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CONTENTS

Front cover: *Iolaus silas* ♂: S. Woodhall
Back cover: *Junonia orithya* ♀ : S. Woodhall

Solving the mystery of the Soutpansberg *Neptis*

E. L. Pringle

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During March 1998, Anne and I visited the nature reserve at Mpophouli on the eastern Soutpansberg, near Sibasa. This is a very good butterfly locality, with a profusion of papilios and pierids, particularly in the riverine areas. Among the many commoner species were two species of *Neptis*, namely *N. laeta* Overlaet and *N. saclava marpessa* Hopffer. I decided to take a couple of fresh *N. laeta* for the locality record, and noticed two males engaged in a territorial dispute at a river crossing; they were flying fairly high, and a sweep of my extension net bagged one of them. When this specimen was set later that day, I noticed that it differed quite markedly in size and markings from specimens of *laeta* also captured at this locality, and this caused me to wonder about its identity. Fortunately it was a male, and when dissected I concluded that it was not *laeta* but either *penningtoni* van Son or *serena* Overlaet – both unknown from South Africa. However, these two species have very similar genitalia, and, because the white discal band of the hind wing was not distinctly broader than the dark marginal area, I concluded that it must be *penningtoni*. This was recorded in *Metamorphosis* later that year (Pringle, 1998), but so far this record has not been followed up by any further captures, and seems to have been ignored in Woodhall (2005), as well as in the SABCA atlas.

In the meantime I have accumulated enough *Neptis* material from further north to be able to make a better informed judgement, and so have recently spent some time dissecting the genitalia of many examples, in order to acquaint myself with the "inner workings" of this difficult complex. In this regard, the work of van Son (1979), and those of Larsen (1991, 2005) have been of great assistance.

These dissections very soon showed that external facies can be misleading in certain instances. I dissected a specimen from Busi River in Moçambique which I was certain was *kiriakoffi* Overlaet, and this turned out to be *laeta*. This specimen has very white upperside markings, with comparatively little intrusion of black marking into the white areas, and shows that *laeta* is more variable than we are inclined to believe. This causes me to doubt whether records of *kiriakoffi* from northern Zululand can be accepted without the proof of proper genitalia dissections. I subsequently dissected a *kiriakoffi* specimen from Kasanka in Zambia, which distinctly shows the small tooth on the ventral side near the base of the apical spine of the valve: this is the most obvious distinguishing feature of *kiriakoffi*. *Neptis laeta* can be identified through its genitalia in a number of ways:

a) The apical spine is comparatively thick, and placed centrally in the valve.
b) The aedeagus is shorter than the valves, and has a short robust point.
c) It has a small chitinous tooth facing inwards on the apex of the valve.

These features are important, as *laeta* normally occurs with many of the other *Neptis* species.

I then dissected a specimen of *serena* from Busi River in Moçambique, and was immediately struck by the similarity between its genitalia and those of the Soutpansberg insect. A careful comparison between these genitalia and those of *penningoni* revealed the following :

a) Like *penningtoni*, the apical spine of *serena* is long, at least a quarter of the length of the valve. But in *penningtoni*, this spine is placed on the costa, whereas in both *serena* and *kiriakoffi* it is more centrally placed, although closer to the costal than to the ventral margin; in *penningtoni*, it is also slightly longer and curved upwards, rather than slightly downwards, as in the case of *serena*.

b) As in *penningtoni*, the aedeagus of *serena* is longer than the valve, but because it has a longer, thinner upcurved point, it is more distinctly so.

So the genitalia have led me to conclude that this is a specimen of *serena* and not *penningtoni*. There is also no evidence of any middorsal white line on the abdomen, and only three marginal lines on the hind wing underside, which would lend support to this view. However, as has been stated, the comparatively narrow white hind wing discal patch makes this diagnosis more difficult, perhaps indicating that isolation has caused this population of *serena* to deviate slightly from the norm. Further material is necessary before any definite conclusions can be drawn as to whether this population merits subspecific status.

While working on this group, I also dissected specimens of *N. jordani* Neave from Malelane in KwaZulu-Natal, and found these to be compatible with *jordani* from Zambia. This species has a large and distinctive tooth turned inwards near the apex of the valve, as well as an extremely short apical spine, and a characteristically miniscule aedeagus – no insult intended!

While it cannot be denied that the *Neptis* are a difficult complex, it must be emphasised that their genitalia make identification comparatively easy, since most differences are readily discernible. Anyone who has spent any time dissecting and diagnosing our Thestors will find them a piece of cake!

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A rapid assessment protocol for surveying and monitoring diurnal Lepidoptera in Africa

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Introduction

Typically, a survey of diurnal Lepidoptera* of an area results in a species list, which is a useful measure of diurnal Lepidoptera biodiversity. Species lists alone have their limitations since they exclude information about the relative abundances of species in an area from year to year and at different times of the year. Counting individuals of flying insects on the other hand may involve specialised techniques with numerous, often hidden pitfalls and limitations, making it very time and labour intensive. In addition, if the seasonal variations in the patterns of adult flight periods and the rarity of optimal conditions for representative counts of adult butterflies are taken into account, the number of count efforts needed even just to count populations of the critically endangered butterfly species in South Africa is far beyond the capacity of the few skilled observers able to identify accurately such butterflies in flight.

Quantitative data on butterfly populations are needed by conservation officials or environmental practitioners conducting ecological impact assessments, who often only have time for a rough estimate of numbers of particular species since many other observations have to be made during a work day.

The rapid assessment method proposed here is a practical approach to acquiring meaningful quantitative data based on an abundance class-scale. This method, being less labour intensive, enables more regular counts and coverage of larger areas. For the more common species it is important to note whether a migration was taking place. If this was the case the observer only needs to apply an abundance class and continue with other observations. For rarer species, it makes a big difference whether 20 individuals were flying or if only one was present on the day at any locality. Many insect populations are density-dependent and for the

*Footnote: The term "diurnal Lepidoptera" as used here refers to Lepidoptera that fly during some time of the day (while the sun shines) of their own accord and not from being disturbed. Diurnal Lepidoptera include the wonderful array of colourful diurnal moths, which are often part of very interesting mimicry complexes. Addition of diurnal moths does add a valuable new dimension for future surveys and is encouraged, although the butterfly specialist can just apply this protocol to butterflies.

abundance classes of this protocol it is posited that the difference between one and two or six individuals is ecologically more significant than (for example) the difference between 51, 52, and 56 individuals. Since weather conditions have an enormous influence on the activity levels of diurnal Lepidoptera, the protocol also includes a weather assessment section.

Rapid assessment protocol

Step 1: Selection of areas or localities for which the counts will take place

Define the areas for which the survey will take place from the following choices:
1) The entire area that is explored on the day.
2) A number of relatively homogeneous areas, biotopes or habitats. Subjectively judged by conspicuous differences in landscape or habitat structure you may select relatively homogeneous areas. For example one could survey the summit, upper slopes of a hill and a pediment (valley bottom) separately. Another example is to survey a grassland patch, sparse savanna and dense savanna in woodland separately.
3) A selected habitat of a localised, often a threatened species, of which the extent is known or determined. The delineation of such a habitat falls beyond the scope of this proposal, but there are methods available (Dennis *et al.,* 2007).
4) A belt transect of particular width, for example 5 m from both sides of the observers (often more appropriate for detailed counts).
5) From a fixed grid-referenced point within a particular radius.

Step 2: Assess the prevailing weather conditions

Four weather components are recorded, with 0 representing the most adverse conditions and 5 the most favourable conditions. Half points can be used if appropriate.

C: Cloud cover
Estimate the proportion of the surveying period that the sun is obscured (no shadows cast).
- 5 Clear sky, no clouds
- 4 Thin cloud, sun coming through and casting a faint shadow
- 3 Sun obscured for 10-30% of time
- 2 Sun obscured for 31-60% of time
- 1 Sun obscured for 61-80% of time
- 0 Sun obscured for 81-100% of time

P: Precipitation
- 5 No precipitation
- 4 Very slight fog or drizzle during the survey period
- 3 Light rain for less than 10% of the survey period
- 2 Light rain for 11-50% of the survey period
- 1 Light rain for 51-70% of the survey period
- 0 Rain for more than 70% of the survey period

W: Wind conditions

In addition to wind strength, wind direction should be recorded.
- 5 No wind, still
- 4 Gentle breeze (<10km/hr)
- 3 Light intermittent wind (<20km/hr)
- 2 Fresh wind, gusting (<30km/hr)
- 1 Strong persistent wind <40km/hr)
- 0 Very strong wind (>40km/hr)

T: Temperature

Estimate the prevailing temperature. Many modern cars have an external temperature gauge.
- 5 Very hot (>40°C) Uncomfortable for humans. Butterfly activity declines
- 4 Hot (35-39°C) Limit of bearable conditions for humans
- 3 Warm (30-34°C) Noticeably warm, peak butterfly activity reached
- 2 Mild (25-29°C) Very pleasant conditions
- 1 Cool (20-24°C) Very few butterflies flying
- 0 Cold (15-19°C or less) No butterflies flying at all, maybe some moths

After the survey the weather component scores can be added as a total out of 20 and multiplied by 5 to give a weather optimality score out of 100.

Weather optimality score = (C+P+W+T) x 5.

Step 3: Allocate an abundance class for each species encountered

In each area selected for surveying, plan a walking route that will cover the entire area with minimal repetition. Walk through the area and count the number of individuals of each species seen (males and females). Multiple counting of individuals may occur but only obvious repetitions of identifiable individuals should be excluded from the count. Depending on the size of an area, the duration of counting can be adjusted. As a rough guide it should take about an hour to survey a hectare. Counts should be done between 9.30 am and 3.30 pm, although in some habitats butterfly activity may be shorter than this, and the counting day should be

reduced. The appropriate abundance class for each species is allocated as follows:

Abundance class	Description of abundance class
5	Description of abundance class
4	More than 50 individuals recorded
3	21-50 individuals recorded
2	6-20 individuals recorded
1	2-5 individuals recorded
0	1 individual recorded

Discussion

The protocol presented here reflects field experience acquired from research and biodiversity surveys conducted by trained observers on diurnal Lepidoptera in Africa. If consistently applied it should yield reproducible results independent of who the observer is. Field testing in future should be used to validate or modify the methods described here. Quantitative surveying is used to assess lepidopteran biodiversity at a site whereas monitoring usually focuses on particular taxa of interest and is used to record trends from season to season and from year to year (Asher *et al.,* 2001; Hellawell, 1991; McGeoch, 2007; Samways *et al.*, 2010). In order to achieve accurate monitoring counting methods have to be specifically designed for the taxa of interest (Edge, 2005), and multiple counts are necessary.

The assessment of prevailing weather conditions may be incorporated in any type of counting of butterflies in the field. There is probably a cut-off level of weather conditions below which counting becomes pointless because lepidopteran activity is too low. Weather stations are often quite far from the locality that is surveyed, particularly in Africa. Furthermore weather conditions on any day may vary considerably even between a locality and a nearby weather station. In coastal areas there can be considerable variation in weather conditions depending on the distance from the coastline. Inland, weather conditions can change radically over short distances because of thundershowers in the savanna, karoo or grassland biomes. Extremely hot and dry conditions can exceed the tolerance level of Lepidoptera and activity significantly declines. The observer should note such conditions and possibly discard the results on such days.

Relative humidity (RH) is not included in the weather assessment proposed here. The response of diurnal Lepidoptera to changes in RH could be an interesting field

of research. Observers can if they wish add RH observations by noting a five-point scale of conditions: 5 = Severely humid RH 100% - your face may be slightly swollen; 4 = Very humid RH >90% - after rain on a very hot day, or in hot coastal areas; 3 = Fairly humid RH >50%; 2 = Dry RH 20-49% - very pleasant conditions; 1 = Very dry RH <20% - dry winter's days on the Highveld or hot dry days in desert areas.

For the assessment of weather conditions the human body can be trained to be quite an accurate measuring instrument. Even though individual variation occurs between observers, the five point scale recommended provides a framework that makes the patterns in abundance versus weather conditions evident, especially if many observations are conducted using this protocol. Lepidopterists can compare their assessments in the field so that over time a consensus on application of the scales will emerge.

The rapid assessment method we propose here is based on experience of African conditions and its often overwhelming wealth of Lepidopteran biodiversity in some places on some days. It can be used by conservation officials, environmental practitioners and recreational lepidopterists to quickly assess the status of a habitat, of specific endangered species at restricted localities, or for measuring species biodiversity as part of an Environmental Impact Assessment. The method can be developed further as more field experience is gained, and it can also be incorporated into protocols for projects such as SABCA (South African Butterfly Conservation Atlas) in the future. Most of all, in an age when time is running out for much of the biodiversity of the planet, such rapid assessments will hopefully benefit conservation of overall lepidopteran biodiversity, as well as the many endangered Lepidoptera species.

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APPENDIX 1

Example of a score sheet

Country: South Africa	
Region: Gauteng Province	
Locality: 7 km South East of Carletonville	
Grid reference: S 2624'54.1" E 02726'27.0"	
Area surveyed: 40000 m^2	
Date: 16 September 2011	
Time interval: 12:00 – 13:00 (1 hour)	
Observer: R.F. Terblanche	
Habitat description	
Topographical: Moderate slope, southern aspect of rocky hill	
Rockiness: Rocks scattered as stones on slope of rocky ridge	
Vegetation: Burnt grass, numerous bare patches, conspicuous diversity of indigenous grasses and forbs. Single exotic *Acacia mearnsii* (>5m) occurs in habitat.	
Subjective estimate of local weather conditions	
C: Cloud cover	5
P: Precipitation	5
W: Wind conditions	4
T: Temperature	3
Total	17
% Weather optimality score	**85**
LEPIDOPTERA ENCOUNTERED	
BUTTERFLY SPECIES	**Abundance class**
Colias electo	1
Danaus chrysippus	1
Junonia hierta cebrene	1
Lampides boeticus	1
Lepidochrysops praeterita	3
Pontia helice	2
Spialia diomus	2
Tarucus sybaris	1
Vanessa cardui	2

Custodians of rare and endangered Lepidoptera (COREL)

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Introduction

The conservation of insects generally and of butterflies in particular has gained momentum in the last few decades in many parts of the world as recent publications show (Pullin, 2005; Samways, 2005; New, 2009; Van Swaay *et al.*, 2009; McGeoch *et al.*, 2011). South Africa has not lagged far behind in this enterprise, and following the establishment of the Lepidopterists' Society of Africa (LepSoc) in 1983 there have been many efforts to alert the authorities and the public at large to the plight of our butterflies (e.g. Henning, S.F. & G.A., 1989, 1996; Edge, 2005a; Henning *et al.,* 2009). LepSoc also participated in the Southern African Butterfly Conservation Assessment (SABCA) project, from which the publication of a revised Red List for butterflies in southern Africa is pending (Mecenero *et al.,* in prep.). This will provide butterfly conservation with an even sounder base of scientifically accumulated data. LepSoc has also gained increasing expertise in butterfly conservation, following research and successful conservation efforts with butterflies such as the Brenton Blue (*Orachrysops niobe*) (Edge, 2011), the Roodepoort Copper (*Aloeides dentatis dentatis*) (Deutschländer & Bredenkamp, 1999), and the Heidelberg Copper (*Chrysoritis aureus*) (Henning & Roos, 1999).

