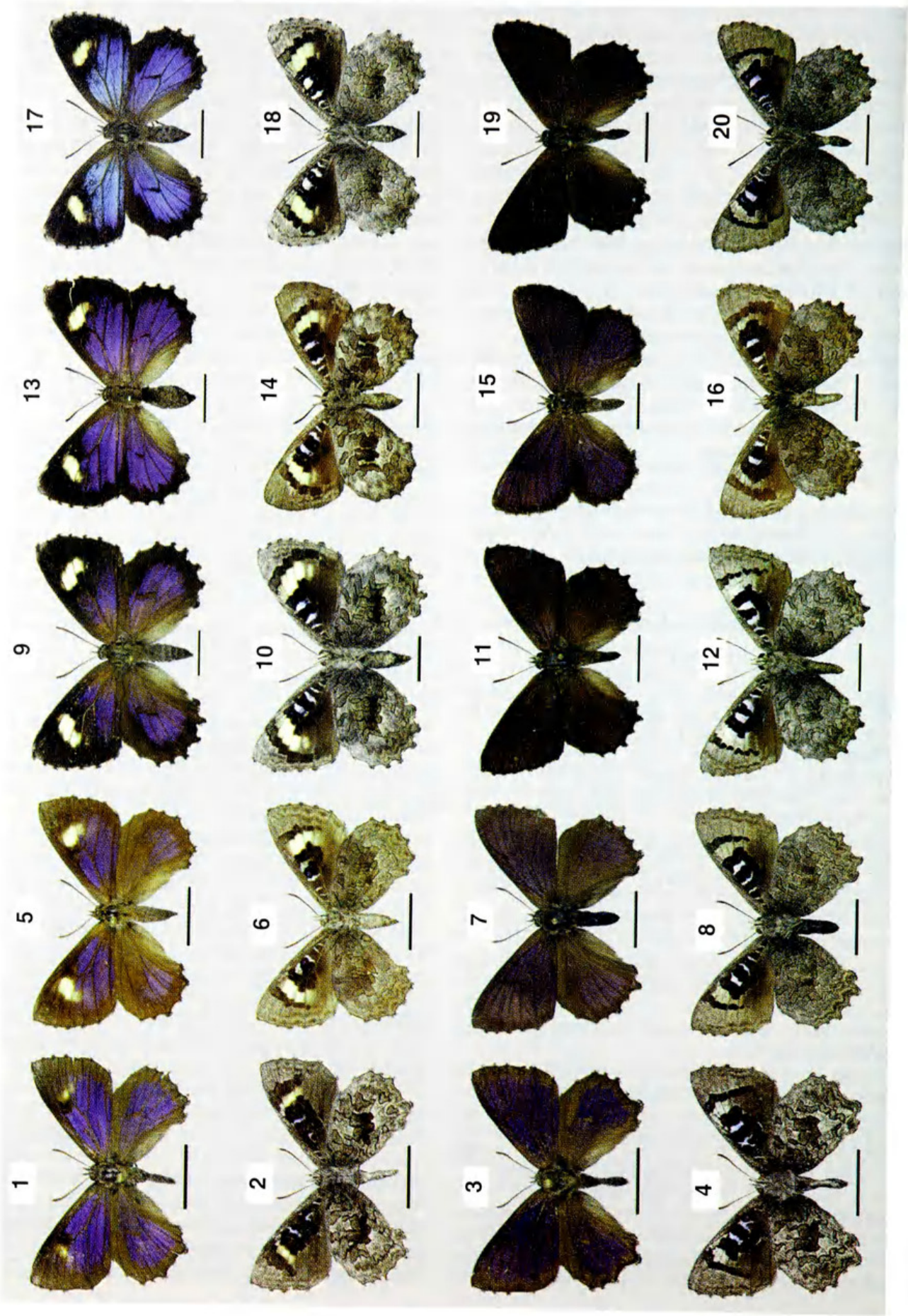
Paratypes (all Victoria): 1 male, same data as holotype (NMV T-17265); 1 female, 150 m NW of Ring Road at 1 km NNE of junction with Grub Tk, Pink Lakes, Murray-Sunset NP, F. Noelker, 18.ii.1996 (NMV T-17267); 11 males, 2 females, same data as holotype; 1 male, Pink Lakes, Murray-Sunset NP, 15 km N of Lima, 12.iv.1996, R.P. Field (RPFC); 1 female, Mildura 16.x.1972, B. H. Vardy, 1 male, Mildura, 26.x.1972, B. H. Vardy (ANIC); 1 male, 2 females, Mildura, 26.x.1972, B. H. Vardy (BHVC).

