



## A new species of *Lepidochrysops* Hedicke, 1923 (Lepidoptera: Lycaenidae) from the Northern Cape, South Africa

Published online: 14 March 2013

Graham A. Henning<sup>1</sup> and Jonathan B. Ball<sup>2</sup>

<sup>1</sup> 17 Sonderend Street, Helderkruijn, 1724, Gauteng. E-mail: [safshenn@mweb.co.za](mailto:safshenn@mweb.co.za) (corresponding author)

<sup>2</sup> Department of Zoology and Entomology, University of Pretoria, Pretoria, Gauteng. E-mail: [jball@iafrica.com](mailto:jball@iafrica.com)

Copyright © Lepidopterists' Society of Africa

**Abstract:** The genus *Lepidochrysops* Hedicke (Lycaenidae) is briefly discussed and a new species in the *L. methymna* group, *Lepidochrysops frederikeae* sp. nov. from the Northern Cape, is described and figured. The habitat, a small inselberg (at an altitude of over 1200 m) of the Fynbos vegetation unit Roggeveld Shale Renosterveld surrounded by Succulent Karoo vegetation units, is discussed in relation to other apparently new animal and plant taxa found there.

**Key words:** Lycaenidae, Polyommatainae, *Lepidochrysops*, new species, *Pelargonium* larval host-plant, Afrotropical Region.

**Citation:** Henning, G.A. & Ball, J.B. (2013). A new species of *Lepidochrysops* Hedicke (Lepidoptera: Lycaenidae) from the Northern Cape, South Africa. *Metamorphosis* 23: 1–7.

### INTRODUCTION

The lycaenid component (51.6%) of the 796 butterfly taxa (662 species and 134 additional subspecies) of South Africa is the highest in the world (Ball, 2012). In this local geographical area the genus *Lepidochrysops* Hedicke, 1923 is also the most speciose of all the butterfly genera. The species of the *L. methymna* group in the genus *Lepidochrysops* are discussed to facilitate the description of a new species discovered by John White in the Northern Cape. The new species is closest to *Lepidochrysops badhami* Van Son, 1926, which has been collected at Calvinia, about 25 kilometres to the north of where the new species flies. The full distribution of this new species has not yet been ascertained as it has only been recorded in the area near the type locality. The discovery of an undescribed butterfly utilizing an apparently undescribed succulent-stemmed *Pelargonium* L'Hér. as a larval host-plant is a rare event, given the fairly thorough knowledge that exists for both genera. It is also unusual finding a butterfly taxon in the Roggeveld Shale Renosterveld vegetation type in the Fynbos

Biome (Mucina and Rutherford, 2006), where adult emergence is decoupled from the earlier vernal abundance of ephemeral flowering plants. This discovery highlights the importance of citizen scientists and the amount of endeavour still needed to define the vast biotic riches of South Africa.

The *L. methymna* group was revised previously by Cottrell (1965). His terminology for the male and female genitalia is followed.

### MATERIAL AND METHODS

One hundred and four specimens were examined: 71 males and 33 females. The specimens have been deposited in the Ditsong National Museum of Natural History (formerly Transvaal Museum); and the collections of J. White, A.S. Morton, J.B. Ball, A.I. Curle and G.A. Henning.

The dissections of genitalia have been preserved in Canada balsam or glycerine; the slide preparations will accompany individual specimens to the collections concerned.

Measurements of forewing lengths are from the apex, without the cilia to the base of the costa. Measurements of the antenna are from the apex to the attachment to the head without making allowance for the curve that is consistent in most specimens.