Mecenero *et al.* (in prep.) identify 61 taxa as threatened in terms of the IUCN (2010) categories and criteria (Table 1). Drawing inspiration from SANBI's successful Custodians of Rare and Endangered Wildflowers programme (CREW, 2009), LepSoc has decided to launch a programme called COREL (Custodians of Rare and Endangered Lepidoptera), to promote and ensure the conservation of all butterflies and moths Red Listed as threatened in South Africa. In view of LepSoc's currently limited manpower and financial resources, COREL will initially focus on the Critically Endangered (CR) butterfly and moth taxa, of which there are currently 15, including the moth *Callioratis millari*. Taxa in this category are at imminent risk of extinction, and five of these have been assessed as possibly extinct (Mecenero *et al.*, in prep.). For each CR taxon LepSoc has identified one or more custodians who have agreed to take the primary responsibility for monitoring and preventing extinction of the taxon. The COREL

programme may later be expanded to include CR taxa occurring in the rest of Africa and the Endangered, Vulnerable and Data Deficient butterflies and moths, when resources become available.

Table 1 Threatened South African butterflies (after Mecenero *et al.*, in prep.)

Red List category	No. of taxa
Critically Endangered	14
Endangered	28
Vulnerable	19
Data deficient	8

Threats to Critically Endangered butterflies and moths

The general threats to South African butterflies are dealt with in Henning *et al.* (2009) and Mecenero *et al.* (in prep.), and most of these threats would also apply to moths. Critically Endangered butterflies and moths have already undergone much general habitat loss and fragmentation through a combination of agriculture, forestry, urbanization and mine or industrial developments, and generally have only one or a few extant localities. Even if these localities are saved from destruction, further degradation of habitats can continue through alien plant invasions and loss of natural processes such as fire and herbivore activities. Understanding these endangering processes is of critical importance and requires both an intimate knowledge of the butterfly's or moth's life history and interactions with other organisms, but also the functioning of the ecosystem within which the butterfly or moth occurs. The Brenton Blue experience provides an informative case study on the entire butterfly conservation process and much can be learnt from studying this (Edge, 2011).

Responsibilities of Custodians

Review the status of the CR butterfly or moth

The custodian(s) will gather data from all available sources, and compile a dossier that will include as a minimum:

- Copies of the published reference works on the butterfly or moth
- A brief summary of its conservation history
- A summary of what is known about its life history and ecology
- Number and location of known populations (GPS coordinates)
- A rough estimate of the population size(s)
- Landowner details and land use for each site

- Map of each site showing topography and extent of occurrence of all populations
- Vegetation description as per Mucina & Rutherford (2006) or other sources
- Current or anticipated threats to the butterfly or moth's habitats
- Conservation measures currently in place

Secure the remaining localities and commence monitoring
Some CR butterflies and moths occur in national parks or nature reserves, but most are found on private land. Whichever is the case, it is essential to get the cooperation of the relevant conservation authorities or the landowners. Once this has been secured, custodians need to obtain permission to carry out research, and arrange for ongoing annual population monitoring (counting).

Search for more localities
If no populations are known of or if only one population is extant, custodians need to plan and execute systematic searches for the CR butterfly or moth. Such searches can be informed by species distribution modelling and use of GIS technology, such as employed by Armstrong (2004).

Research
An important function of the custodian(s) is to recruit and lead a team of researchers. A successful campaign will need expertise from several specialist scientists – including botanists, ant experts (where applicable) and ecologists. Universities should be approached to help – research on CR butterflies or moths which can make for wonderful postgraduate research projects. The researcher, in conjunction with the custodian(s) should assess the state of knowledge of the CR butterfly or moth and identify research priorities. Some of the key areas for investigation are likely to be:

- To establish the full details of the life history, including trophic resources of larval and adult stages, as well as interactions with other organisms such as ants.
- Defining all the abiotic and biotic ecological factors that impact on the survival of the CR butterfly or moth population, leading to a description of its unique ecological niche.
- What are the current threats to the surviving populations and how can they best be mitigated?
- Using all the information gained to develop and implement a habitat management plan for each population of the CR butterfly or moth.

Fundraising

The funding needed to conduct the necessary research and later habitat management is to be estimated using the template given in Table 2. It is assumed that the relevant universities will cover the academic costs of the postgraduate students, and that applications for research bursaries will be made. LepSoc is also endeavouring to raise funds for the COREL programme by approaching corporations that have operations in the areas where the endangered Lepidoptera occur. At present the Brenton Blue Trust plays an important role by providing financial support for the Knysna CR butterflies (*Orachrysops niobe*, *Thestor b. brachycerus*).

Regulations for collecting at known localities of CR butterflies or moths

Collecting of CR butterflies or moths at known localities is already restricted in accordance with the LepSoc Code of Conduct, and the LepSoc Council is empowered to establish the "specific conditions" referred to in the Code for each CR butterfly or moth. The custodian(s) for each CR species will recommend to the Council on what these conditions should be and may be authorised to issue permits to persons wishing to obtain specimens for study. If there are existing regulations or legislation or that prohibit or restrict the collecting of specimens such regulations would have to be complied with. All CR taxa will be listed under the new Threatened or Protected Species (TOPS) regulations soon to be introduced by the Department of Environmental Affairs. These regulations will not only restrict collecting of CR species, but more importantly will protect their habitats from alteration as well as destruction.

Table 2 Template to establish a budget for monitoring and research into Critically Endangered butterflies and moths

Expenditure items	Quantity	Budget (R)	2012	2013	2014
Research					
Travel costs for monitoring	km				
Travel costs for new locality searches	km				
Accommodation	nights				
Sustenance*	field work days				
Soil analysis	samples				
Research materials					
Plant identification					
Equipment (e.g. weather recording)					
Habitat management					
Clearance of alien species					
Controlled burns (if appropriate)					
Disturbance simulation**					

* A fixed amount per field work day – currently R150 per person is typical

** Disturbances that enhance and maintain suitable habitat for the target taxon (e.g. Edge *et al.,* 2008)

The Critically Endangered taxa

The Critically Endangered taxa determined during the SABCA project (Mecenero *et al.,* in prep.), plus the CR moth *Callioratis millari*, are listed in Table 3, with the province of occurrence and the custodians appointed by LepSoc. Three of these taxa occur in Limpopo, one in Mpumalanga, one in KwaZulu-Natal and ten in the Western Cape. Brief notes on each taxon follow; more details can be found in Henning *et al.* (2009), Mecenero *et al.* (in prep.) and Staude (2011), as well as the LepSoc website www.lepsoc.org.za.

Table 3 Critically Endangered South African butterflies and moths (Mecenero *et al.,* in prep.; Staude, 2011)

CR taxa (*possibly extinct)	Province	Custodian(s)
Alaena margaritacea	Limpopo	D McDermott/ A Coetzer
*Anthene crawshayi juanitae**	Limpopo	R F Terblanche
Callioratis millari	KZN	H S Staude
Chrysoritis dicksoni	W Cape	R F Terblanche/ D A Edge
Chrysoritis rileyi	W Cape	R F Terblanche/ H E Selb
Chrysoritis thysbe schloszae	W Cape	H E Selb
*Dingana fraterna**	Mpumalanga	G A Henning
*Erikssonia edgei**	Limpopo	J C H Dobson/ O G Garvie
Kedestes barberae bunta	W Cape	A Morton
Orachrysops niobe	W Cape	D A Edge
*Stygionympha dicksoni**	W Cape	J B Ball
Thestor brachycerus brachycerus	W Cape	E A Bazin/ D A Edge
*Trimenia malagrida malagrida**	W Cape	A J Claassens
Trimenia malagrida paarlensis	W Cape	A Morton/ H E Selb
Trimenia wallengrenii wallengrenii	W Cape	J B Ball

The following brief accounts of the butterfly and moth CR taxa are summarised from Henning *et al.* (2009) and for *C. millari* from Staude (2001; 2011).

Alaena margeritacea Eltringham, 1929

This species occurs in a very restricted area near a plantation in the vicinity of Haenertsburg on the Wolkberg, where it flies in December/ January. The habitat is on steep grassy slopes strewn with lichen-covered rocks, on which the females lay their eggs so the larvae can feed on the lichen (Clark & Dickson, 1971). The breeding area is about 400 m below the peaks and adult males do some 'almost-hilltopping' near midday when they congregate at the higher rocks above the colony. There are reports of a second colony in the vicinity and efforts will be made to relocate it, and other suitable habitat, this year. The main threat is that the habitat is becoming overgrown with alien trees escaping from the adjacent pine

plantation. *Eucalyptus* species are also established higher up on the hill, and contribute to drying out the natural seepage. Suppression of natural fires by the plantation owners is also detrimental since this type of grassland is fire-dependent. Conservation of this butterfly is therefore critically dependent on securing the co-operation of the landowners. A buffer zone of natural, managed vegetation has to be urgently established around the habitat, with removal of all alien trees. The management plan will further have to incorporate regular burning of the habitat and its surrounds. If other colonies or suitable areas of habitat are found they will in addition need to be managed and plans made to re-establish connectivity between all the habitat patches.

Anthene crawshayi juanitae Henning & Henning, 1993

This taxon has only been encountered once, at Manoutsa Park north of the Abel Erasmus Pass in Limpopo, and the type series of one male and five females are the only specimens in existence.The habitat is in riverine forest on the banks of the Olifants River and the vegetation type is Granite Lowveld SVl3 (Mucina & Rutherford, 2006). Two of the female specimens were captured while sucking fluid from wet mud, with the other specimens being found as pupae under a rock. The taxon must be viewed as extremely rare since the area has been regularly visited by lepidopterists over a long period. The type locality may be under threat from development of further recreational facilities, and its protection as a butterfly conservation area should receive urgent attention. Identification and search of similar potential sites also needs to be conducted.

Callioratis millari Hampson, 1905

This species disappeared from its type locality near Kloof, KwaZulu-Natal *circa* 1928, and was regarded as extinct until rediscovered in the Entumeni Nature Reserve 120 km further north in 1997. This remains the only known locality, with an area of occupancy of less than 1 km^2 and a very small adult population (<50). After Staude's (2001) discovery of the cycad host plant *Stangeria eriopus*, early stages and basic habitat requirements, focussed searches of all known likely localities from Mtwavuma Reserve in the south to Ngoye Forest Reserve in the north of KwaZulu-Natal, have so far been unsuccessful (Staude, unpublished reports to KZNNCS, 1999, 2000, 2001). *C. millari* is restricted at Entumeni to two small patches of Moist Ngongoni Grassland about 500 m apart surrounded by forest, cultivated land or unsuitable drier grassland. The species is reasonably well established in only one of these patches. Staude (2001) assessed the conservation status of *C. millari* as Endangered. A population monitoring programme initiated by Ezemvelo KZN Wildlife relies on egg counts (Armstrong & Louw, 2011). The population of the host plant *Stangeria eriopus* has been increased by transplanting

specimens both at the main habitat patch and in the nearby grassland. Critical habitat management goals are to maintain an appropriate fire regime, prevent excessive grazing and trampling pressure from zebra and other game and to control alien plants. KZN Wildlife have a longer-term goal to establish the species at other seemingly suitable localities (Armstrong & Louw, 2011).

Chrysoritis dicksoni (Gabriel, 1947)

Historically this butterfly occurred between Melkbosstrand and Atlantis on the west coast north of Cape Town (three colonies, now all apparently 'extinct'*). A large and variable number of small populations, constituting a metapopulation, currently occur over a large area north of Witsand near the mouth of the Brede River. The adult males fly from the end of July until mid September in relatively open sandy areas, settling on low vegetation and establishing small territories. Females are more wide ranging, and lay their eggs on a variety of substrates (Edge & Terblanche, 2010). The vegetation at the Witsand habitat has been identified by Edge & Terblanche (2010) as Canca Limestone Fynbos FFl3. The life history was investigated by Clark & Dickson (1971) and Heath & Brinkman (1995). A research programme is currently being conducted as described by Edge & Terblanche (2010) and includes developing counting methods for the adults, accumulating oviposition observations, vegetation surveys at the sites of male and female adult activity, searches for larvae and pupae, and sampling of ants and homopterans at oviposition sites. The immediate threat was perceived to be alien trees *Acacia cyclops* (Rooikrans) on part of the site, and control is being implemented by the landowner.

Chrysoritis rileyi (Dickson, 1966)

In the 40 years since its descripton *C. rileyi* has still only been recorded from its type locality near the east side of the Brandvlei Dam southwest of Worcester. The habitat is a few hectares in extent at an altitude of about 300 m on gentle west-facing sandy slopes, with deep erosion channels. The sparse vegetation has been classified as Breede Sand Fynbos FFd8 (Mucina & Rutherford, 2006). Less than 200 adult individuals emerge even in a favourable year and the species was last observed in good numbers in 2005. Adults fly energetically among short bushes and are often seen feeding on mesembryanthemum flowers. The early stages are little known, with the larval food being variously reported as species of *Thesium* (Heath *in* Pringle *et al.,* 1994) or *Aspalathus* (Schlosz *in* Heath, 1997). The associated ant is *Crematogaster peringueyi* (Heath, 1997). Continued property and agricultural developments in the area constitute major threats, and the presence of a quarry in the vicinity has also impacted on the habitat. It is therefore of critical importance adequately to conserve the type locality, which is on private land.

Chrysoritis thysbe schloszae (Dickson, 1994)

This butterfly is only known from its type locality (< 1 km²) near Koringberg north of Cape Town, and the surviving population is very small (<50 adults emerging per brood). The habitat is a small remnant of Swartland Shale Renosterveld FRs15 (Mucina & Rutherford, 2006) on a low rocky hill (< 450 m) surrounded by wheat fields. The adults mostly emerge in October and March, and whereas the males have a short, low, whirling flight, settling on low vegetation or on the bare ground, the females are rarely seen. Nothing is known of the life history or ecology of this butterfly. The whole region has been severely impacted by increasing aridification, possibly as a result of by climate warming. Pesticide use on the surrounding wheat fields has also in all probability taken its toll. Natural fires and grazing no longer occur, leading to an invasion of agricultural cultivars and grass into ever higher levels on the low hill. Conservation measures are urgently needed to prevent imminent extinction and the co-operation of the local farmers is essential. Such measures would include population monitoring, an autecological study to determine the habitat requirements of the taxon, eradication of alien invasive species, and establishment of appropriate fire and grazing regimes.

Dingana fraterna Henning & Henning, 1996

Also only known from its type locality southwest of the town of Stoffberg, Mpumalanga, at an elevation of 1,600 to 1,700 m. The habitat is situated on the south to southeast-facing slopes of a steep rocky ridge near the base of a deep valley at the eastern escarpment of the highveld plateau. This rocky grassland is interspersed with *Protea* bushes, and the vegetation type is Rand Highveld Grassland Gm11 (Mucina & Rutherford, 2006). Extensive exploration of the Stoffberg area by lepidopterists in recent years has so far not yielded any more localities. Adults only fly early in the morning for about 10 days in early October, with fewer than 10 individuals having been observed each day. Females lay their eggs on an (unknown) grass species. The population appears to be stable from year to year, but potential threats include inappropriate fires and airborne pollutants from mining operations which could degrade the habitat. Ecological research needs to be done on this species to determine the reasons for its restricted distribution before a management plan is established.