Other material examined. Victoria: 1 female, Lake Waltah, xi. 1918, F.R. Spry, G.A. Waterhouse Collection (AM KL 20211).

New South Wales: 1 male, Broken Hill, xii.1912 (NMV LEP 6272).

South Australia: 1 female, Koonibba Mission, nr Ceduna; 1 male, Loxton, 1986, Hudson (SAM); 1 male, 7.5 km NW Ramco, 13.x.1993, 34°07'38"S, 139°53'22"E, P.J. Peile; 3 females, 7.5 km NW Ramco, 34°07'38"S, 139°53'22"E, 12.iii.1994, R.P. Field; 1 male, 1 female, 7.5 km NW Ramco, 13.iii.1994, R.P. Field; 1 female 7.5 km NW Ramco, 34°07'38"S, 139°53'22"E, 14.iii.1994, R.P. Field; 4 males, 3 females, 7.5 km NW Ramco, 34°07'38"S, 139°53'22"E, 30.x.1994, R.P. Field (all RPFC); 1 female, 10.v.1992, Qualco; 1 female, 19.i.1993, Qualco; 4 males, 1 female, 25.ii.1993, Qualco; 1 female 26.ii.1993, Qualco; 2 males, 19.iii.1993, Qualco; 1 female, 20.iii.1993, Qualco; 1 female, 20.iv.1993, Qualco; 1 female, 28.ix.1993, Qualco; 1 male, 2.x.1993, Qualco (all MMC).

Description. Female. (figs 1, 2). Antennal length (of holotype) 7.1 mm, flagellum 37 segments, brown and bronze with segmental bands narrowly banded black with lateral white scales; club short, apically broad, rounded, tipped orange. Head, palpus, thorax and abdomen dorsally brown with white scales, ventrally white with brown scales; legs speckled brown and white; ventral surface of head, thorax, base of abdomen, all of coxae with long white hair scales; dorsal surface of thorax with long bronze hair scales. All tibiae of equal length, first and third femora equal length of tibiae, mid femur much longer than tibiae. Forewing length (of holotype) 21.0 mm, apex weakly acute, rounded, termen slightly convex; above central area from base to subterminal area and from subcostal area to inner margin royal blue, remaining areas and veins browny bronze except for narrow black bar proximal to discocellulars, wide black bar distal to discocellulars between M_1 and M_3 proximally edging a postmedian cream patch between M_2 and M_3 which extends faintly towards M_1 and CuA_1. Hindwing termen crenated convex; above central area from base to subterminal area and from M_1 to CuA_2 royal blue, remaining areas, veins and bands at discocellulars browny bronze, long tan hair scales throughout cell and from base to termen at CuA_2 and to inner margin. Cilia of both wings white, browny bronze at veins. Beneath forewing base colour grey, dark brown cell, extending to basal fifth of area between M_1 and M_3, basal third of M_3 to CuA_1, basal quarter of CuA_1 to CuA_2, and circular brown patch between junction of cubitus and CuA_1 and 1A + 2A narrowly edged near 1A+2A with white and iridescent blue scales; cell with 2 iridescent light blue bands 1 median band from proximal end of Rs to base of CuA_1, the other subbasal parallel to radius with bend towards cubitus distally; 2 fine white inner subbasal lines between radius and cubitus; prominent postmedian cream band extending from M_1 to nearly CuA_1 slightly stepped towards termen between M_3 and CuA_1; broad subterminal brown band from costa to CuA_1, twice as wide at costa than at CuA_1 edged dark brown; prominent white scales in subcostal, subapical and apical areas. Hindwing base colour grey with irregular brown or white patches edged dark brown; 2 subbasal dark brown lines, between costa and Sc + R_1 subparallel to basal Sc + R_1 then bending back to costa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subparallel to mid Sc + R_1 and between Sc + R_1 and cubitus displaced towards termen between Sc + R_1 and radial sector; submedian lines dark brown from Sc + R_1 to cubitus (2), radial sector to mid cell, cubitus (nearly) to anal vein; median lines from Sc + R1 to Rs (2), Rs to M_1, M_1 to M_3 (2) 1 either side of discocellulars, M_3 to CuA_1, CuA_1 to CuA_2, 1A+2A to anal vein; postmedian dark brown lines between Rs and M_1, M_1 and M_3 (2), dark brown edged v markings between M_3 and CuA_1 and CuA_1 and CuA_2; brown areas basal fifth of M_2 to CuA_1 extending proximally into cell, basal quarter of CuA_1 to CuA_2 extending proximally into cell and spot distal to junction of CuA_1 and CuA_2 between CuA_2 and 1A + 2A edged dark brown; costa and termen edged dark brown.