### RESULTS AND DISCUSSION

#### Genus *Lepidochrysops* Hedicke, 1923

*Lepidochrysops* has more than 130 species (Williams, 2011), and is the most speciose of all Afrotropical lycaenid genera (Ackery *et al.*,

Received: 11 September 2012

Accepted: 15 November 2012

Copyright: This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License. To view a copy of this license, send a letter to Creative Commons, Second Street, Suite 300, San Francisco, California, 94105, USA, or visit: <http://creativecommons.org/licenses/by-nc-nd/3.0/>

1995). This taxon is the forty-ninth of the genus recorded from South Africa (Ball, 2006). *Lepidochrysops* are fast-flying species, which occur in open habitats in the following South African Biomes: Grassland, Succulent Karoo, Nama-Karoo, Fynbos, Albany Thickets, Indian Ocean Coastal Belt and Savanna (Mucina and Rutherford, 2006). Where the life history is known all species appear to be phyto-predacious. The eggs are laid on the flower buds or leaf buds of plants and the later instars of the larvae are ant-nest parasites, feeding on the eggs, larvae and pupae of the host-ants. The host-ants recorded for those South Africa species that have been reared belong to the genus *Camponotus* Mayr, 1861 (Formicinae) (Cottrell, 1965; Heath and Claassens, 2003). Because of the (usually) fairly narrow habitat specificity (due to specific soil, drainage, other abiotic factors, larval host-plant and specific myrmecophily) some species whose habitats have been fragmented and modified, are threatened with extinction (Ball, 2006; Henning *et al.*, 2009).

**Generic characters**

Head: small; eyes pilose; palpi medium size, first segment short and stout, second segment long, laterally compressed, with black and white scales and black bristles ventrally, third segment short, slender, acuminate; antennae slender, more than half the length of the costa, club elongate and flattened. Thorax: sturdy, pilose, dark dorsally and greyish to white ventrally. Legs: femur pilose, tibia about as long as femur on fore legs and hind legs, femur longer on middle legs, tarsus fused, spinose ventrally; middle and hind legs with a pair of short spurs at apex of tibia. Wings: medium sized; forewing sturdy, apex angular, outer margin very slightly convex; hind wing

oval, tailed in some species. Forewing has 11 veins. The genitalia of some species in the genus *Lepidochrysops* may only differ slightly from one another thereby making it difficult to identify them by the genitalia alone (Cottrell, 1965). The apices of the valves also may vary considerably in individuals of the same species and can sometimes be asymmetrical. Bethune-Baker (1923) described and illustrated the genitalia of a large number of *Lepidochrysops* species.

Cottrell (1965) illustrated and revised the *L. methymna* group in which he included *L. methymna* (Trimen), *L. badhami* Van Son, *L. bacchus* Riley, and *L. puncticilia* (Trimen), and described *L. variabilis* Cottrell, *L. robertsoni* Cottrell, *L. ketsi* Cottrell and *L. dukei* Cottrell. This new species will be included in the *L. methymna* group.

Further information on this genus can be found in Pringle *et al.* (1994): 241-244, Henning *et al.* (2009) and Williams (2011).

***Lepidochrysops frederikeae* sp. nov.**

Similar to *L. badhami*, from which it can be separated by its smaller size (average forewing length 89% of *L. badhami*) and rounder wing shape. The upper side differs in being a lighter brown with a greyish sheen, which in *L. badhami* is coppery, there is no spot, or a very indistinct spot, in cellule 2 of the hind wing; and the greyish-white markings on the cilia are smaller. The underside differs from *L. badhami* in that the forewing postdiscal spots are strongly curved distally from cellules 3–6 and the submarginal markings are larger, extending basad. Hind wing black spots in cellule 7 are much wider apart, with the distal spot being closer to the discal spot in cellule 6 – these spots being the same distance apart in *L. badhami* (Figs 1–4). Antenna-wing



**Figure 1** – *L. frederikeae* (Paratype, top) & *L. badhami* (Springbok, bottom), male upper sides



**Figure 2** – *L. frederikeae* (Paratype, top) & *L. badhami* (Springbok, bottom), male undersides



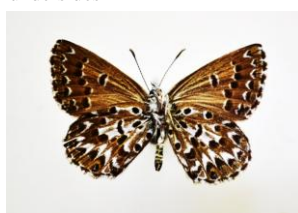
**Figure 3** – *L. frederikeae* (Paratype, top) & *L. badhami* (Springbok, bottom), female upper sides