Erikssonia edgei Gardiner & Terblanche, 2010

This species was only recently recognised and described (Gardiner & Terblanche, 2010), and is only known from its type locality (<1 km²) at the northwestern base of Perdeberg hill near Jan Trichardt's Pass in the Waterberg mountains of Limpopo (Edge, 1982). The habitat is grassy savanna (Dobson & Garvie, 2005), and the

vegetation type is Central Sandy Bushveld SVcb12 (Mucina & Rutherford, 2006). Trees found at the habitat include *Ochna pulchra*, *Burkea africana* and *Protea caffra*. The life history was described by Henning & Henning (1984), and the larval food plant is *Gnidia kraussiana,* with the larvae being tended by ants of the genus *Lepisiota*. Adults have been recorded from November to February. De Wet (1995) conducted research and observed an increase in numbers of adults after introducing a veld-burning programme. In recent years absence of veld-burning or grazing has resulted in the type locality becoming overgrown by a dense sward of tall grass, which has shaded out the larval food plant (Dobson & Garvie, 2005). Consequently the butterfly seems to have become extinct at the type locality, which is on private property. No other localities have yet been found despite exploration by lepidopterists and conservationists in the Marakele area. No conservation measures are currently in operation, and with the cooperation of the landowner at the type locality veld-burning must be reinstated, in conjunction with intensive searching for other populations.

Kedestes barberae bunta Evans, 1956

This subspecies is now restricted to two small localities near Strandfontein on the Cape Flats near Cape Town, 8 km north of its type locality near Steenberg where it went extinct (Dickson & Kroon, 1978). The localities are east and west of the junction between the M17 and R310 roads. The habitat consists of stands of the larval host plant *Imperata cylindrica* growing in damp seeps between the dunes. The vegetation type is Cape Flats Dune Strandveld FS6 (Mucina & Rutherford, 2006). An investigation by Allan (2004) showed that the total area of potential habitat at these two localities and in adjacent areas is less than 10 hectares. Adults fly from early September to the middle of October, and are seldom found far from the larval host plant. Threats to the remaining localities are housing developments, road construction, alien vegetation, and too frequent fires. Changing climate, causing greater and earlier drying of the seeps of adequate quality may also be a factor (Henning *et al.*, 2009). CapeNature is currently conducting further research to assess its conservation status, but as yet no conservation measures have been implemented. These should include restriction of further development in the area, clearing of alien vegetation at the remaining suitable *Imperata* sites, small mosaic block burns at greater intervals, and selective fencing (Allan, 2004). The five hectares of apparently suitable *Imperata* habitat which falls within reserves, namely the Rondevlei Nature Reserve (a municipal reserve) and the Driftsands Nature Reserve (CapeNature), should be prioritised.

Orachrysops niobe (Trimen, 1862)

This species now only occurs at one very small locality (1.4 ha) at Brenton-on-Sea in the southern Cape. The population at Nature's Valley (about 30 km east of

Plettenberg Bay) went extinct in the late 1980s owing to housing development (Ball, 1997). The Brenton-on-Sea locality was proclaimed as a Special Nature Reserve (SNR) in July 2003. It is situated at *c*. 100 m above mean sea level on a south-facing slope about 500 metres from the sea. The habitat is Knysna Sand Fynbos FFd10 (Mucina & Rutherford, 2006), and the SNR consists of a mosaic of thicket and fynbos, with the larval host plant *Indigofera erecta* usually occurring in the shade of candlewood trees, *Pterocelastrus tricuspidatus* (Edge *et al.*, 2008). Adults emerge in November and February and the later instar larvae feed on the rootstock of the host plant, tended by *Camponotus baynei* ants. Since 2001, the adult population at the SNR has fluctuated between 50 and 250 individuals per brood (Edge, 2005b). All current threats to the species have been identified and mitigated, but there are longer term-threats such as the loss of genetic diversity, extreme climatic events, runaway fires, and global warming. The SNR is being managed by a management committee established by the Brenton Blue Trust with representatives from all stakeholders, in accordance with a management plan, which is continuously being refined by research (Edge, 2008). The ongoing research focuses on continued population and habitat monitoring; determination of ant nest distribution; increasing the *I. erecta* population, and expanding the reserve onto neighbouring properties. Re-introduction of *Orachrysops niobe* to its former habitat at Nature's Valley is being attempted, without success so far (Edge, 2007).

Stygionympha dicksoni (Riley, 1938)

This species was last known to occur on the Kapokberg just south of Darling, in the Swartland of the Western Cape. The type locality was in the gullies on the southern and western flanks of the Tygerberg Hills, east of Cape Town, which was progressively being destroyed by housing developments and quarrying. The vegetation at the type locality was Swartland Shale Renosterveld FRs9 (Mucina & Rutherford, 2006), but at the Darling locality it is Swartland Granite Renosterveld FRg2 (Mucina & Rutherford, 2006). More than 70% of the original extent of renosterveld vegetation types has been replaced by agriculture (Cowling & Richardson, 1995). Adults emerge in early September and favour the higher western and southern slopes of hills (Pringle *et al*., 1994). There has been a declining population trend over the last 30 years. *Tribolium echinatum* has been recorded as a larval host plant (Dickson *in* Pringle *et al.,* 1994), but little else is known about its ecology. Habitat degradation and fragmentation due to farming, invasive alien vegetation, housing and mining are the major threats, although a warmer and drier climate may lead to renosterveld being replaced by Succulent Karoo vegetation (Van Wyk & Smith, 2001). If populations can still be found, considerable research is needed on this species, into its life history, ecology and population dynamics. Searches for new localities should also receive high priority.

Thestor brachycerus brachycerus (Trimen, 1883)

This taxon has only been recorded from the eastern Knysna Heads. Earlier it was quite widespread, but urban, agricultural and leisure developments have decimated its populations. Two viable populations remain adjacent to the Pezula Golf Estate, and there may still be other small scattered populations elsewhere. The preferred habitat is on north-, northeast- and northwest-facing slopes with low vegetation and open sandy soil (Edge, 2005a), and the vegetation type is Knysna Sand Fynbos Ffd10 (Mucina & Rutherford, 2006). Adults fly in December and January, with the males establishing small territories where they perch. Females are wider ranging and oviposit on a range of organic and inorganic substrates, including at least seven different plant species (Bazin & Edge, unpublished observations). The first-instar larva was illustrated by Clark & Dickson (1971), and may be aphytopaghous. Many localities have already been destroyed by plantation forestry (earlier years) and ongoing housing, road and golf course development. Further threats are from regular veld-burning and high-intensity sheep grazing across the agricultural parts of its former range. The only conservation measures in place are the undertaking by the owners of Pezula not to disturb the known localities (Edge, 2005a). An intensive research programme has recently been launched by E.A. Bazin and D.A. Edge, which will inter alia include:

- Developing counting methods for the adults
- Oviposition behaviour
- Vegetation surveys to compare sites and identify critical site characteristics
- Detailed mapping of the site to establish resource requirements
- Sampling to establish the ant assemblages
- Searching for larvae and pupae in ants' nests
- Sampling of homopterans at egg sites
- Stable isotope analysis to establish trophic interactions
- Experimental management methods – fire, cutting
- Locating other populations

Trimenia malagrida malagrida (Wallengren, 1857)

This subspecies has not been seen at its last known locality on the western side of Lion's Head in Cape Town since the mid-1990s, and it is feared that it is now extinct (Claassens, 2000). It used to occur at other localities on the Table Mountain Range (e.g. Llandudno). The habitat was on west-facing slopes at altitudes of 250 to 350 m, with fairly open rocky ground and short vegetation of the type known as Peninsula Granite Fynbos FFg3 (Mucina & Rutherford, 2006). The adults flew from late January to early April making short jerky flights, settling on the ground,

rocks, grasses or other vegetation. Favourite nectar sources were pink-flowered *Mesembryanthemum* and *Cuscuta* species. Between 20 and 50 adults used to be observed per season in the late 1980s (J.B. Ball, pers. obs.). Little is known of the life history of this butterfly, but the first instar larvae do not appear to feed on plant material and may be exclusively aphytophagous (Clark & Dickson 1971), with an obligate ant association. The most likely cause of its demise is thought to have been repeated intense mountain fires during the butterfly's late summer flight period in the mid-1990s (Claassens, 2000). These fires were intensified by the presence of alien vegetation, and the reluctance on the part of the authorities to allow controlled burns before the fuel load got too great. Invasive alien vegetation (*Eucalyptus* trees) also destroyed the locality at the Apostle Batteries above Llandudno. Searches continue however, in the hope of finding another population somewhere along the western side of the Table Mountain range.

Trimenia malagrida paarlensis (Dickson, 1967)

This subspecies used to occur on Paarl Mountain, where it now appears to be extinct, and is at present only extant at two small localities on the Perdeberg (Paardeberg) some 20 km to the north-west. These localities are high up, each *c*.0.5 ha and are about 1 km apart, near some rocky outcrops, with some bare ground. Both mountains support the vegetation type Boland Granite Fynbos FFg2 (Mucina & Rutherford, 2006). Adults fly from December to March, with the peak in February and March, a time when the fire hazard is most significant. Probably less than 150 adults emerge every season, based on observations over the past decade. Oviposition has been observed on an *Aspalathus* species (Swanepoel, 1953), although the larvae are probably aphytophagous with an intimate ant association, as has been noted in another subspecies, *Trimenia malagrida maryae* (Heath & Brinkman, 1996). Severe invasion of alien vegetation and too frequent fires in late summer/autumn probably led to the demise of the Paarl Mountain population. Alien vegetation has not yet become a serious threat on the Paardeberg since it is in a nature conservancy (formed by a group of local farmers), but dense alien vegetation forms a ring around the lower part of the Paardeberg mountain, posing an ever-increasing fire risk. The western Paardeberg locality is very overgrown by natural vegetation (and probably needs a localised and carefully timed burn), but the smaller eastern locality is currently not overgrown. The Paardeberg conservancy needs to be persuaded to clear all alien vegetation and to institute an appropriate regime of mosaic burning. Ongoing monitoring and research into the life history and ecological interactions of this taxon are urgently needed.

Trimenia wallengrenii wallengrenii (Trimen, 1887)

The last two known localities for this taxon are on privately owned farms on the Kapokberg and the Contreberg near Darling in the Western Cape. Both localities are

about 700 m^2 in extent each, and occur on the southwestern side towards the summit of the mountains. Historically there were populations near Stellenbosch and north of Mamre. The vegetation at the extant localities is Swartland Granite Renosterveld FRg2 (Mucina & Rutherford 2006), and like most renosterveld vegetation is threatened (Cowling & Richardson, 1995), principally by urban development and wheat farming. Places where it has survived are situated on rough, rocky or steep ground which have escaped the plough. The adult butterflies emerge in November and fly low and fast in open areas. The Kapokberg locality does not exceed 50 adults per flying season, whereas at the Contreberg site there were around 100 adults in November 2003 (J.B. Ball, pers. obs.). The life history is unknown, but the larvae are probably aphytophagous, with an obligate ant association. The past and present threats are habitat destruction and degradation from agricultural activity and invasive alien vegetation, with cultivated areas sometimes extending up to the borders of the existing colonies. Fires can also be devastating when the adult butterflies are on the wing. Habitat fragmentation is already severe at the Darling sites and may worsen in the near future if no conservation action is taken. Cooperation of the landowners is crucial, not only to secure the known localities, but also to create corridors for movement of adults between the sites. Ongoing monitoring of populations and research into the life history and ecological interactions of this taxon are essential to inform conservation efforts.

Conclusions

Many of the South African butterflies listed as Critically Endangered in the new Southern African Butterfly Conservation Atlas are very close to extinction, or may already have gone extinct. The COREL programme is a response to this desperate situation and a call for immediate action by all persons and organisations dedicated to biodiversity conservation. It is also an appeal to both institutional and corporate funders to support this programme by making resources and funding available to prevent the tragic loss of these beautiful and charismatic emblems of our country's amazing natural riches.

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Taxonomic issues between *Chrysoritis lyndseyae* (S.F. Henning) stat. rev. and *C. thysbe bamptoni* (Dickson) (Lepidoptera: Lycaenidae: Aphnaeini)

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ABSTRACT

Chrysoritis lyndseyae (S.F. Henning, 1979) is here reinstated as a valid species (stat. rev.). Previously synonymized with *C. thysbe bamptoni* (Dickson, 1976) by Heath (2001), it is shown to differ from that taxon by the wing phenotype of the majority of specimens, as well as by virtue of its male patrolling behaviour. These differences are further supported by provisional molecular evidence. Both of these taxa as well as *C. perseus* (W.H. Henning, 1977) occur together in some localities and they are now known to share the same foodplants and ant-associate. Most specimens are readily identified as one of these three, but some material cannot be separated on morphological grounds with certainty. No difference in UV reflectance has been detected between the three taxa; this together with the other morphological similarities suggests that mate recognition between sympatric populations might rely heavily on pheromones. Typical and intermediate specimens of *lyndseyae* and *bamptoni* are illustrated; also juvenile stages of the former.

INTRODUCTION

Chrysoritis lyndseyae stat. rev. was described (as *Poecilmitis*) by S.F. Henning (1979) based on specimens taken from a locality "10 km north of Wallekraal". It was synonymized with *Chrysoritis thysbe bamptoni* (Dickson) on morphological grounds by Heath (2001). The type locality of the latter taxon was stated as "18 km east of Hondeklip Bay". This synonymy was briefly discussed and upheld by Heath & Pringle (2007: 16), as the wing phenotypes of some specimens were intermediate between *lyndseyae* and *bamptoni*, also that most of the characters in the description diagnosis of *lyndseyae* were shown to be labile and not representative of material from the type locality.

It was later observed by the author on subsequent visits to the area north and west of Wallekraal that some males patrolled the tops of low earth mounds and other prominences, whilst others established their territories on adjacent flat or depressed areas. Years earlier at these localities and elsewhere *Chrysoritis* specimens or their legs had been placed in vials of alcohol and sent to Harvard University for DNA analysis as part of a phylogenetic study of *Chrysoritis* that is still in progress. It has been known for many years (pers. obs.) that males of *C. thysbe* patrol prominences (see also Heath & Fisher, 2010: 113); hence there appeared to be an anomaly in the

behaviour of some males at the type locality and surrounding areas. In 2007 an attempt was made to quantify this anomaly, and re-evaluate the status of *C. lyndseyae* stat. rev., also to add life history information to that already known for the genus (see Heath *et al*., 2008).

Note the actual type locality of *bamptoni* is 8.6 km E of Hondeklip Bay as shown by I. Bampton to this author (pers. comm.) and not 18 as indicated on the holotype label. He also accompanied the author to the type locality of *lyndseyae* north of Wallekraal.

A study by Espeland *et al.* (2010) shows that Vapona, containing dichlorvos (DDVP), damages DNA in insect collections within a few months of exposure. The author's collection has been exposed to Vapona for many years, hence successful DNA extraction, particularly on older specimens, is unlikely.