Genitalia (Fig. 21): Apophyses anteriores long, slender; papillae anales broadly acute, setose; ostium bursae broad, weakly sclerotised; ductus bursae not sclerotised, membranous, broad, moderately long, expanding to rounded, membranous corpus bursae.

Male. (figs 3, 4). Antennal length 6.6–8.3 mm (mean 7.6 mm, n=20), flagellum 34–41 segments (mean 38, n=20). Colour of head, palpi, antennae, thorax, abdomen and legs similar to female. Forewing length 19.5–23.5 (mean 21.7 mm, n=20), apex acute, termen straight or slightly concave, above similar to female but without postmedian cream patch and darker purple blue; remaining areas, veins and narrow band at discocellulars bronze. Hindwing above similar to female but darker purple blue central area and bronze submarginal areas; beneath similar to female (holotype) but postmedian cream band of forewing more grey and median iridescent light blue band in cell often broader, subbasal iridescent band often more extensive forming a cross and an additional narrow basal iridescent band in cell; subterminal brown band narrower than in female but extending past CuA_1 often to CuA_2.

Genitalia (fig. 22): Vinculum+tegumen ring oval, saccus small, blunt; uncus lobes narrow, bases close dorsally, setae numerous, brachia long, U-shaped, curved laterally inwards, broad basally tapering to a blunt point; valva broadly triangular, numerous long setae on posterior margin concentrated near dorsal and ventral regions; juxta prominent, v-shaped; aedeagus long, straight, basal fifth swollen, zone broad; postzonal sheath length longer than half the pre-zonal sheath, broad, displaced ventrally near base with cornuti well developed near zone, apically round.

Variation. Female, size of the cream spot on the forewing varies from almost absent to a small patch; flagellum 36–44 segments (mean 39, n=20), length 6.8–8.3 mm (mean 7.7 mm, n=20), wing length 20-25.5 mm (mean 22.7 mm, n=20).

Distribution. In Victoria the subspecies occurs in the Murray Sunset National Park, near Linga and was recorded from Mildura, in October 1972 (B. Vardy collection). A single specimen was recorded from Broken Hill, New South Wales, in December 1912 (Museum Victoria). In South Australia it occurs locally in a small remnant roadside strip of mallee vegetation, near Ramco, (Moore, 1999) and has also been recorded near Loxton and near Ceduna.

Ogyris subterrestris petrina ssp. nov.

Figures 5–8

Types. Holotype: female, Western Australia: female, Lake Douglas, 12 km SW of Kalgoorlie, 12.xi.1989, R.P. Field (NMV T-17268).

Paratypes: 1 male, Lake Douglas, 12 km SW of Kalgoorlie, 4.x.1991, R.P. Field (NMV T-17269). 1 male, 1 female, Lake Douglas, 12 km SW of Kalgoorlie, 1.ii.1982, A.J. Graham 12 males, 3 females, Lake Douglas, 12 km SW of Kalgoorlie, 16.x.1986, A.J. Graham; 4 females, Lake Douglas, 12 km SW of Kalgoorlie, 17.x.1986, A.J. Graham; 1 male, Lake Douglas, Kalgoorlie, 22.xi.1991, L. R. Ring, (all ANIC); 1 female, Lake Douglas, 12 km SW of Kalgoorlie, 5.x.1987, R.P. Field; 3 males, 5 females, Lake Douglas, 12 km SW of Kalgoorlie, 6.x.1987, R.P. Field; 2 males, Lake Douglas, 12 km SW of Kalgoorlie, 7.x.1987, R.P. Field; 1 male, 1 female, Lake Douglas, 12 km SW of Kalgoorlie, 9.xii.1989, R.P. Field; 2 males, Lake Douglas, 12 km SW of Kalgoorlie, 10.xii.1989, R.P. Field; 3 males, Lake Douglas, 12 km SW of Kalgoorlie, 11.xii.1989, R.P. Field; 2 males, 4 females, Lake Douglas, 12 km