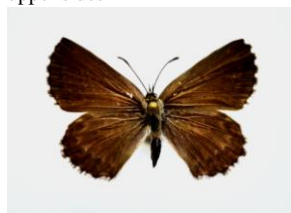
**Figure 4** – *L. frederikeae* (Paratype, top) & *L. badhami* (Springbok, bottom), female undersides



**Figure 5** – *L. frederikeae* Holotype, male upper side



**Figure 6** – *L. frederikeae* Holotype, male underside



**Figure 7** – *L. frederikeae* Paratype, female upper side



**Figure 8** – *L. frederikeae* Paratype, female underside

ratio differs from *L. badhami*: male 0.516, *L. badhami* 0.501; female 0.477, *L. badhami* 0.455.

Male genitalia similar to those of *L. badhami* but uncus lobes much smaller, apex of subunci smoothly narrowing not sinuate as in *L. badhami*; valves longer, broader at base, narrower centrally and distally, recurved apex angular, smoothly recurved in *L. badhami*, and not as strongly recurved. Aedeagus narrower, proximal portion not expanded distally, proximal lobes smaller. Lateral pieces shorter, being half the length of the proximal portion, this proportion being two-thirds in *L. badhami*, sharply pointed not rounded as in *L. badhami* and narrowing smoothly distally.

Female genitalia similar to those of *L. badhami* but ovipositor lobes more triangular than in *L. badhami* and membranous plate more rounded. Anterior apophyses short and broad, those of *L. badhami* being long and narrow.

### Description

Male (Figs 5 & 6): forewing length 14–18 mm (n = 71); antenna-wing ratio 0.516 (n = 33). Head white with two longitudinal rows of black hairs between eyes and greyish-brown hairs behind antennae, two narrow black bands connect base of antennae to eye. Antennae black with faint narrow greyish-white bands on club, more prominent on outer edge with some reddish-brown scales, and white at base of each segment, apiculus blunt, club flat and twisted.

Labial palpi: first segment white with black scales dorsally; second segment black dorsally white laterally and long black scales ventrally; apical segment black with some white scales ventrally.

Thorax: greyish-brown dorsally, greyish-white ventrally.

Legs: greyish-brown dorsally, white ventrally.

Abdomen: greyish-brown dorsally, white ventrally.

Forewing: upper side uniform mid-brown with a greyish sheen slightly darker towards margin, slightly darker brown faint mark at end of cell, cilia with small greyish-white markings with darker brown in between. Underside is light brown, darkening towards margin; has an elongate mark at end of the cell; with white laterally, the distal portion being chevron-shaped. Postdiscal row of dark brown rounded spots strongly arched distally from 3 to 6, row of submarginal dark brown spots ringed with white, inner margin chevron-shaped, with marginal white chevron-shaped marks, and cilia with small greyish-white markings with dark brown in between.

Hind wing: upper side uniform mid-brown with a greyish sheen, slightly darker towards margin, cilia small greyish-white markings with darker brown in between, some specimens have a row of faint greyish-blue chevron-shaped postdiscal markings with a slightly darker brown spot distally and some specimens have a faint black

spot at the margin of cellule 2. Underside ground colour darker brown than forewing. Discal area with a strongly curved irregular arc of eight spots, those in 1c–6 dark brown; spots in 1b and 7 black, the black spots ringed with white; other spots edged with white on inner and outer edges, inner edge extending basad, that in 4 extending to discocellular mark, the spot in 1 being displaced distally. Cell closed by a longitudinal discocellular mark, edged laterally by white. Subbasal area with row of four rounded black spots in 1a, 1c, the cell and 7, all edged with white. Submarginal row of dark brown spots with a large extended chevron-shaped white mark basally, narrowly white distally, between spot in space 2 and margin there is a small ocellate spot faintly marked with orange and blue and a further dark spot in 1b; margin with chevron-shaped white marks, cilia with small greyish-white markings with dark brown in between.