MATERIALS AND METHODS

Several visits were undertaken in August through October 2007 to the general area of Hondeklip Bay - Wallekraal, particularly locality 1: 8.6 km east of Hondeklip Bay (30°20.27'S: 17°21.66'E, the actual type locality of *bamptoni*) and locality 2: 8–10 km north of the Wallekraal-Soebatsfontein tee-junction, near Wallekraal (29°56.47'S: 17°09.44'E, the type locality of *lyndseyae*), to assess more closely the difference between the phenotypes at the different localities. A further locality on the Hondeklip Bay road and situated at the tee-junction with a gated track leading south to Groenriviersmond, locality 3: 6.4 km ESE of locality 1, (30°21.18'S: 17°25.57'E) was also included in this study. Localities 1 and 3 are now securely fenced and included in the West Coast National Park. Locality 3 has ample flat and depressed terrain, interspersed with several low mounds, and some large dunes set well back from the track.

For this study the patrolling site of each male captured was noted, i.e. whether captured on a mound or on flat ground. The assessment was subjective in that each specimen was compared to the holotypes of *C. t. bamptoni* and *C. lyndseyae*, respectively. Legs from the latter individual (collected in December 1977) were sent to Harvard University, USA for mitochondrial DNA extraction and sequencing.

Specimens of *C. t. bamptoni, C. perseus* and *C. lyndseyae* stat. rev. were sent to the School of Physics, University of Exeter, UK to assess the comparative UV reflectance of these species.

RESULTS

The *C. lyndseyae* legs sent to Harvard University proved too old for DNA extraction, the holotype having been collected by S.F. Henning 34 years earlier. At locality 3, on both sides of the Hondeklip Bay–Wallekraal road, the phenotypes of males were

very variable. On aggregate, male specimens from there, collected on low mounds as well as on the larger dunes were found to differ significantly in their phenotype from those taken on flat ground. On males from flat ground (*n*=15) the forewing 'solid blue' extended marginally closer to the apical spots with fingers of iridescence extending between the apical spots; these specimens conformed well to the type specimen of *C. lyndseyae* stat. rev. Males collected from the mounds (*n*=25) had marginally less blue on the forewing and conformed more closely to the type of *C. t. bamptoni*.

The wing phenotypes were readily identified in most fresh dark specimens where the postdiscal margin of 'solid blue' of the forewing was clearly defined against the dark background. In many other more lightly marked or worn individuals the phenotypic characters were more difficult to assess, these phenotypes merging seamlessly between the two taxa (see also Heath & Pringle, 2007, p.16 & slide 25). The taxonomic assumptions based on morphological evidence above were supported by provisional data from an unpublished molecular analysis in 2006 by J. Fleming and later by Z.A. Kaliszewska (both at Harvard University).

The molecular analysis also confirmed the identification of specimens shown in Plates 1 and 2, thereby highlighting the plasticity of the phenotypes. Females of both taxa are also variable, particularly the underside, and are impossible to separate on morphological grounds. Some older specimens in the Heath collection collected from near Soutfontein (30°35.57'S: 17°30.95'E), from near Kotzesrus (30°56.21'S: 17°51.38'E) and at Groenriviermond (30°51.87'S: 17°35.52'E) resemble *lyndseyae* from the Wallekraal area. DNA extraction from these specimens was unsuccessful as they had been exposed to Vapona for several years (see Espeland *et al*., 2010). As a result their identity can no longer be determined by molecular means, but some of them (see Plate 3) appear to conform well to the holotype of *C. lyndseyae* stat. rev.

This study shows that males of *bamptoni* and *lyndseyae* sometimes establish their territories within a few metres of each other. In view of their overlapping phenotypes, the shared foodplants and ant-associate, it had earlier been concluded that they were conspecific (Heath & Pringle, 2007). The above observations on adult phenotype and provisional results of a molecular analysis have now provided compelling evidence that this is incorrect, and that two species are involved.

Distribution: *Chrysoritis lyndseyae* stat. rev. has been recorded at localities 2 and 3 with a single confirmed record from locality 1, but it probably occurs at other suitable places nearby and may even be found in outlying localities as far as Groenriviermond. To confirm or dismiss such an extended distribution would require further molecular analysis, in addition to that still in progress.

UV Reflectance: An unpublished report by Jackson & Fell (2008) gave very similar accounts for *bamptoni*, *lyndseyae* and *perseus* as follows:

- **Dorsal**: Areas which appear blue iridescent under visible light reflect UV

light strongly. Small white patches along edges of forewings reflect UV also. Areas that appear black or orange under visible light absorb UV completely.

- **Ventral**: Areas that appear brown or orange absorb UV. Silver spots on forewings reflect UV strongly. Any areas appearing white or silver under visible light also reflect UV. Light brown/white edges on bottom of forewings reflect UV slightly.
- **Juvenile stages**: Plate 4 shows larvae of *C. lyndseyae* stat. rev. The upper picture shows two second-instar larvae inside a partly opened sand and silk shelter with an ant attending the Dorsal Nectary Organ (DNO) of one of them. The lower picture is of a final (6^{th}) instar larva attended by an ant, also a partly obscured pupa. Both pictures were taken at Locality 2; the ants were *Crematogaster peringueyi* For. (Myrmicinae) and the foodplant in both cases was a species of *Thesium* (Santalaceae). Other foodplants recorded by the author are *Osteospermum incanum* (Burm. f.) Norl. (Asteraceae) and *Roepera teretifolia* (Schltr.) Beier & Thulin (Zygophyllaceae).

CONCLUSION

This study shows that males of the two taxa sometimes establish their territories within a few metres of each other. In view of their overlapping phenotypes and shared foodplants and ant-associate, it had earlier been concluded that they were conspecific. The phenotypic observations above supported by provisional molecular data now show this to be incorrect, and that two species are involved, hence *C. lyndseyae* stat. rev. is here reinstated as a valid species.

The UV reflective intensity was reportedly the same for *bamptoni*, *lyndseyae* and *perseus* (Jackson & Fell, 2008). Male and female genitalia are indistinguishable in all three taxa (Heath, 1997).

In view of all the morphological and behavioural similarities discussed above, mate selection is probably dominated by pheromones, coupled with male territorial preferences, as visual recognition seems unlikely for either sex. The probability of hybrids occurring might be high in the areas of frequent contact in view of the many characteristics that the three taxa have in common.

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The geometrid moth *Afrophyla vethi* (Snellen, 1886) transferred from Oenochrominae to Sterrhinae (Lepidoptera: Geometridae)

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Abstract

The geometrid moth *Afrophyla vethi* (Snellen, 1886), which is found in sub-Saharan Africa, Yemen and Madagascar, has historically been assigned to the subfamily Oenochrominae. This association was questioned in a recent molecular study, where it was placed in the subfamily Sterrhinae. We provide morphological evidence, particularly from the male and female genitalia and tympanal organs, that is congruent with the molecular data, and reclassify *A. vethi* in the subfamily Sterrhinae, tribe Rhodometrini (new combination). Adults and genitalia of both sexes of *A. vethi* are illustrated for the first time, and these are compared to the similar species *Rhodometra sacraria* (Linnaeus, 1767) and *Casilda antophilaria* (Hübner, [1813]).

Key words:

Afrophyla, Rhodometrini, Africa, taxonomy, systematics.

Introduction

The family Geometridae (inchworms or loopers), which occurs worldwide in terrestrial habitats supporting plant life, is one of the two most diverse families of Lepidoptera, with approximately 23000 described species (Scoble, 1999; Scoble & Hausmann, 2007). Approximately 18000 of these have been described before 1940, prior to the time when the more revisionary and comparative, or modern taxonomy arose (Gaston *et al*., 1995; Scoble *et al*., 1995). Consequently, many species were placed in generic and higher taxon combinations that were not critically assessed, partly because the diagnosis was based on external characters alone. The study of genitalia, which allowed for more accurate taxonomical conclusions to be made, did not become a common practice until around the early 1940s. This, and other more recent methodological improvements, have improved

the classification of the Geometridae.

Afrophyla vethi (Snellen, 1886) is a geometrid moth described from Angola before the rise of modern taxonomy. It has undergone a taxonomic history typical of many non-European species – after description it did not receive much attention and its systematic position has not been critically assessed.

Summary of the taxonomic history of *A. vethi*:

- 1886. *Panagra vethi* Snellen, 1886, is described (Snellen, 1886). Description is detailed although based only on external characters. The species is assigned to the genus *Panagra* Guenée, [1858] in the geometrid subfamily Oenochrominae. *Panagra* is nowadays considered a junior subjective synonym of *Epidesmia* Duncan [& Westwood], 1841, and it is placed in the Oenochrominae (Scoble, 1999).
- 1895. The monotypic genus *Afrophyla* Warren, 1895, is described (Warren, 1895). Its type species is *A. dichordata* Warren, 1895, from East Africa. *Afrophyla* is described in isolation, i. e., without any reference to other genera or its unique, derived features. Warren places *Afrophyla* in the Oenochrominae.
- 1910. Prout transfers *Panagra vethi* Snellen, 1886, to *Afrophyla* and proposes *Afrophyla dichordata* Warren, 1895 to be a junior synonym of *Panagra vethi* Snellen, 1886 (Prout, 1910). As a result, *Afrophyla vethi* (Snellen, 1886) becomes the type species of the genus *Afrophyla*. Prout notes that *A. vethi* is possibly misplaced in the Oenochrominae, perhaps having affinities with the genus *Palaeaspilates* Warren, 1894 (Sterrhinae).
- 1912. Prout (1912) follows his earlier classification (Prout, 1910) and places *A. vethi* in the Oenochrominae.
- 1929. *Afrophyla vethi* ssp. *meloui* Prout, 1929 is described from Madagascar. Prout (1929–35) places the species in the Oenochrominae.
- 1935. Janse (1933–35) illustrates and describes *A. vethi* in detail, including the venation and lateral view of the male genitalia. The species is placed in the Oenochrominae.
- 1935–2002. *Afrophyla vethi* (Snellen, 1886) is considered an oenochromine moth (e.g. Pinhey, 1975; Vári & Kroon, 1986; Scoble, 1999; Staude, 1999; Vári *et al.*, 2002).
- 2011. Sihvonen *et al*. (2011) include *A. vethi* as a representative of an oenochromine moth in a molecular analysis aimed at resolving the phylogenetic relationships of the Geometridae in a global context. *A. vethi* groups together with the sterrhine tribe Rhodometrini. The

Cosymbiini, Timandrini, Lythriini and Rhodometrini, which are the most closely related taxa, are represented in the analysis by one species each only. Therefore the more accurate position within the Timandrini lineage of the Sterrhinae (see Sihvonen & Kaila, 2004) was not exhaustively tested. *Epidesmia* Duncan [& Westwood], 1841 is placed in the Oenochrominae + Desmobathrinae complex, and is therefore not closely related to *A. vethi*.

The Oenochrominae, as historically constituted (e. g. Prout, 1910), are an unnatural group largely encompassing genera that cannot be placed in any other geometrid subfamily. To overcome this, Scoble & Edwards (1989) proposed a strict definition for the Oenochrominae, including in this taxon the robust-bodied and almost exclusively Australasian moths belonging to *Oenochroma* Guenée, [1858], and a few similar genera. When the putative Oenochrominae species were examined against the strict definition, it was found that many, especially the non-Australasian taxa, have been misplaced. These included, for instance, the African *Aletis* Hübner, 1816, currently placed in the Sterrhinae (Holloway, 1996; Sihvonen, 2005) and the Palaearctic *Epirranthis* Hübner, 1816, currently placed in the Ennominae (Kullberg *et al*., 2001; Sihvonen *et al*., 2011). The affinities of numerous putative Oenochrominae taxa remain to be examined in the modern context; therefore these artificial groupings are still likely to exist in the literature.

In this paper we propose a new systematic position for *A. vethi*, based on morphology, and illustrate the species in a modern way for the first time, including its genitalia.

Materials and methods

A comparative morphological method was used to examine the systematic position of *A. vethi*. We restricted our detailed comparisons to the Oenochrominae, following the earlier classifications, and to the Timandrini lineage of the Sterrhinae, following the molecular results of Sihvonen *et al*. (2011). Both authors are well-experienced in the systematics of the Geometridae, and this wider knowledge enabled us to exclude associations with the other Geometridae subfamilies and the Scopulini lineage of the Sterrhinae, although those taxa are not explicitly listed in Table 1.

The detailed morphological examinations of studied taxa included external and genitalia characters. Genitalia terminology follows Klots (1970) and the genitalia dissection methodology follows Hardwick (1950) and Sihvonen (2001). Specimen data are presented as they appear on the labels: a forward slash separates

lines; a semicolon separates labels; and information enclosed by square brackets provides further details about the specimen or label.

Institutional acronyms are as follows: BMNH = The Natural History Museum, London, United Kingdom; FMNH = Finnish Museum of Natural History, Helsinki, Finland; HSS = private collection of Hermann S. Staude, Magaliesburg, South Africa; Sihvonen = private collection of Pasi Sihvonen, Veikkola, Finland; TMSA = Ditsong National Museum of Natural History, Pretoria, South Africa; SAM = Iziko South African Museum, Cape Town, South Africa.

Systematic position of *A. vethi*

Based on morphology, *A. vethi* is not an oenochromine moth but a member of the tribe Rhodometrini in the subfamily Sterrhinae, agreeing with the molecular results of Sihvonen *et al*. (2011). *A. vethi* does not externally resemble the traditional Rhodometrini taxa (i.e. the genera *Rhodometra* and *Casilda*) but other structural features are similar. The most notable of those include the enlarged base of the sacculus that is setose or spinose; the apex of the valvae, which is setose or spinose; the presence of a narrow, ring-shaped structure, which is located ventrally between the valvae; elongated vinculum arms; the central flap of the tympanic ansa is enlarged and its upper margin is concave (Figures 4–6); in addition, hind wing veins Sc+R1 and Rs are fused for a long distance. The relative length of the valvae and the saccus of the male genitalia are different in *Afrophyla* when compared against those in *Casilda* and *Antophilaria*, but the structures are similar. The female genitalia share the flat signum with a medial, invaginated ridge (Figures 7–9). This kind of signum is present in numerous genera in the Timandrini lineage, except the Lythriini, where the signum is absent (Sihvonen & Kaila, 2004).

Homoplasy is a common phenomenon in the Sterrhinae, and it is difficult to find unique, derived characters that would unambiguously define the higher taxonomical categories (Sihvonen & Kaila, 2004). The morphological character support for the Rhodometrini association of *A. vethi* is no exception. To name a few potential examples, *A. vethi* has bilobed socii that are present also in *Timandra*; the enlarged condition of the central flap of the tympanal organ ansa with a concave upper margin is seen also in *Palaeaspilates inoffensa* Warren, 1894; a somewhat similar narrow, ring-shaped structure is present also in *Chlorerythra rubriplaga* Warren, 1895; and the Rhodometrini, including *A. vethi*, and Lythriini share the long anastomosis of hind wing veins Sc+R1 and Rs. Traditionally the relatively long fusion has been considered a larentiine synapomorphy, but recent analyses have shown it to be a symplesiomorphy for the Larentiinae and Sterrhinae (Õunap *et al*., 2008; Sihvonen *et al*., 2011). This

condition is also present in a few other sterrhine taxa (illustrated in Janse, 1933–35).

The immature stages and host-plant associations of *A. vethi* are unknown, thus it remains to be seen if there are similarities with other Rhodometrini species. Larvae of Rhodometrini are often associated with Polygonaceae (Hausmann, 2004; Staude, 2008); the pupa of *Rhodometra* is enclosed in an open network of silk between the stems of the host plant, and the pupal cremaster has eight hooklets (Holloway, 1997).