Figures 1–4, *Ogyris subterrestris subterrestris* ssp. nov. 1, 2, holotype female upperside and underside; 3, 4, paratype male upperside and underside.
Figures 5–8, *Ogyris subterrestris petrina* ssp. nov. 5, 6, holotype female upperside and underside; 7, 8, paratype male upperside and underside.
Figures 9–12, *Ogyris idmo idmo*. 9, 10, female upperside and underside; 11, 12, male upperside and underside.
Figures 13–16, *Ogyris idmo. Halmaturia*. 13, 14, female upperside and underside; 15, 16, male upperside and underside.
Figures 17–20, *Ogyris idmo* (Mt Ragged form). 17, 18, female upperside and underside; 19, 20, male upperside and underside. Scale lines 1 mm.

SW of Kalgoorlie, 12.xii.1989, R.P. Field; 1 female, Lake Douglas, 12 km SW of Kalgoorlie, 3.x.1991, R.P. Field; 2 males, 2 females, Lake Douglas, 12 km SW of Kalgoorlie, 4.x.1991, R.P. Field, (all RPFC); 1 female, 13.xii.1986, R. H. (WAM 96/177); 2 males, 1 female, 14.xii.1986, R.H. (WAM 96/175, 96/176, 96/178); 1 female, Lake Douglas, 30.xi.1985, R.H.; 1 male, Kalgoorlie, 14.xii.1986, R.H.; 1 male, Lake Douglas, 28.ii.1988, R.H.; 1 female, Lake Douglas, 3.x.1991, R. H.; 4 males, Lake Douglas, 4.x.1991, R.H.; 1 female, Lake Douglas, 5.x.1991, R. H.; 2 males, 2 females, Lake Douglas, 6.x.1991, R.H.; 1 male, Lake Douglas, 8.x.1991, R. H.; 1 male, Kalgoorlie, 9.x.1991, R.H. (all RHC).

Other material examined. Western Australia: 1 female, S. W. Australia, Kalgoorlie district, W. Subiaco, 23.x.1911, W.J. Brooks (BMNH).

Description. Female. (figs 5, 6). Antennal length (of holotype) 7.9 mm, flagellum 41 segments, brown and bronze with segmental bands narrowly banded black with lateral white scales; club short, apically broad, rounded, tipped orange. Head, palpus, thorax and abdomen dorsally brown with white scales, ventrally white with brown scales; legs speckled brown and white; ventral surface of head, thorax, base of abdomen, all of coxae with long white hair scales; dorsal surface of thorax with long bronze hair scales. All tibiae of equal length, first and third femora equal length of tibiae, mid femur much longer than tibiae. Forewing length (of holotype) 21.0 mm, apex weakly acute, rounded, termen slightly convex; above central area from base to median area in cell and subterminal area at CuA_1 and from subcostal area to inner margin purple blue; discocellulars and veins browny bronze, remaining areas, brown with scattered browny bronze scales except for narrow brown black bar proximal to discocellulars and a narrow brown black bar distal to discocellulars between M_1 and M_3 proximally edging a large postmedian cream patch between M1 and M3 which extends faintly towards CuA1. Hindwing termen crenated convex; above central area from base to subterminal area and from M_2 to CuA_2 purple blue, discocellulars and veins browny bronze, remaining areas, brown with scattered browny bronze scales, long tan hair scales throughout cell and from base to termen at CuA_2 and to inner margin. Cilia of both wings white, brown at veins. Beneath forewing base colour grey with dark brown cell, extending to basal sixth of area between M_1 and M_3, basal quarter of M_3 to CuA_1, basal third of CuA_1 to CuA_2, cell with median iridescent light blue patch and 2 iridescent light blue bands 1 sub-medial and 1 subbasal, 2 fine white inner subbasal lines between radius and cubitus; prominent postmedian cream band extending from M_1 to nearly CuA_1 slightly stepped towards termen between M_3 and CuA_1; broad subterminal brown band from costa to midway between CuA_1 and CuA_2, twice as wide at costa as at CuA_1 edged dark brown; prominent white scales in subcostal, subapical and subterminal areas. Hindwing base colour grey and flecked with white scales with irregular brown lines; 2 subbasal dark brown lines, between the costa and Sc + R_1 and back to costa subparallel to basal Sc + R_1 and between radial sector and cubitus, subbasal brown ring between anal vein and inner margin; submedian dark brown lines between Sc + R_1 and radial sector (2), radial sector and cubitus (2), cubitus to 1A+2A; median dark brown lines from Sc + R_1 to Rs (2), M_1 to M_3 (2) 1 either side of discocellulars, 1A+2A to anal vein median dark brown rings (3), in cell half the width of the cell at the base of CuA_1, between M_3 and CuA_1 and between CuA_1 and CuA_2, median brown spot distal to junction of CuA_1 and CuA_2 between CuA_2 and 1A + 2A; postmedian dark brown lines Rs to M_1(2), M_1 to M_2 (2), M_3 to CuA_1, CuA_1 to CuA_2, CuA_2 to 1A+2A; termen edged dark brown.