Female (Figs 7 & 8): forewing length: 16–18.5 mm (n = 33); antenna-wing ratio 0.477 (n = 4). Head: as in male. Thorax: as in male. Wing margins much rounder in shape than male.

Forewing: upper side similar to male but paler brown, some specimens have a row of faint greyish-blue chevron-shaped postdiscal markings with a slightly darker brown spot distally. Under side similar to male but paler brown ground colour.

Hind wing: upper side similar to male but paler brown; most specimens have a row of distinct greyish-blue chevron-shaped postdiscal markings with a slightly darker brown spot distally. Underside similar to male. There are no tails in either sex.

Male genitalia (Figs 9, 10 & 11): uncus consists of two small lobes fused to tegument; subunci, long, slender, curved dorsally tapering gradually to a small, slightly curved tip. Uncus lobes with long fine hairs. Lower fultura slender and fused to the base of the valves. Valves long, bowed, narrower centrally, apical quarter recurved to a strong angular apex. Valves with long fine hairs. Aedeagus cylindrical, of even width, approximately equal in length to the valve; anellus narrow, fused to the aedeagus. Proximal lobes (lateral flanges of Cottrell, 1965), to which the protractor muscles are connected, are rounded. Lateral pieces about half the length of proximal portion, sharply narrowing ventrally to a pointed apex.

Female genitalia (Figs 12 & 13): Ovipositor lobes triangular, posterior apophyses about twice the length of ovipositor lobes. Genital plate roughly ovoid with distal edge evenly rounded and proximal edge straighter but irregular with sclerotized patches and membranous centrally, ridges on inner surface of plate very slight and membranous plate oval. Ductus bursae about three times as long as genital plate, colliculum with four ridges. Anterior apophyses short and broad.

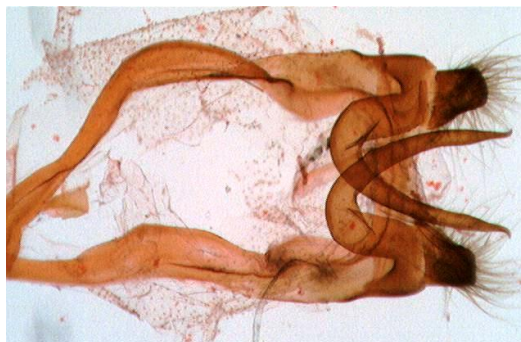


Figure 9 – *L. frederikeae* uncus and tegumen



Figure 10 – *L. frederikeae* valve



Figure 11 – *L. frederikeae* aedeagus



Figure 12 – *L. frederikeae* ovipositor lobes

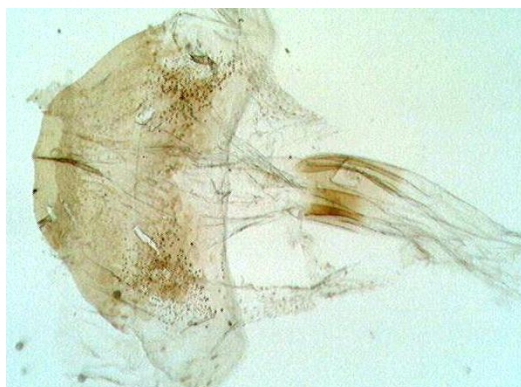


Figure 13 – *L. frederikeae* genital plate and colliculum

Early stages: The larval host-plant of *L. frederikeae* has been located (from observations only of oviposition by Ball & Ficq) and is an unidentified and cryptic species of succulent-stemmed *Pelargonium* [in the Section *Otidia* (Sweet) G. Don] (Geraniaceae), which is currently under investigation at the Kirstenbosch Botanical Gardens (Fig. 14). The base of the underground stem is markedly globose (*pers. obs.* Ball, 2012) (Fig. 15). The ant species with which this butterfly is associated was not recorded. The larval host-plant of *L. badhami* is the succulent *Pelargonium dasyphyllum* E. Mey (Van der Walt *et al.*, 1981; Pringle *et al.*, 1994), which was not noted at the type locality of *L. frederikeae* (*pers. obs.* Ball, 2009–2012).