Prout (1910) noted that *A. vethi* may have affinities with *Palaeaspilates* Warren, 1894 (Sterrhinae), but morphology of the genitalia does not support this. Hausmann (2009) placed *P. mariusi* Hausmann, 2009 in the Cosymbiini. We have examined *P. inoffensa* Warren, 1894, the type species of the genus, and agree with Hausmann (2009) that *Palaeaspilates* belongs to the Cosymbiini. The male and female genitalia of *P. inoffensa* are strikingly asymmetrical, but the cosymbiine features are apparent.

The Rhodometrini are in need of revision. When the inclusion of *A. vethi* in Rhodometrini is considered, it is apparent that the putative external synapomorphies of the tribe, as analysed by Sihvonen & Kaila (2004), are no longer valid. These included the absence of the terminal line on both pairs of wings; a reddish straight line from the forewing apex being present on the forewings only; and the forewing ground colour being bright yellow. The forewing ground colour varies in several species (e.g. Hausmann, 2004) and is of limited value, and the remaining two characters can be used only to define the genera *Rhodometra* and *Casilda* (Figures 1–3).

The other proposed synapomorphies for Rhodometrini include (after Sihvonen & Kaila, 2004): hind wing veins Sc+R1 and Rs are fused for a long distance (not unique); the uncus is naked (not unique); the apex of the sacculus is spinose medially (not unique); and a transtilla is present, but its arms do not meet dorsally (unique). Unlike Sihvonen & Kaila (2004) and Hausmann (2004), we question the presence of an uncus in *Rhodometra* and *Casilda*. The bare, dorsomedial extension could simply be an extended tegumen (Figures 5a, 6a). In the sterrhine genera where an uncus is present, for instance in *Rhodostrophia* Hübner, [1823], there is a membrane between the tegumen and the uncus, and the latter is often setose. The dorsally fused transtilla is absent in *Afrophyla*, but we were unable to determine if the lateral rudiments are present.

Referring to the list of diagnostic characters above, it is evident that a wider revision of the tribe Rhodometrini and its relationships to the other sterrhine tribes

is needed. The narrow, ring-shaped structure, which is located ventrally between the valvae in *Afrophyla*, *Casilda,* and *Rhodometra*, has not been mentioned in the literature, and its value as a potential rhodometrine synapomorphy needs to be investigated (enlarged in Figure 5a). The genus *Casilda* Agenjo should perhaps be synonymised with *Rhodometra* Meyrick, as already noted by Hausmann (2004). Further, *Pseudosterrha* Warren and *Chlorerythra* Warren, currently tentatively classified in the Cosymbiini (Hausmann, 1993), should perhaps be transferred to the Rhodometrini; affinities of *Ochodontia* Lederer, 1853 with the Rhodometrini remain to be analytically tested (see for instance Sihvonen & Kaila, 2004); and affinities of the neotropical *Rhodometra* species with their palaearctic and afrotropical counterparts need to be examined.

Afrophyla vethi (Snellen, 1886), Geometridae: Sterrhinae, Rhodometrini **(new combination)**

vethi vethi Snellen, 1886, *Tijdschr. Ent.* **29**(3): 139, pl. 6, figs 1–9 (*Panagra*). Syntypes male, female (National Museum of Natural History, Leiden, The Netherlands), 'South-west Africa' [Angola]: Benguela. (Examined externally).

dichordata Warren, 1895, *Novit. zool*. **2**: 83 (*Afrophyla*). Holotype female (in coll. BMNH), East Africa, Tauta. (Examined externally).

vethi meloui Prout, 1929, in Seitz, *The Macrolepidoptera of the World* **16**: 3 (*Afrophyla*). Syntype(s) (in coll. BMNH), Madagascar: Diego Suarez. (Examined externally).

Further, non-type material examined: *A. vethi* ssp. *vethi*: >20 specimens from [Southern] Rhodesia [Zimbabwe]; Nyassaland [Malawi]; Tanzania: Kilimanjaro; Kenya: Nairobi; Abyssinia [Ethiopia]; Uganda; Congo Belge [Democratic Republic of the Congo]; Angola; Sierra Leone; Senegambia [Senegambia Confederation]; South Africa: numerous localities; Yemen. *A. vethi* ssp. *meloui*: > 20 specimens from Diego Suarez, Madagascar.

External characters (Figure 1) and pregenital abdomen: Wingspan males 24–31 mm ($n = 20$), females 26–29 mm ($n = 20$). Facies of both sexes similar. Forewing with one areole, hind wing veins Sc+R1 and Rs fused for a long distance. Forewing apex acute, margin below it concave. Forewings sand-coloured, heavily suffused with grey and dark grey, particularly beyond medial line, giving wings a greyish appearance. Antemedial and postmedial lines dividing wings into three areas, terminal area often darkest; these lines narrow, distinct, inner margin sand-coloured, outer margin brown. Antemedial line slightly curved outwards,

postmedial line distinctly curved, ending subapically. Discal spots present on all wings, brown, small but distinct. Terminal line continuous, fine, brown. Fringes slightly darker than wings. Hind wings lighter, only postmedial line visible, terminal area slightly suffused with grey. Wings coloured below as above, area near costa darkest, markings weaker and only postmedial line visible. Proboscis long, labial palpi short. Frons and collar brown or greyish-brown. Male antennae bipectinate to three-quarters, female antennae filiform. Thorax and abdomen concolorous with wings. Hind tibia of both sexes with 2+2 spurs. Tympanal organs (Figure 4d) medium-sized, not meeting medially. Tympanic ansa narrow at base, central flap enlarged, upper margin concave, tip hammer-headed. Abdominal segments 3–8 of both sexes undifferentiated.

Subspecies *meloui* Prout from Madagascar is slightly darker and yellow-brownish in colour than the nominate subspecies.

Male genitalia (Figure 4): Uncus absent. Socii minute, represented by long setae. Gnathos arms short, minute, blunt-ended. Juxta large, weakly sclerotised, plate-shaped. Valvae divided into two arms, the dorsal arm being longer and weakly sclerotised, margins parallel, dorsal margin smooth and weakly setose, ventral margin serrate and weakly setose, apex round and covered with numerous spine-like setae, dorsal margin slightly expanded near base, with keel-shaped extension. Ventral arm of valvae weakly sclerotised, somewhat rounded and cup-shaped, setose. Vinculum wide, ventrally narrower and concave. Saccus small, narrow. Aedeagus slightly curved ventrally. Vesica taking the form of a large sac, with a round diverticulum near base, two further diverticula near opening of ductus ejaculatorius, lacking cornuti or sclerotisations.

Female genitalia (Figure 7): Papillae anales soft, setose. Apophyses narrow, long, a. posteriores slightly longer than a. anteriores. Lamella postvaginalis formed by two very weakly sclerotised, separate plates. Lamella antevaginalis narrow, membranous, lunular. Sinus vaginalis appearing as a large, sclerotised plate, its posterior margin round, slightly concave medially. Ductus bursae short, wide, flat and curved. Ductus seminalis distinct, spiral. Corpus bursae pear-shaped, membranous, covered with minute spicules until anterior margin of signum; the latter taking the form of a large plate, invaginated medially and with a pocket at its anterior margin.

Similar species: There are no known species of Geometridae with a similar facies in Africa. The Eurasian noctuid *Colobochyla salicalis* ([Denis & Schiffermüller]) shows some resemblance.

Distribution (Figure 10): According to the label data of collection specimens, *A.*

vethi is found in sub-Saharan Africa, Yemen, and Madagascar.

Phenology: Label data record adults to be on the wing in all months of the year with the exception of July ($n = 85$). A graphic illustration of the southern African records ($n = 62$), which fall within the southern summer rainfall area (Figure 11), shows an increase in adult occurrence as temperatures increase and the season gets wetter, peaking in late summer and declining again towards winter. This pattern is typical for multivoltine species which have several generations during the warmer months and indicates that this may also be the case for *A. vethi*.

Species niche and biology: Records from label data on specimens examined in HSS, TMSA and SAM ($n = 69$) indicate that the species occurs in warm drier inland areas from 600–1550 m asl., typically in the Savannah and Woodland Biomes. There are no unambiguous records from wet humid coastal areas or from wet forests (see Figure 10). The species appears also to be absent from the temperate southern Grassland, Nama Karoo, Succulent Karoo and Fynbos Biomes where much collecting has been done with no records for this species. Host plant associations are unknown; however, a significant percentage of records (37%) are from areas where natural habitats have been partially or totally transformed by man, indicating that the species may be using a pioneer plant species. The species appears to be present in low numbers wherever it occurs: 65 occurrence records for *A. vethi* spanning over a century show only two occasions where more than one specimen was recorded at any one time. The immature stages are unknown. Adults are attracted to light and have never been recorded being active by day. The moths adopt a planiform, 'delta-type' resting position (own observation, Fig. 1e), not tectiform as in *Rhodometra* and *Casilda* (Hausmann, 2004).

Conservation: Despite the apparent rarity in collections of *A. vethi*, the species' wide distribution and apparent ability to exist in anthropogenically transformed habitats indicates that its conservation status would be of least concern.

Acknowledgements

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Figure 10. Distribution map of *A. vethi*.

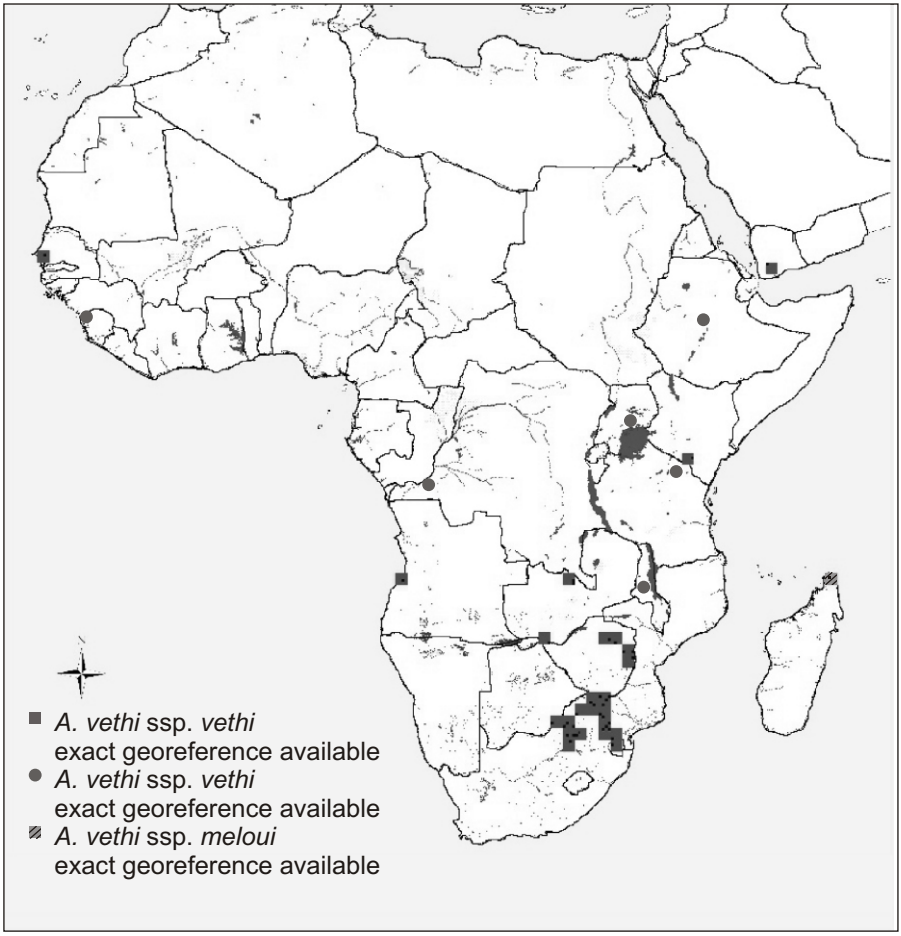


Figure 11. Phenology of the southern African adult specimens of *A. vethi* ($n = 62$) that fall within the southern summer rainfall area. Y-axis shows number of specimens.

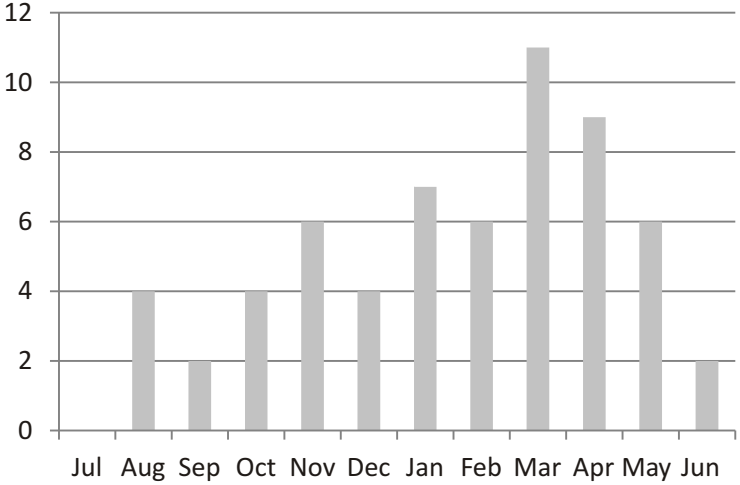


Table 1. List of examined genera of Oenochrominae and Sterrhinae that were considered potentially related to *Afrophyla*. Numerous other taxa, whose morphology is well known and whose genitalia are illustrated elsewhere in a modern way, were also examined but are not listed here.

Subfamily and tribe	Genus and author	Reference and remarks
Oenochrominae	*Oenochroma* Guenée, [1858]	Scoble & Edwards (1989)
Oenochrominae	*Parepisparis* Bethune-Baker, 1906	Included in Oenochrominae *s. str.* in Scoble & Edwards (1989)
Sterrhinae: Cosymbiini	*Chlorerythra* Warren, 1895 *Cyclophora* Hübner, 1822 *Palaeaspilates* Warren, 1894 *Pseudosterrha* Warren, 1888	Hausmann (1993) Hausmann (2004) Cosymbiini in Hausmann (2009), Rhodostrophiini of uncertain association in Sihvonen & Kaila (2004) Hausmann (1993)
Sterrhinae: Lythriini	*Lythria* Hübner, [1823]	Transferred to Sterrhinae in Õunap *et al*. (2008)
Sterrhinae: Rhodometrini	*Rhodometra* Meyrick, 1892 *Casilda* Agenjo, 1952 *Ochodontia* Lederer, 1853	Hausmann (2004) Hausmann (2004) Systematic position tentative (Hausmann, 2004; Sihvonen & Kaila, 2004)
Sterrhinae: Timandriini	*Haematopis* Hübner, 1823 *Timandra* Duponchel, 1829 *Traminda* Saalmüller, 1891	Hodges *et al*. (1983) Hausmann (2004) Timandrini in Sihvonen & Kaila (2004), Cosymbiini in Hausmann (2009)

Book review – Basic pattern of Lepidoptera diversity in southwestern Africa by Wolfram Mey

M. Krüger

Mey, W., 2011. Basic pattern of Lepidoptera diversity in southwestern Africa. *Esperiana* Memoir **6**: 7-316, incl. 40 plates. Wissenschaftlicher Verlag Peks, Schwanfeld. ISBN 3-938249-02-4. Price: 125 Euros (approximately R 1290). Available directly from the publisher (www.esperiana.net).