Male. (figs 7, 8). Antennal length 7.3–8.5 mm (mean 8.1, mm, n=19), flagellum 37–43 segments (mean 40, n=20) colour of head, palpi, antennae, thorax, abdomen and legs similar to female. Forewing length 21.5–24.5 mm (mean 23.4 mm, n=19), apex acute, termen straight or slightly concave, above similar to female but without postmedian cream patch and central area browny purple. Hindwing above similar to female but central area browny purple and browny bronze submarginal areas; beneath similar to female but postmedian cream band of forewing more grey and iridescent light blue bands in cell often broader; subterminal brown band narrower than in female but extending past CuA_1 often to CuA_2.

Etymology. Petra and *-ina* (Latin), small rock, upon which females will sometimes oviposit; also the name of my wife.

Variation. Female, flagellum 39–43 segments (mean 41, n=20), length 6.8–8.6 mm (mean 8.3 mm, n=18), wing length 22–25 mm (mean 22.7, n=18).

Distribution. Western Australia, *Ogyris subterrestris petrina* is known only from a few square kilometres to the north east of Lake Douglas, near Kalgoorlie

Biology

The life history of *O. subterrestris* is largely unknown. It is associated with the sugar ant *Camponotus terebrans* (Lowne), the same species

that is associated with all populations of *O. idmo* and *O. otanes* (C. and R. Felder) (McArthur et al., 1997). *O. subterrestris* has been recorded every month from September to May with peak flight activity in mid-spring and late summer and is probably bivoltine at all locations. Near Waikerie and at Pink Lakes males fly low in open grassland and on nearby ridges whereas females generally fly close to the trees where the ant nests occur. At Kalgoorlie, the butterflies are sparse but have definite flight paths and often exhibit hill-topping and individuals, particularly males, fly to the tops of small rises and settle on the ground. Females are also often found on these rises.

The eggs are laid close to the ground at or in the entrance to the ants' nest usually on the bark of trees or occasionally on small stones. At most locations the trees are mallee eucalypts, *Eucalyptus concinna* Maiden & Blakely near Kalgoorlie (Field, 1992), *E. oleosa* F. Muell., *E. foecunda* Schauer, and *E. pileata* Blakely but also exotic garden eucalypts and *Myoporum platycarpum* R. Br. near Waikerie, South Australia (Moore, 1999) and *E. largiflorens* F. Muell. at Mildura, Victoria. At the type location only one egg has been found (on a mallee eucalypt) although ant nests are abundant, occurring at the base of many plants, not only eucalypts.

At Lake Douglas in 1991, ant nests at the base of 50 randomly chosen *E. concinna* trees were examined. Egg clusters of *O. subterrestris* were found on 18 trees with 26 clusters present, four of which were unhatched. Egg shells seem to remain attached to the bark for several years. The cluster size averaged 7.8 eggs (range 2–20) with 11% of the eggs parasitised. In 1989 an encyrtid wasp (*Ooencyrtus* sp.) was reared from one cluster of eggs (Field, 1990). Captive females readily oviposit on stones and bark taken from the entrance of ant nests, producing clusters of 40 or more eggs if left undisturbed. Nearly 90% of the eggs laid in the field were in the northern to western quarter of the tree. However, the entrances to the ant nest seemed to be well distributed around the base of the tree and averaged 7.2 holes/tree (range 1–18). Female butterflies that were caged over ant nests readily oviposited, but only between 1145 h and 1300 h, when the sun was shining on the northwestern sector of the base of the tree. During this period the ants, which are predominantly nocturnal, exhibit little activity above ground. If disturbed during the day the ants will leave the nest and attack intruders. It is likely that the butterflies oviposit during periods when the sun is shining on the base of the tree and the ants have retreated further underground. This enables the females to back into the nest entrances to oviposit undisturbed. Near Waikerie, hundreds of old eggs occur on some trees with few eggs showing evidence of parasitism.