Figure 14 – *Pelargonium* sp., larval host-plant of *L. frederikeae*



Figure 15 – *Pelargonium* sp., larval host-plant underground stem with bulb

*P. dasyphyllum* occurs along the coast/subcoastal region, in a broad belt 100–140 km wide and about 400 km long, extending from the Gariep (Orange) River southwards to the vicinity of Wuppertal, near Clanwilliam and as far west as Tweerivier, near Garies (Van der Walt *et al.*, 1981). *L. badhami* and *L. frederikeae* are the only known members of the obligately myrmecophilous (with *Camponotus* spp.) *Lepidochrysops* genus (Heath and Claassens, 2003), where the (initial) larval host-plant is a *Pelargonium* species (Geraniaceae). The other South African members of the *Lepidochrysops* with known larval host-plants (number of species in parentheses), utilize taxa in the Selaginaceae (17), Lamiaceae (14) and Verbenaceae (3) (Pringle *et al.*, 1994; Germishuizen *et al.*, 2006).

Only two widespread taxa (*L. asteris* and *L. ketsi ketsi*) are known to utilize two different plant families (Selaginaceae and Lamiaceae) as larval host-plants.

### Type Material

Holotype male: South Africa: Keiskie Road, Calvinia District, Northern Cape; 31°39.24'S, 19°53.78'E, 1246 m; 15 December 2007, J. White. To be deposited in the Ditsong National Museum of Natural History (formerly Transvaal Museum), Pretoria. Paratypes: 5 males, 3 females same data as holotype; 7 males, 6 females same data as holotype but 17 December 2011; 6 males, 5 females same data as holotype but 16 December 2009, J.B. Ball; 12 males, 3 females same data as holotype but 17 December 2011, A.S. Morton; 2 males, 1 female Keiskie Road, Calvinia District, Northern Cape; 31°38.93'S, 19°53.81'E, 1235 m; 18 December 2008, J. White; 29 males, 13 females 26 km south of Calvinia, Northern Cape; 31°39.61'S, 19°53.78'E, 1256 m; 16–18 December 2011, H.C. Ficq; 9 males, 2 females 25 km south of Calvinia, Northern Cape; 31°39.22'S, 19°53.84'E, 1246 m; 16 December 2011, H.C. Ficq. Paratypes in the Ditsong National Museum of Natural History (formerly Transvaal Museum), and in the collections of J.B. Ball, A.I. Curle, G.A. Henning, A.S. Morton and J. White.

### Habitat and Habits

The habitat (Figs 16 & 17) is on a small inselberg of Roggeveld Shale Renosterveld FRs3 (Mucina and Rutherford, 2006) in the Fynbos Biome and at an altitude of close to 1250 m. The inselberg is surrounded by lower altitude Succulent Karoo areas of the vegetation types Tanqua Escarpment Shrubland (SKv4) to the north and west and Roggeveld Karoo (SKt3) to the east and south (Mucina & Rutherford, 2006) (Figs 18 & 19).

In contrast, the known occurrences of *L. badhami* are from an altitude of about 120 m (about 30 km east of Port Nolloth), to 1000 m east of Springbok and 1100 m north of Calvinia, all located in vegetation types within the Succulent Karoo Biome. The localities of *L. badhami* are thus all at a lower altitude and are found in a different biome to that of *L. frederikeae*, which occurs in Fynbos.