As the title suggests, the focal point of the present volume are biogeographical patterns of Lepidoptera diversity in the arid and semiarid area between southern Angola and the Cape Peninsula, which encompasses no fewer than five biomes (Desert, Nama Karoo, Succulent Karoo, Fynbos and dry Savanna). In 2006 the author, who is Curator of the Lepidoptera collection at the Museum für Naturkunde in Berlin, Germany, joined the now completed German BIOTA South Africa project, and most of the results presented here are based on material collected during the project. The acronym stands for Biological Transect Analysis, and BIOTA as a whole was aimed at investigating the relationships between different land use patterns and biodiversity, using a multidisciplinary approach.

As the author explains in the Foreword, this book had not been planned in its final form but rather came about by necessity. Although in the case of Lepidoptera and a few other groups it had been decided from the first that inventorying work at the various BIOTA observatories should form an integral part of research activities, with a view to eventually producing field guides, it quickly became evident that the Lepidoptera fauna, especially the so-called Microlepidoptera, was too poorly known to achieve this outright and, notwithstanding its title, much of this volume is dedicated to filling the numerous taxonomic lacunae.

The book consists of eight chapters. Following a Foreword and Acknowledgements, the first (Introduction) provides a brief history of the Lepidoptera collection at the Berlin museum and its curators from 1818 to the present, stressing the important role the museum has played historically in studying the afrotropical fauna.

The second chapter on Materials & methods first provides a brief overview of the different sampling protocols used for butterflies and moths, respectively. This is followed by a detailed table of the 109 localities at which Lepidoptera were collected, including numerous sites visited in addition to the BIOTA observatories

forming the core of the study, and a map showing the location of the sampling sites.

In the third chapter (Study area), the author presents a brief and succinct introduction to the topography and geology of the region, as well as its vegetation (a point of obvious importance given that the overwhelming majority of Lepidoptera larvae are phytophagous) and ecological conditions. Although short, this chapter is well illustrated with a range of maps and bar charts, the latter especially on annual rainfall patterns.

With the first three chapters having served to establish a background to the project, the author then proceeds in the fourth to present the results. As its title (Lepidoptera diversity of light trap samples) suggests, this is a rather technical account. On close to 100 pages basic information on family spectrum, number of species and specimens, distribution of species over abundance classes, as well as lists of the most common species with dominance values is presented for a representative selection of 36 of the 109 localities, grouped according to biomes. Each section is introduced by a header detailing the geographical coordinates and altitude of the site plus information on sampling date and the then prevailing weather conditions, including temperature and relative humidity. This is followed by a brief characterization of vegetation type, dominant trees and landscape features. A nice touch is the inclusion of a (presumably typical) habitat photograph for each site.

The following fifth chapter on Butterflies is much shorter and summarizes the faunistic data gathered in a mostly incidental manner during the project. Although Papilionoidea and Hesperioidea did not form the major target group, data are nonetheless presented for 92 taxa.

In the introduction to the sixth chapter, which bears the title of the book as a whole, the author again stresses the problem of incompletely known taxonomies when trying to analyse faunistic samples (as a result of which inventories of the samples from the various BIOTA observatories have not yet been compiled). Consequently, he had to limit himself to data from completely analysed light trap samples, which largely accounts for the fact that at 12 pages this chapter is perhaps rather shorter than one might have expected from the title. Information is first presented on features of the fauna in terms of distribution in the five different biomes, followed by an analysis of diversity and faunal composition, seasonality (again presented per biome), and endemism. The chapter closes with comments on biogeography, focusing on chorological types and radiations.

Results presented in the seventh chapter on New and little known species clearly demonstrate how inadequate our knowledge of the Lepidoptera fauna of

southwestern Africa remains. Running to 116 pages, it contains descriptions of no fewer than 118 new species and 13 new genera, mostly by the author, occasionally in collaboration with other specialists. Particularly striking for this reviewer was the first record of the small homoneuran superfamily Acanthopteroctetoidea, previously known western North America and the Crimea, from the Afrotropical Region. The chapter is illustrated by 280 figures, mostly line drawings of wing venations and male and female genitalia.

The book closes with the eighth and last chapter on References, followed by 15 b/w plates of male and female genitalia and 15 colour plates depicting adult moths. As with previous contributions in the *Esperiana* series, the volume is nicely presented in hard cover with a dust jacket, printed on good quality paper and richly illustrated. Unfortunately, the book contains rather numerous spelling mistakes, especially of taxonomic names, which the Editor should have been able to avoid with a little more attention to detail. This notwithstanding, however, it is an important contribution to the faunistic and biogeographical knowledge of this vast and often still unexplored part of the Afrotropical Region.

Book review – Butterflies of the Afrotropical Region Volume 3: Lycaenidae by Bernard D'Abrera

350 pages. Hill House Publishers, ISBN-13:9780947352523. Pounds 325 (currently R 3600)

Leonard McLeod

Writing a review of this book is quite a daunting task. One is tempted to enter into the creation/evolution debate. This, however, is not my intention. Unlike the author, I will attempt to limit my jottings to the field of lepidopterology. Those readers who wish to delve into the debate can do so in the archives of www.insectnet.com/forum where very many entomologists have submitted their views under the heading "*Bernard D'Abrera is not alone*".

Bernard D'Abrera is primarily a photographer and owner of a publishing company, Hill House Publishers. It is highly unlikely that any other publishing company would have accepted such a book in its current form. D'Abrera may be a lover of butterflies but he has made a grave error in combining this love with his hatred of Charles Darwin and evolution. A large proportion of the text concerns D'Abrera's fanatical anti-evolution stance. He flagrantly attacks anyone who isn't a "creationist". His fanaticism and diatribe against scientific progress and understanding obviously indicates that he lacks common sense. In this aspect he is similar to other extremists, particularly religious fundamentalists.

This pretty-pretty coffee table book may possibly be of use to some museum entomologists (as stated on the internet by Prof. Shapiro), but the fact that the rather sparse information on butterflies is often incorrect and incomplete makes its use rather limited. As in earlier volumes of this work, collection data for the illustrated specimens are lacking, there are no descriptions, distribution data are poor, some species are absent, he fails to comply with taxonomic convention regarding authorship, and errors are not uncommon. As one example of many such errors, I mention that of *Chrysoritis brooksi tearei* for which Worcester is given as a locality (p.726). This is incorrect. Only *C. brooksi brooksi* is to be found at Worcester. When writing about D'Abrera's books, Prof. Arthur Shapiro of the University of California, Davis, gives the following warning….. *Attention should be paid to their stupidities, their errors, their pig-headedness and their bad writing.*

Bernard D'Abrera is sometimes described in national press as a great authority on butterflies. The Daily Telegraph (a UK newspaper) refers to him as "*one of the*

world's best-known lepidopterists". P.J.de Vries labels him as "*one of the best-known lepidopterists in the world and therefore an eminence on all things butterfly*". How he has gained this reputation is difficult to understand because he certainly does not have this standing in the scientific community nor the amateur lepidopterists' community. He never has been employed by the Natural History Museum (formerly the British Museum (Natural History)), where visitors are welcome, and where his presence and arrogance were tolerated for a number of years. D'Abrera is listed as a signatory on the petition known as "*A Scientific Dissent from Darwinism*". However, he has no scientific qualification and once more he falsely pretends to be "of the British Museum".

Rupert Murdoch and his company *News Corporation* have recently been headline news throughout the world because of the telephone hacking scandal in the UK. Murdoch's objectives are to influence a gullible public by exaggerating facts and selectively doctoring information, and thereby to manipulate politicians to do his bidding. Bernard D'Abrera appears to be using the same tactics as his fellow Australian.

I do admit a certain admiration for D'Abrera's fluency and lucidity with the use of the English language, but it is sad to see this gift misused in such a tragic way. His, often insulting, epithets are irrelevant to the scientific content. Some of his adjectives and expressions, although misplaced, bring a smile to my face. In passing, I mention a few from pages 722 and 723.

Principal amongst this vast, powerful industry of mutual admiration, self deception and humbug: folly-fable of speciation : cod-scientific absurdity : tragic-comically precious flapdoodle : academic theatre of the absurd : baby-talk of the Evolutionist nursery : Anything else is totally unmitigated, extravagant, embarassingly preposterous gobbledegook.

Further on, one finds statements which are quite amazing, *e.g.* on page 737 : *the outrageous ideological drivel that is Darwinism.*

Occasionally he makes use of crude, vulgar words, as on page 823, where his opinion is rudely expressed by the word *bollocks.* This vulgar habit probably originates from his Australian background.

From an early age I was fascinated by myrmecophily in butterflies and I was later fortunate, living in Provence, to be able to study three species of *Maculinea* in the field and laboratory. I was able to pass on information of localities etc. to Jeremy Thomas who later published his research on this most interesting of subjects.

In 1984, I was an invited speaker at the Symposium of the Royal Entomological Society on Butterfly Biology. Naomi Pierce was also an invited speaker, and I think that her presentation stimulated me to further investigate myrmecophily in South Africa, where the ant-butterfly relationships had evolved to a far greater extent than in Europe. Family commitments somewhat restricted this interest until my retirement in 2005 when I began accompanying Alan Heath on field trips. Heath is one of a handful of South African lepidopterists with a passion for myrmecophily and he has taught me a lot. D'Abrera acknowledges Heath's kindness and expertise on more than one occasion in the text. Despite this, he jettisons all of the work by Pierce and Heath in a few strokes of his pen.

Page 737. *Next, I return to Professor Pierce's entirely contrived neo-Darwinism fantasia. Her work, no matter how erudite and peer-adulated, is still fundamentally and fatally flawed……..*

Page 740. *Dear Professor Pierce, and all you lovely Evolutionists out there, there is absolutely no incontrovertible scientific evidence to support any of your untestable reductionist theories. You are, and have been, wasting your time and resources.*

The latter sentence certainly implies that Prof. Pierce obtains money under false pretences.

Page 823. *Naomi Pierce's gibberish revisited.*

How any intelligent man can write such nonsense is difficult to understand. It confirms how religious fanatics, such as D'Abrera and suicide bombers, become totally "blocked off" from reality. There is really little one can do in such cases.

He fails to comprehend a number of basic concepts, thus reflecting his lack of scientific education, and attempts to force his own ideas onto the reader. He mentions in his text the term "*false reasoning*", yet I note the use of this throughout his rantings. He thus carries out exactly what he accuses others of doing. It is not surprising that some readers, who are ignorant of the subject matter, might be persuaded by his biased and incorrect arguments when they are accompanied by the diligent use of flowery language.

This volume terminates with Appendix 2 on Pages 862-864. It consists mainly of childish nonsense about non-existent creatures *1. The Basset-phant (Elephas ridiculosus), 2. The Dachs-iraffe (Cameloleopardus dachsiraffa), 3. The Short-strich (Absurdia evolutionis).* Yet again D'Abrera presents the reader with text which is of little or no interest to the lepidopterist.

Such a profusion of misguided nonsense, which reflects a great deal of misunderstanding by the author, merits a similar tome of rebuttal. Perhaps someone with more time to waste than myself will do the honours. Apparently, even his warped taxonomic ideas, as well as his logical ones, supersede the work by many qualified and experienced taxonomists. His taxonomic changes unfortunately stand until further publications rectify the situation. This strange state of affairs surely indicates that there is something very wrong with the way in which taxonomic revisions are accepted by the scientific community. Let us hope that this bizarre situation can be rectified without delay.

Obituary – Lajos Vári (27 September 1916 – 21 April 2011)

D. M. Kroon

P.O. Box 572, Sasolburg, 1947, South Africa

Lajos was born in 1916 in Hungary, and grew up with Dutch foster parents in Amsterdam after the Great War. This was arranged for orphans by the Red Cross; his foster father was an artist, restorator and collector. He worked as a laboratory assistant at the University of Amsterdam during the German occupation and directly after WWII, and later qualified as a teacher. He was a member of the Dutch Entomological Society from 1942 and developed his entomological expertise and interests at the Zoological Museum of Amsterdam.

In 1948, at the age of 32, he emigrated to South Africa, together with his wife Geertje and his three small children, to take up a post at the Transvaal Museum. His qualifications from Europe were not recognized in South Africa. He therefore returned to his studies and obtained an M.Sc. at the University of Pretoria. Thereafter he specialized in the study of leaf miners and in 1961 was awarded a D.Sc. (*cum laude*) for a revision of Southern African Lithocolletidae (now Gracillariidae). From 1948 to 1952 he worked in close collaboration with Dr A.J.T. Janse and spent much of his time in Gezina, a suburb of Pretoria, where the Janse collection was housed. This collection had been purchased by the South African Government in 1945 and was intended to be consolidated with the Transvaal Museum collection (now Ditsong National Museum of Natural History); the merger only happened in 1952. He also worked with Dr G. van Son, and indeed succeeded him after his death in 1967, managing the Lepidoptera Department at the museum. Later he completed and edited the manuscript of Dr van Son's fourth volume dealing with Southern African butterflies. He also acted as Assistant Director of the Transvaal Museum from 1963 – 1976.

He first went on pension at the Transvaal Museum in 1981, but continued as Head of the department, retiring fully in 1986. However, Lajos just continued working at the Transvaal Museum and especially continued working on the checklist project as an Honorary Curator. This was particularly relevant while he co-authored the standard reference checklist for southern African Lepidoptera which appeared in 2002. This contains a huge number of references useful to moth or butterfly enthusiasts, all set out formally and impeccably correct. In reality he never really retired in the normal sense of the word, but continued working in the Lepidoptera Department until 2007, but gradually was forced to reduce the time spent on library and journal research, and checking aspects of the moth literature and systematics.

His duties at the Transvaal Museum were varied, at times requiring his expertise as an authority identifying insects for governmental agencies, universities or colleagues. When filling in as Acting Director, he had to deal with running both the museum and his own department efficiently. At the museum his career in South Africa brought him into contact with eminent entomologists such as Dr A.J.T. Janse, Dr G. van Son, Dr M.J. Scoble, who later rose to become Keeper of Entomology at The Natural History Museum (formerly British Museum (Natural History)). Today his work is being expanded substantially by the present incumbent – Dr Martin Krüger – and others. All the while the Lepidoptera Department of the former Transvaal Museum is still growing in stature and importance.

His linguistic abilities allowed him to evaluate many overseas journals in German, French and Dutch, in addition to English, and thereby revise and adapt what was known of Southern African insects from time to time. This gift was particularly useful when he acted as editor of a variety of journals. His knowledge of published journals and books was impressive. No effort was spared to resolve disputes, difficulties or contentious issues. The nuances of being an editor are demanding and Lajos excelled in this task. Dr Vári had a wide spectrum of professional friends and correspondents locally as well as overseas. His opinion was widely solicited as an authority. Today, overseas researchers regularly visit the museum to study the vast collections built up during the last century by Lajos and the Lepidoptera Department staff. He made significant impacts and contributions over the years to encourage and educate aspirant lepidopterists. His profound knowledge of European and African moths and entomological literature enabled him to make major contributions over many years to the development of the Transvaal Museum Lepidoptera Department.