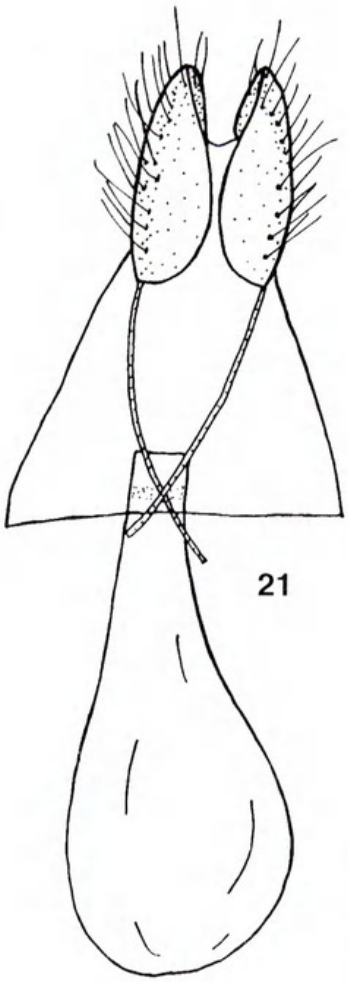
Newly hatched larvae are carried in the mandibles of ants or walk into the ant nest where larval growth and pupation occurs. The first instar larvae of *O. subterrestris* (Fig. 23) has morphological differences from *O. idmo idmo* (Fig. 24). *O. subterrestris* has two pairs of dorsal posteriorly curving abdominal spines, a pair on segment 6 and on segment 7. A smaller pair of dorsal spines also occurs on the mesothorax. These spines do not occur on second instar larvae. There are no spines on first instar *O. idmo*, but numerous long hairs occur on the lateral margin of the abdomen and thorax and there are numerous clubbed secondary setae on the thorax and abdomen. As with *O. idmo*, the larval food is unknown. The larvae and pupae are thought to be totally subterranean and probably have an obligatory association with *C. terebrans*. Adult pinned specimens of *O. idmo* and *O. subterrestris* often develop greasy wings, a feature commonly occurring in lycaenids that are known to have predatory larvae (Sands, 1980).

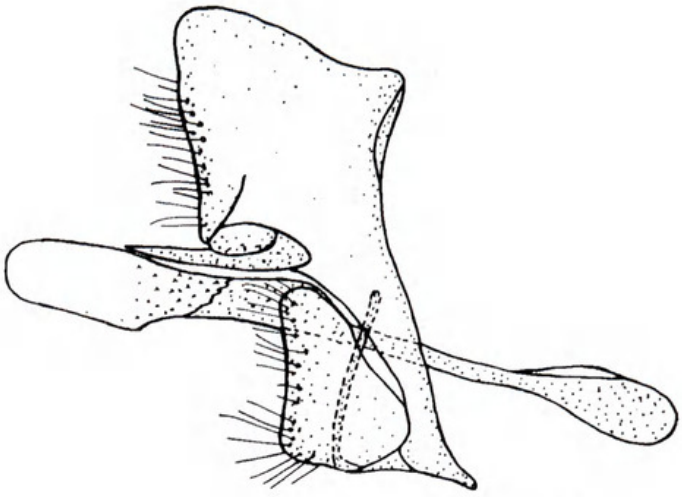
Discussion

A female specimen of *O. subterrestris subterrestris* in the AM and labelled Lake Waltah, a nonexistent location, and bearing the name F. R. Spry, is most likely incorrectly labelled but may refer to Lake Hattah, a location between the two known Victorian locations of the species. Spry's diaries (held in the NMV) do not indicate that he travelled in northwestern Victoria during November 1918, hence he probably labelled this specimen with misinterpreted data from the collector.