It should also be noted that *L. badhami* usually emerges about two months earlier than *L. frederikeae*, in the considerably 'cooler' period of September to October. In the 'good years' a significantly greater availability of ephemeral flowers is noted in the *L. badhami* habitats than what is found when and where adult *L. frederikeae* occur.

The flight period of *L. frederikeae* appears to be limited to December, with peak emergence usually being in mid-December. Maximum daytime air temperature at the time of adult emergence often reaches 40 °C. For this reason the butterfly usually flies during the relatively



Figure 16 – *L. frederikeae* habitat, with the Hantamsberg in the distance



Figure 17 – *L. frederikeae*, habitat close-up

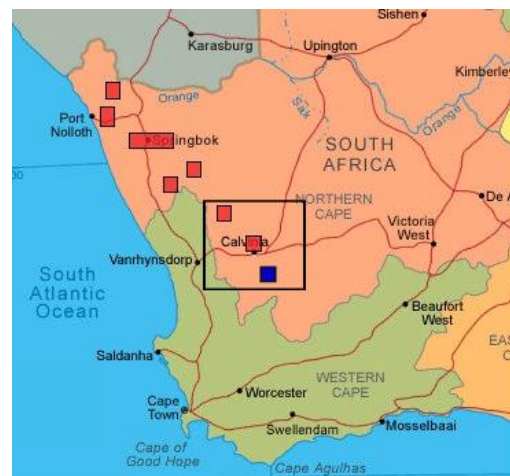


Figure 18 – Distribution map for *L. badhami* (red squares), and for *L. frederikeae* (blue square). The vegetation of the boxed area is shown in Figure 19.



Figure 19 – *L. frederikeae* locality vegetation map, with the arrow indicating the inselberg of Roggeveld Shale Renosterveld FRs3 (Mucina & Rutherford 2006)

cooler hours before midday and again after 16h00 (*pers. obs.* Ball, 2009–2011). The erratic and energetic flight is low over the squat, windswept Renosterveld. The butterfly often settles on the ground or on the outer twigs of the patchy groupings of the dwarfed plants (Fig. 20). This makes it difficult to visually follow male specimens as they actively seek females. The mosaic of species-rich herb-land and heavy clay soil has drifts of seeds of an *Eriocephalus* sp. (kapok bush) littering the habitat in mid-summer. Two other undescribed insects have been noted at the type locality, namely a diurnal antlion (*Pamexis* sp.) and an ascalaphid – *Bubomyiella* sp. (*pers. obs.* Ball, 2009). At the time of emergence of the adult *L. frederikeae*, there is a marked paucity of available geophytic and annual flowers. The meagre amounts of flowers that are available for nectaring mainly belong to the Asteraceae, Aizoaceae and Geraniaceae.

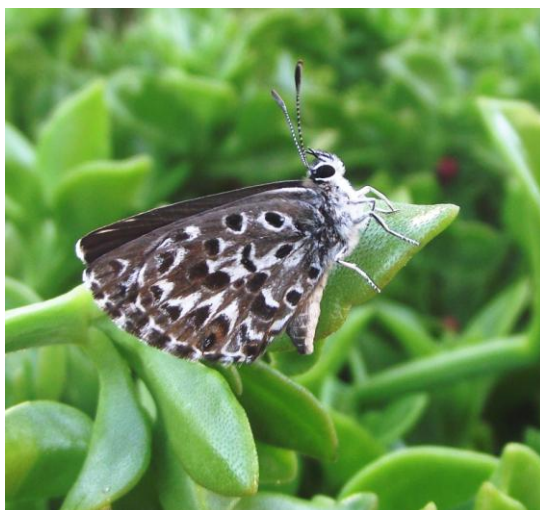


Figure 20 – *L. frederikeae*, male perching

### Conservation Status

The remoteness of the habitat and the large numbers of observed adults, coupled with the unlikely possibility of significant habitat destruction in the near future, makes this taxon one of Least Concern (LC) according to Version 3.1 of the IUCN criteria (IUCN, 2001) of Red List categories. Sheep farming is the mainstay of local agricultural activity.