The well-being of the Transvaal Museum was the second-most important concern in his life, after his family and descendants. He was always willing to share his vast expertise with anyone who asked for help, and offer words of encouragement for those interested in collecting moths. He strongly supported collecting trips to acquire new material and participated in many faunal surveys. Lajos was a kind, religious man known for his integrity, with high principles and ethical standards. He was widely known, locally and overseas, with a large circle of friends and colleagues. He was highly respected among the entomological fraternity, research scholars and universities. His opinion was frequently sought. Ever helpful to others, he set an example among budding biologists especially those interested in his lifelong hobby relating to moths. As can be expected of so eminent an authority, he has some species of moths, honouring and named for him. One of these, a beautiful and also one of the smallest, is *Agrionympha vari*, a tiny moth found on Mariepskop, in the Eastern Transvaal.

On a personal level his favourite pursuit was collecting the mega-diverse, small Microlepidoptera. He would collect leaf mines from the larval host-plant, detail the life history, and then proceed to press the leaves as a permanent record. His reference collection of accessioned leaves and mines and voucher material is housed in the Transvaal Museum.

It was a privilege to have known Lajos, and benefitted from his extensive experience, knowledge and friendship, for nearly five decades. He and his wife Geertje (who passed away in 1992) were a friendly couple and I often enjoyed their hospitality on visits to Pretoria during the late 1960s. At the age of 82 years he remarried Josephina (née Bourquin), who also predeceased him. Through the years at the museum he mentored and guided me personally. He always supported collecting and field trips, safely storing the collected material, perhaps even for future researchers before a habitat disappeared forever. Visitors to his department were always treated courteously and with enthusiasm. There surely cannot be any aspirant butterfly or moth collector who has not heard of Dr Vári, or personally enjoyed corresponding with him. But the real fun was to enjoy a field trip with Lajos – especially when new species would be discovered, and there always seemed to be new ones. A twinkle of surprise would light up his eyes – exciting times those were! He could be as enthusiastic as a child going to the seaside on holiday.

During his active career he received many awards – the most treasured ones are listed below, followed by a short list of some important publications.

Accolades:

- Honorary Life Member of the Entomological Society of Southern Africa.
- Honorary Life Membership of the Lepidopterists' Society of Africa.
- Appointed Honorary Curator of the Lepidoptera Department of the Transvaal Museum after his retirement.
- Fellow of the Royal Entomological Society, London.
- Associate Member of the Transvaal Museum.

Major publications:

- Doctoral thesis 1961, Southern African Lithocolletidae (Gracillariidae)
- Editor of Dr G. van Son's Volume IV of *The Butterflies of Southern Africa*
- Collaborated with Dr L.A. Gozmány and published: Tineidae of the Ethiopian Region.
- Occasional revisions of some SA Butterflies published in the Transvaal

Museum Annals.

- *Classification and Checklist of the Species of Lepidoptera of Southern Africa* (Vári, Kroon and Krüger (2002)).

I cherish the wonderful memories and times spent with him, even as we are saddened by his passing, and the memories of this great man and friend will remain with those who knew him. In scientific circles we mourn the loss of a leading entomologist and lepidopterist, who specialised on the smaller moths and their life histories. His private collection of the smaller moths of the Netherlands was returned to the country of origin (The Institute of Taxonomic Zoology Amsterdam) some years ago.

He leaves three children, five grandchildren and three great-grandchildren.

Footnote: The above obituary is reproduced with minor editorial changes with the Editor's permission from *African Entomology* **19**(2), September 2011.

Letter from the President

The future of LepSoc...

Dear Members

At the end of SABCA we recognized that the Lepidopterists' Society of Africa stood at a crossroads. Would we carry on the way we had, or would we take advantage of the opportunities that our collaboration with the ADU and SANBI in SABCA had brought us?

This was put together in a somewhat light-hearted but ultimately serious document, Vision 2020. Where would we be in that year? Some strong-minded decisions were needed to set us on that path, and a lot has happened since September 2010 when the document was presented.

Our website www.lepsoc.org.za is now fully operational; you can now join and pay subs online. It's proving a great communications tool; more and more members are posting on the forums. The posts vary from reports on our rare and endangered species, to recipes and classified ads. The bulk is made up of trip reports from a growing number of members each week. These are replacing the trip reports that used to go into *Metamorphosis*... and the Editor is receiving very few of this kind of material now.

Yolande Bode is doing a wonderful job, collating all the reports, articles and forum posts on the site into an e-newsletter. This goes out to members via the site; if you missed one, the most recent is to be found under the 'Latest Newsletters' box on the left side of the site's front page. They are all archived and if anyone wants to get hold of back numbers all they have to do is e-mail Yolande and she'll e-mail you a copy.

You'll probably also have noticed that the Council is using the site more and more to communicate. The Call for Papers for Conference 2011 went out as a newsletter.

It follows, then, that if we don't have your e-mail address, or have the wrong one, you won't be receiving these newsletters. We are sure we've got correct e-mail addresses for the great majority of members, but there are a few for whom we don't. Quite simply, if you aren't receiving regular newsletters, e-mail me at steve.woodhall@sos.co.za and I'll update your e-mail address on the site. Or, you can go to the site and under User Menu, click 'Edit My Profile' and do it there. And, if you forget your username and password, e-mail me and I'll reset them for you.

One of the best 'goodies' on the site is a directory of all your fellow members, also under User Menu. When I joined LepSoc, the roneoe'd list of 'Fellow Sufferers' that

Bill Henning gave me was like gold – within a few days I'd made communications with all the members in my area. But it soon got out of date, and with the old technology it was a real trog for the poor secretary to produce. All that has now changed. Under 'LepSoc Members', members (not the public) can access the e-mails, addresses and phone numbers of all fellow members on the site.

There is a live calendar of events, and a Frequently Asked Questions list for newcomers. You can access all abstract lists from back issues of *Metamorphosis*.

In an attempt to boost membership we started a paid-for page in *Environment* magazine. This journal, edited by Dr John Ledger, has been mailed to all full members quarterly over the last year. A collaboration of SANCCOB, SAAMBR, Wildlands Conservation Trust, Wilderness Foundation, WESSA, Cape Leopard Trust, EWT, and the Game Rangers Association of Africa, it has a circulation of 19000. Our four issues were made possible by sponsorship we no longer have and not by membership fees. Unfortunately it has not had the impact on membership that we'd hoped for, and we don't have the budget to carry on with it – so the last issue sent will be the last we send out.

In fact, the medium that's had the biggest impact is Facebook! Andrew Morton and Justin Bode started off by starting Facebook pages for Western Cape LepSoc and African Butterflies – LepSoc. We started using it to publish events and slowly but surely they developed an audience. As I write this, Western Cape has 69 'likes' and African Butterflies – LepSoc 90. But that reckoned without all the Virtual Museum contributors and a group called 'S.A. Butterflies, Bugs, Bees and Other Small Things'. It has 302 members and is growing; many are Virtual Museum contributors and new LepSoc members. We have now had three LepSoc meets where new 'Facebook friends' almost or actually outnumbered the 'old faithfuls'... the Gauteng Braai, the Krantzkloof Nature Reserve biannual walk, and most recently a gathering in PE where I was the only 'traditional' member present. And one of the new people down there, Sean Allen, actually found a new locality for the rare White's Opal, *Chrysoritis thysbe whitei.*

Facebook marketing is a definite skill and requires someone to look out for like-minded groups and send them a Friend Request – then get them to start posting on the VM and join LepSoc. We know there is a risk that people will get all they need from Facebook and ignore the LepSoc site. But as things have turned out, they are more likely to join and see their membership as support for our conservation efforts. We could in fact set up the site's forums to work like Facebook but we need funding, and a reliable web developer, to do that properly. If any member has such skills and is prepared to volunteer his services please contact me.

We have some new Council members, whom we didn't even know before the Virtual Museum. Yolande Bode, as said earlier, runs the Newsletters. Peter Webb has taken over the portfolio of marketing, and Justin Bode is helping with secretarial duties, as

well as some very effective sourcing of donor funds.

The Rare and Endangered Species Custodian programme now has a name – Custodians of Rare and Endangered Lepidoptera (COREL). It has made a start under Dave Edge's tutelage. You can already read updated reports on the site, on a special forum set up for this. Any member can post there, so if you have anything to say about any of those species please do so. The Custodians will automatically be sent a link to your post.

We decided to take a leaf out of the Botanical Society's book and recently signed an MoU of collaboration with SANBI. Prof. Michelle Hamer is now on the Council and her wise advice and help is already proving of value, not least in an issue that has recently cropped up. Collecting permits have been subject to a lot of e-mail traffic recently. Truth to tell, we were all so used to Silvia Mecenero and her team managing these so smoothly under SABCA, my view is we got a little complacent! 31 March 2011 came around with no permit arrangements except the old one with CapeNature were in place. We had MoU's with some of the other provinces but no-one was managing the process – there were a lot of unhappy confused lepidopterists out there.

I am pleased to announce that Bennie Coetzer and Hermann Staude have taken on the job of ensuring the CapeNature & Mpumalanga permit management progresses as smoothly as it did under SABCA. They have formulated necessary rules to ensure compliance with the memorandum of agreement we have with CapeNature (and other provincial authorities): All the members who have indicated interest in being included on the undated CapeNature permit are asked to fill in an application form that they can download from the site. Once accepted their name appears on the permit, and they are expected to report on their activities quarterly and submit data via Lepibase annually. If a member has been inactive for any reason he/she will have to state this as a 'zero report'. Those that do not provide any report will be taken off the permit. Sensitive localities will be excluded from the permit; members wishing to work in these areas will be required to submit a special application.

To make things easier, a downloadable version of Lepidops will be put onto the site, and Council will hold workshops on how to use it. Submission of data via MS Excel will also be allowed, via a Council-approved template to ensure referential integrity with Lepibase. This can already be downloaded from the site.

The Council is working towards securing similar permitting arrangements for all provinces, IsiMangaliso Wetland Park and SanParks. The rules of each permit will differ from province to province, but we hope to keep members' engagement with the process, via Lepibase, as painless and consistent as possible. Michelle Hamer will help manage the way we disseminate information gleaned from Lepibase to the authorities and institutions. It is envisaged that all members who submit data will have access to the dataset, subject to restrictions laid out in the Sensitive Species

policy. We are doing our best to keep things going as they did under SABCA.

The major public engagement with SABCA was of course the Virtual Museum (VM) and Butterfly Census Weeks (BCW). These were open to all, not just LepSoc members – but I can reveal that over 70 citizen scientists who found out about us via the VM have subsequently joined the Society, either as full or e-members. Many have recently come from Facebook. What a start, and a sign we need to carry on with this! As stated above, SABCA1, as we are calling it, concluded on 31 March 2011, and Silvia Mecenero is busy putting together the final report. SANBI provided funding for its publication, and soon we will all be able to get copies.

So what about the future of the VM and BCW's? They have proved a major attracting force for people interested in butterflies and moths, and we are loath to let them end. So, LepSoc decided to use the remaining funds from the project to keep the VM going until we can find funding to carry on with 'SABCA2' indefinitely into the future.

Funding is of course the major issue here and I can report that a lot of activity has been happening on this front. Corporate funding will be vital to provide the impetus behind COREL and SABCA2, essentially the conservation activities of LepSoc going forward.

LepSoc is already a Section 21 company not for gain in terms of the Act but this does not allow us to issue tax certificates to donors. It just means our income is not subject to tax. To get large corporate funding we needed to set up an SARS-approved section 18A trust to which companies or individuals can donate and claim this as a deduction from income for tax purposes. Such a trust must be shown to engage in 'Public Benefit Activities' (PBA's) to be designated a 'Public Benefit Organisation' (PBO) in terms of the Income Tax Act.

Enter Dave Edge with a great idea to broaden the scope of the existing Brenton Blue Trust (BBT) to cover all Lepidoptera conservation activities in South Africa. This creates an entity rather like the Xerces Society in the US, which works closely with their Lepidopterists' Society to study and conserve Lepidoptera. This expansion is at time of writing almost complete; the funds existing with BBT and those to date kept by the Western Cape Branch will be controlled by the Trust and ring-fenced for use with Lepidoptera in the southern and western Cape.

As we attract corporate donors the Trust will be able to do PBA's like:

- Funding COREL, starting with the Critically Endangered species and expanding to all Red Data taxa, to secure their future
- Funding research into Lepidoptera, ultimately aiding their conservation
- Publicising more widely the Virtual Museum and Butterfly Census Weeks, and other Citizen Science projects aimed at gathering data on ALL our species

- Funding data gathering and analysis of these and other Citizen Science projects such as moth counts
- Such projects will give advance warning if species currently seen as common become threatened (as has happened in the UK), making it possible to draft early conservation plans

This is all very well, and the future looks very bright. BUT (you knew there was going to be a BUT, didn't you?) we have had to make some hard decisions before moving forward.

The Council has to date been made up of committed and enthusiastic lepidopterists giving their time for free. The administrative workload got to the point where it is a real burden, and with website and permit admin added, too much for the current incumbents to deal with. Added to this is the fact that those being burdened with the admin work are those who are going to be needed to run the critical data analysis and research. And let's not forget, these are lepidopterists who want to be out in the field and not stuck behind a computer screen!

Peter Sharland agreed to take over from Dave Edge as Treasurer, to allow Dave to concentrate on COREL. But there is more. We have decided to change the way *Metamorphosis* is published.

Why do this? Well, your Journal has been consistently late, despite the best efforts of the outgoing Editor, Martin Krüger – whom I thank for his patient and professional work under very difficult circumstances. Suitable articles were being received but not in a pattern that allowed a regular publication calendar. Refereeing of scientific papers can take as long as six months, and other articles were being held up until each issue was 'full'. And last but not least, the cost of printing and mailing *Metamorphosis* has been absorbing almost all our membership income at a time when we are incurring costs on other endeavours, such as the website and permitting.

Metamorphosis will undergo its own metamorphosis, growing wings, so to speak, into a web-based scientific journal, under its new Editor, Dave Edge. It will be great for authors, because papers will be published on-line as soon as they are ready. They will be able to use colour illustrations without being charged for them. Eventually the plan is to gain IS accreditation for the Journal so that University academics publishing in it will be able to gain funding from their institutions. This will take time, but it is a goal worth pursuing.

Metamorphosis will still be published in hard copy form, but annually. This is common practice with similar journals overseas. There will be a digest of all the web papers, and a selection of the best articles from the web forum. *Metamorphosis* will still land on your doorstep, only not so often.

We on the Council are confident that these changes can only benefit you, our members. You will continue to be entertained by members posting trip reports, humorous articles etc on the site forums, and receive a regular e-newsletter pointing you to these. The site will make it easy for you to stay in touch with your fellow members and share plans and triumphs.

Finally, lepidopterists wishing to make formal contributions new to science will be able to publish in a peer reviewed *Metamorphosis* that is always on time and fresh.

2020 awaits!