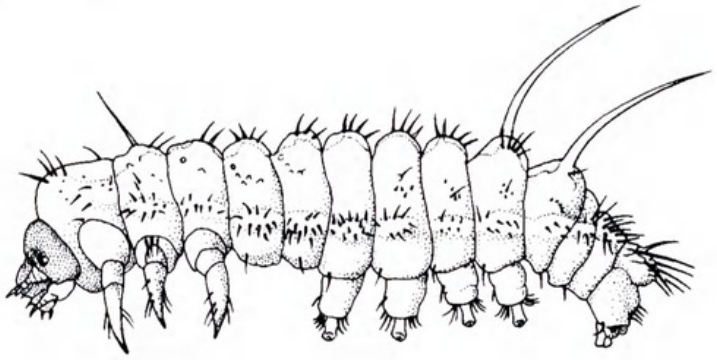
Braby et al. (1997) proposed a common name for this species of Mallee Bronze Azure. However, there are records of *O. subterrestris subterrestris* from mallee and non-mallee areas (Broken Hill, NSW, Mildura, Vic and near Ceduna, SA) and *O. idmo*, both the western and eastern populations, also occurs in mallee vegetation as well as heathland. A more appropriate common name would therefore be Arid Bronze Azure, reflecting the more arid climatic regions in which the species is found in comparison to *O. idmo* (Field, 1997).

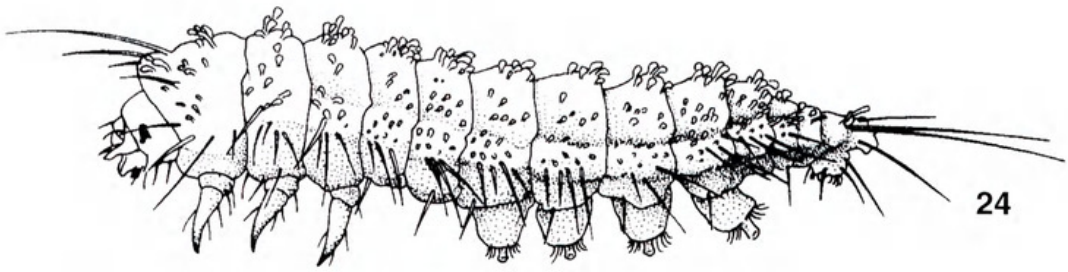
Most colonies of *O. subterrestris* occur in disturbed areas. The colony at Lake Douglas occurs within a public recreation area that can be subjected to significant human interference with numerous vehicle tracks crossing the main breeding areas. In some years, since its first discovery





Figures 21, 22. Genitalia of *Ogyris subterrestris subterrestris* sp. nov.: 21, female; 22, male.





Figures 23, 24. First instar larvae of *Ogyris*: 23, *O. subterrestris* sp. nov.; 24, *O. idmo idmo*. Scale line 1 mm.

in the early 1980s, the butterflies have been common, but few specimens have been seen since 1991 (Field, 1997). Near Waikerie, citrus orchards and vineyards surround the breeding area. These crops are regularly sprayed with pesticide during flight periods of the butterfly. Adults fly commonly in the adjoining farmland as well as in the breeding area and a nearby ridge. The only known extant location of *O. subterrestris* in Victoria is the type location in the Murray Sunset National Park. This relatively undisturbed location is the most secure of all populations of the species (Field, 1997).

The *Ogyris idmo* complex covers colour and pattern variants, morphological and/or behaviouraly distinct populations of *O. idmo* and *O. subterrestris*. Nowhere are specimens common. Both *O. idmo idmo* and *O. idmo halmaturia* are univoltine with peak flight activity in mid to late November. The Mt Ragged form of *idmo* has a longer flight activity period, flying in early/mid October with specimen activity still occurring in late December. Specimens from near Geraldton more closely resemble the Mt Ragged form of *O. idmo* than typical *idmo* and fly in September. Flight activity during the day also differs amongst the complex. Female *idmo* tend to be active only in the late morning, whereas males are mainly active in the afternoon. However, at Mt Ragged, males and females are active throughout the day. Hunt et al. (1998) reported male *halmaturia* having a peak flight activity in the late morning. Both sexes of *O. subterrestris* are active throughout the day although during the heat of mid afternoon, specimens may shelter in trees. The complex may yet reveal more species than *O. idmo* and *O. subterrestris*. Larval characters have proven useful in separating species in the complex. Further studies on the behaviour and immature stages of the various *idmo* populations may clarify the colour and morphological differences that occur in the adult populations.

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