### Etymology

The species is named for Frederike White, wife of the discoverer John White. Frederike (née Stokhuyzen) is one of South Africa's leading artists (Renssen, 2010), whose love of South African landscapes and natural history has been reflected over nearly half a century, with her unique and highly decorative oil and watercolour paintings. It is fitting that this taxon should be named after Frederike as she has a deep appreciation of the less travelled and more arid regions of South Africa.

### ACKNOWLEDGEMENTS

We thank those who have participated in this study: John White, Alf Curle, Chris Ficq, Andrew Morton and Alan Heath. We thank the Northern Cape Conservation Department for the necessary permitting to sample insects.

### LITERATURE CITED

- ACKERY, P.R., SMITH, C.R. & VANE-WRIGHT, R.I. [eds.] 1995. *Carcasson's African Butterflies: An Annotated Catalogue of the Papilionoidea and Hesperioidea of the Afrotropical Region*. The Natural History Museum, London, U.K. and CSIRO Publications, East Melbourne, Victoria, Australia: 803 pp.
- BALL, J.B. 2006. *Approaches towards a critical evaluation and update of the Red List of South African butterflies*. Unpublished MSc thesis, University of Stellenbosch: 1–479.
- BALL, J.B. 2012. Lepidopterology in Southern Africa: Past, Present and Future: 279–300. In: New, T. [ed.] *Insect Conservation: Past, Present and Prospects*. Springer, Dordrecht.
- BETHUNE-BAKER, G.T. 1923. A monograph of the genus *Catochrysops* Boisduval (Auctorum). *Transactions of the Entomological Society of London* **1922**: 275–366, 21 pls.
- COTTRELL, C.B. 1965. A study of the *methymna*-group of the genus *Lepidochrysops* Hedicke (Lepidoptera: Lycaenidae). *Memoirs of the Entomological Society of Southern Africa* **9**: 110 pp., 3 pls.
- GERMISHUIZEN, G., MEYER, N.L., STEENKAMP, Y. & KEITH, M. [eds.] 2006. *A checklist of South African plants*. Southern African Botanical Diversity Network Report No. 41. SABONET, Pretoria: 1126 pp.
- HEATH, A. & CLAASSENS, A.J.M. 2003. Ant-association among southern African Lycaenidae. *Journal of the Lepidopterists' Society* **57**(1): 1–16.
- HENNING, G.A., TERBLANCHE, R.F. & BALL, J.B. [eds.] 2009. South African Red Data Book: butterflies. *SANBI Biodiversity Series* **13**. South African National Biodiversity Institute, Pretoria: i–iv, 1–158.
- IUCN 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission. IUCN, Gland, Switzerland, and Cambridge, UK: ii + 30pp.
- MUCINA, L. & RUTHERFORD, M.C. [eds.] 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* **19**. South African National Biodiversity Institute, Pretoria: 807 pp.
- PRINGLE, E.L., HENNING, G.A. & BALL, J.B. [eds.] 1994. *Pennington's Butterflies of*

- 
- Southern Africa*, 2nd edition. Struik  
Winchester, Cape Town: 1–800.
- RENSSEN, M. 2010. *Frederike Stokhuyzen: Born  
to be an Artist*. Fernwood Press: 127 pp.
- VAN DER WALT, J.J., VORSTER, P.J. &  
WARD-HILHORST, E. 1981. *Pelargoniums  
of Southern Africa*. Vol. 2. Juta & Co., Cape  
Town: 149 pp.
- WILLIAMS, M.C. 2011. *Afrotropical Butterflies  
and Skippers. A Digital Encyclopaedia*. CD  
published by the author.