Yours sincerely

Steve Woodhall, President

Sponsor & Honorary Life Members of LepSoc

The following members, apart from their significant contributions to the Society as individuals, have also chosen to be sponsor members for 2011 and have through their generosity provided significant financial support which is much appreciated:

Sponsor Members

Dr Jonathan Ball
Justin Bode
Yolande Bode
Charles Botha
Kevin Cockburn
Dr Bennie Coetzer
Steve Collins
Alf Curle
Martin Curle
Jeremy Dobson
Dr Dave Edge
Owen Garvie
Tim Gilbert
Glynis Hardy
Graham Henning
John Joannou
Duncan MacFadyen (E. Oppenheimer & Son)
Dave McDermott
Ernest Pringle
Harald Selb
Peter Sharland
Hermann Staude
Richard Stephen
Reinier Terblanche
Steve Woodhall

Honorary Life Members

Dr Stephen Henning
Dr Douglas Kroon
Clive Quickelberge
Prof. Mark Williams

Any member can volunteer to become a sponsor member on an annual basis and make a contribution of R600. As the Society does need all the financial support it can get it is hoped that more members will elect to become sponsor members in the future. Donations to the Society will also be most welcome.

Hondeklip Bay Rd. 10 km W of Wallekraal, Aug. 2007 A.H.

Soebatsfontein Rd. 8 km N of Wallekraal, Sept. 2009 A.H.

Soebatsfontein Rd. 8 km N of Wallekraal, Sept. 2009. A.H.

Soebatsfontein Rd. 8 km N of Wallekraal, Sept. 2009. A.H.

PLATE NO. 2 - All *Chrysoritis thysbe bamptoni*

Hondeklip Bay Rd. 10 km W of Wallekraal, Sept. 2007 A.H.

Hondeklip Bay Rd. 10 km W of Wallekraal, Sept. 2007 A.H.

8 km E of Hondeklip Bay, Aug. 2007 A.H.

Sarrisaam Farm, 9 km WNW of Soutfontein, Sept. 2009 A.H.

Kotzerus, near Bitterfontein, Sept. 2005 A.H.

Groenriviermond (reared from egg), emerged Dec. 1991 A.H.

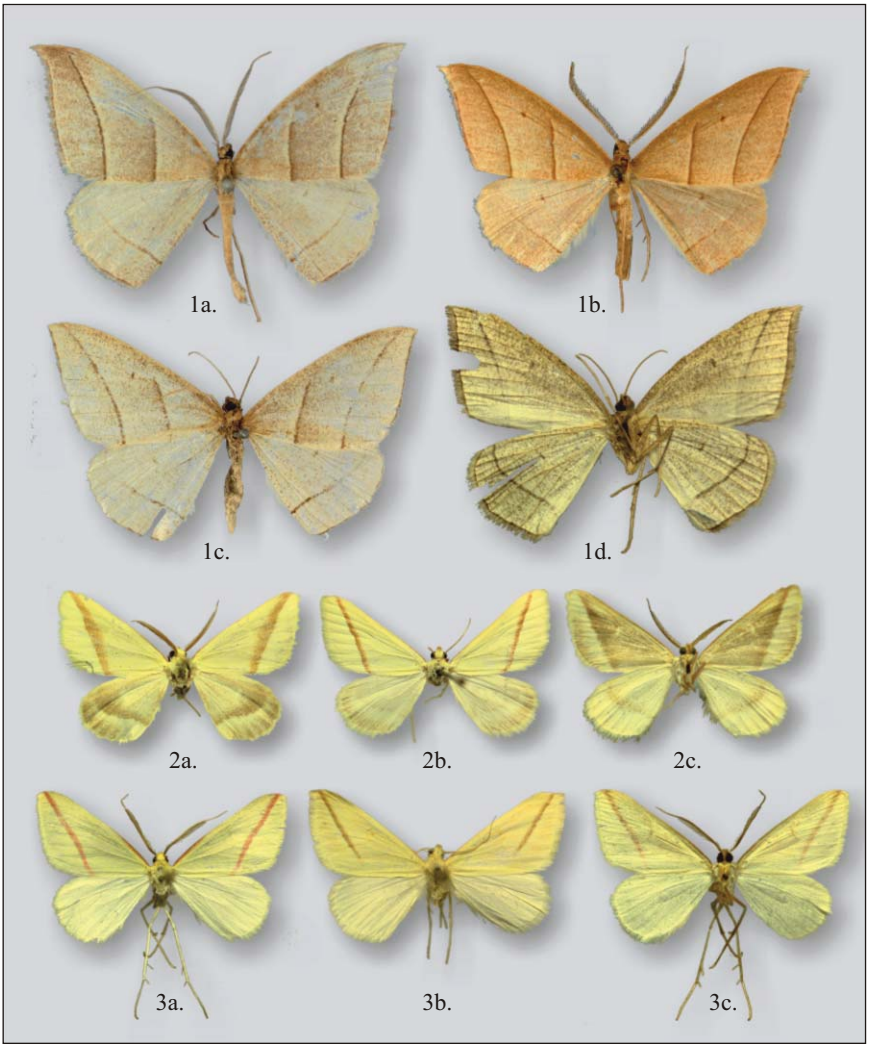
Sarrisaam Farm, 9 km WNW of Soutfontein, Oct. 1992. A.H.

8 km E of Hondeklip Bay, Oct. 1992. A.H.

PLATE NO. 4 - Larvae of *Chrysoritis lyndseyae* stat. rev.

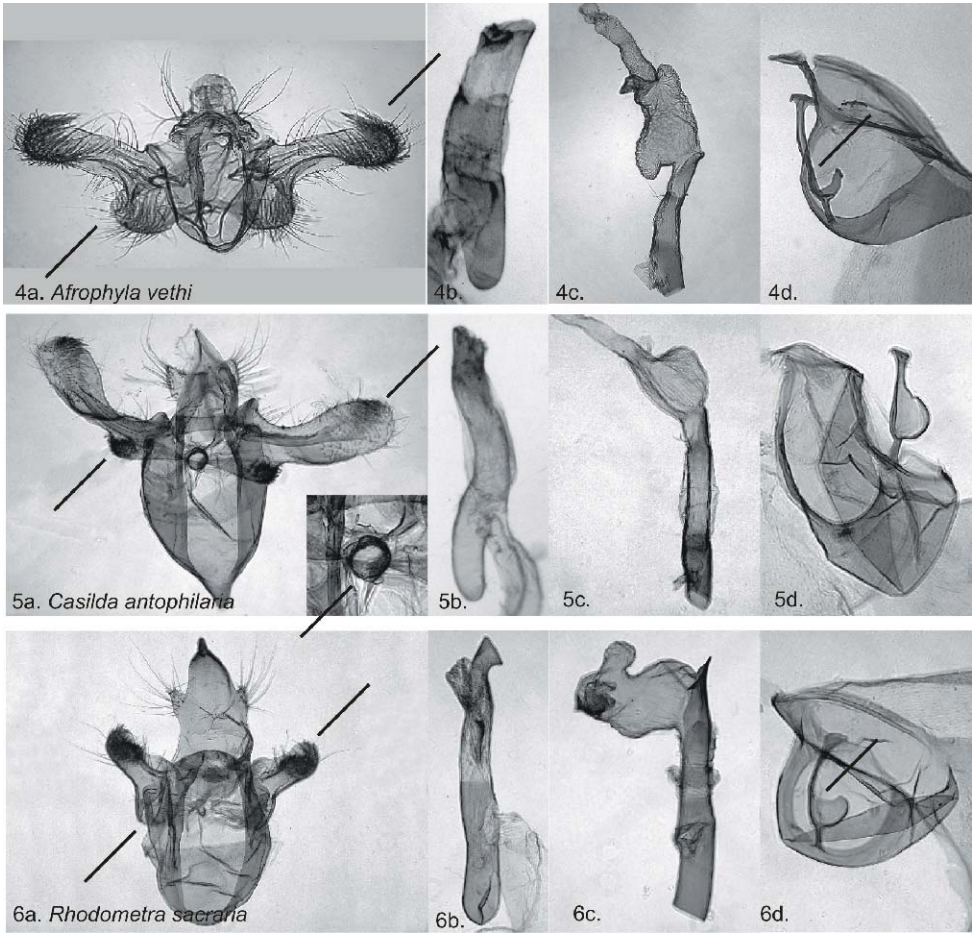
Second instar larvae of *C. lyndseyae* stat. rev. in a part-opened shelter of silk and sand on a stem of *Thesium*, with a *Crematogaster peringueyi* ant attending its DNO. Soebatsfontein Rd. 8 km N of Wallekraal, Oct. 2007.
Photo: Andrew Morton

Final (6th) instar larva of *C. lyndseyae* stat. rev. beside a pupa, and attended by a *Crematogaster peringueyi* ant and found beneath *Thesium* sp. Soebatsfontein Rd. 8 km N of Wallekraal, Oct. 2007.
Photo: A. Heath.

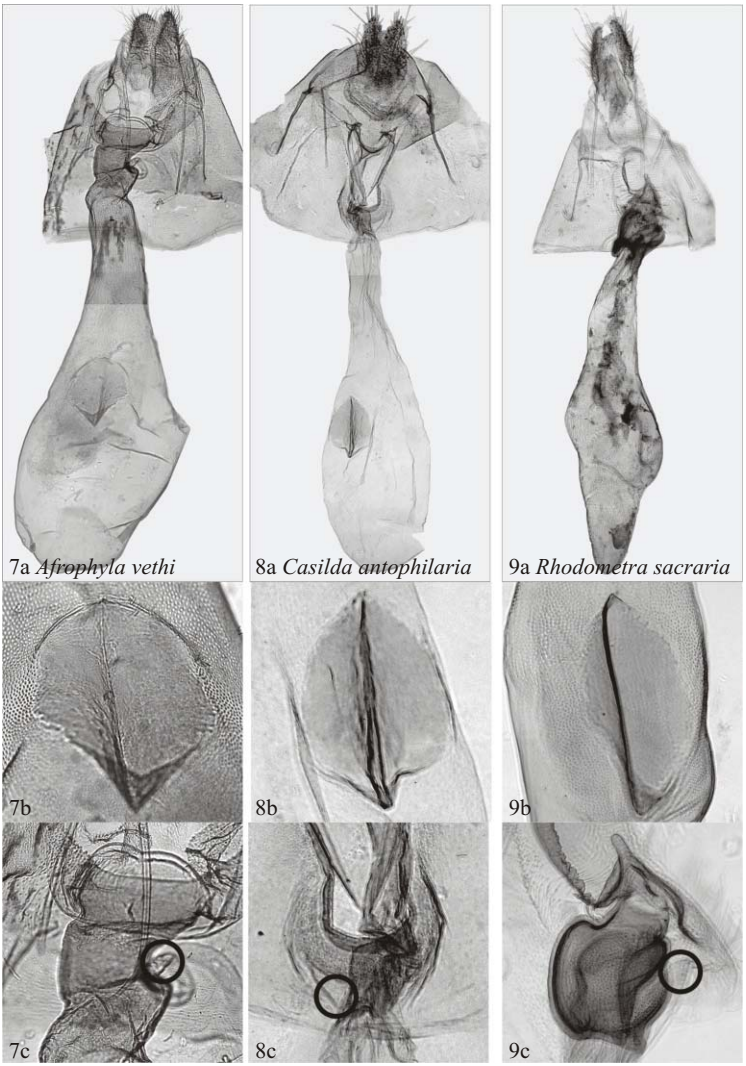


Figures 1–3. Adults.
1a. *Afrophyla vethi* ssp. *vethi*, male, [Zambia:] Upper Luangwa River, 2.8.1910 (in coll. BMNH).
1b. *A. vethi* ssp. *meloui*, male, Madagascar: Diego Suarez, 25.8.1917 (syntype, in coll. BMNH).
1c. *A. vethi* ssp. *vethi*, female, 'East Africa', Tauta, May 1891 (holotype of *Afrophyla dichordata* Warren, in coll. BMNH).
1d. *A. vethi* ssp. *vethi*, female (below), South Africa, Northern Province, Gundani village, 26.11.2000 (in coll. HSS).
2a. *Casilda antophilaria*, male, Russia, Volgograd, 14.8.1895 (in coll. FMNH).
2b. *C. antophilaria*, female, Russia, Sarepta [Volgograd], 30.7.1902 (in coll. FMNH).
2c. *C. antophilaria*, male (below), Russia, Sarepta [Volgograd], 14.8.1895 (in coll. FMNH).
3a. *Rhodometra sacraria*, male, France, Corsica, Bettolacce, 20-28.7.2011 (in coll. Sihvonen).
3b. *R. sacraria*, female, Italy, Prov. Genova, 4.8.1984 (in coll. FMNH).
3c. *R. sacraria*, male (below), France, Corsica, Bettolacce, 20-28.7.2011 (in coll. Sihvonen).

1e. *Afrophyla vethi* ssp. *vethi*, adult male showing resting posture, photo: H. Staude



Figures 4–6. Male genitalia and other structures. Diagnostic Rhodometrini characters are indicated.
4a. *Afrophyla vethi*, genitalia, South Africa: North Province, farm De Brak, 5.3.2000, slide PS1672.
4b. *A. vethi*, aedeagus [Zambia]: Upper Luangwa River, 2.8.1910, slide PS1791.
4c. *A. vethi*, vesica, South Africa: North Province, farm De Brak, 5.3.2000, slide PS1672.
4d. *A. vethi*, ansa of tympanal organ, South Africa: North Province, farm De Brak, 5.3.2000, slide PS1672.
5a. *Casilda antophilaria*, genitalia, with the ring between the valvae bases in the insert (both pictures from slide PS1778, Russia: Sarepta [Volgograd], 14.8.[18]95).
5b. *C. antophilaria*, aedeagus, Russia: Sarepta [Volgograd], 14.8.[18]95, slide PS1778.
5c. *C. antophilaria*, vesica, Russia: Sarepta [Volgograd], 14.8.[18]95, slide PS1778.
5d. *C. antophilaria*, tympanal organ ansa, Russia: Sarepta [Volgograd], 14.6.[18]95, slide PS699.
6a. *Rhodometra sacraria*, genitalia, France: Corsica, Bettolacce, 20-28.7.2011, slide PS1782.
6b. *R. sacraria*, aedeagus, France: Corsica, Bettolacce, 20-28.7.2011, slide PS1781.
6c. *R. sacraria*, vesica, France: Corsica, Bettolacce, 20-28.7.2011, slide PS1782.
6d. *R. sacraria*, ansa of tympanal organ, France: Corsica, Bettolacce, 20-28.7.2011, slide PS1781.



Figures 7–9. Female genitalia. Point of origin of the ductus seminalis is indicated with a circle.
7a. *Afrophyla vethi*, genitalia, South Africa: Northern Province, Gundani village, 840 m, 26.11.2000, slide PS1673.
7b. *A. vethi*, signum, South Africa: Northern Province, Gundani village, 840 m, 26.11.2000, slide PS1673.
7c. *A. vethi*, ostium bursae and adjacent structures, South Africa: Northern Province, Gundani village, 840 m, 26.11.2000, slide PS1673.
8a. *Casilda antophilaria*, genitalia, Russia: Sarepta [Volgograd], [19]05, slide PS821.
8b. *C. antophilaria*, signum, Russia: Sarepta [Volgograd], [19]05, slide PS821.
8c. *C. antophilaria*, ostium bursae and adjacent structures, Russia: Sarepta [Volgograd], without date, slide PS1779.
9a. *Rhodometra sacraria*, genitalia, Italy: Province Genova, Serra Ricco, 4.8.1984, slide PS1780.
9b. *R. sacraria*, signum, Greece: Corfu, Benitse, 6-14.6.1978, slide PS820.
9c. *R. sacraria*, ostium bursae and adjacent structures, Italy: Province Genova, Serra Ricco, 4.8.1984, slide PS1780.