METAMORPHOSIS

JOURNAL OF THE LEPIDOPTERISTS' SOCIETY OF AFRICA

Volume 9 December 1998 Number 4

LEPIDOPTERISTS' SOCIETY OF AFRICA

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EDITORIAL

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METAMORPHOSIS

ISSN 1018-6490

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Covers: Front: *Myrina silenus ficedula* (Lycaenidae) Adult [Photo S. Woodhall]
Back: *Myrina silenus ficedula (Lycaenidae)* larva [Photo S. Woodhall]

Editorial

On the way back from another successful trip to the Maputaland coastal forests recently, John Joannou and I had six hours of driving ahead of us before we would reach the western part of the Witwatersrand where we live.

We usually use this time to discuss in depth any particular subject that may interest us. This time was no exception. The question of computer databases and electronic publishing has been much on our minds recently. John is currently busy attempting to gather and feed into his computer all the scattered available published and unpublished information on the African Lasciocampidae including digital images of type specimens. I have been struggling for some time to do likewise with the Geometridae in order that this data will be more readily accessible to all. We had been looking at a number of databases that members of the society were developing and were discussing the pro's and con's of the different systems. We were looking forward to the upcoming mini-conference on databases at the next AGM just a week or so away.

This of course led to a discussion on electronic data in general and how this convenient way of storage is fast changing the way that we are handling information and how it would affect us in the future, especially the field of publishing. We agreed that *Metamorphosis* as we know it today would probably change drastically in the future. We envisage that the society will probably have a mega, electronic 'data-warehouse' in future, which should contain all of the known information on African Lepidoptera. Information stored in this warehouse should be serviced by powerful search engines, which would ensure that the scattered bits of information be presented to the enquirer in an order that would satisfy his needs. But the question is of course how data will find its way into this 'Warehouse' and what checks and balances will be in place to ensure the validity of this data.

Dick Vane Wright in his article on databases (Metamorphosis supplement No 3, December 1997) expressed the wish for a world database on Lepidoptera. He acknowledged that the question of intellectual property rights was one of the most challenging stumbling blocks towards achieving this goal. When it comes to actually feeding information into this warehouse, existing published scientific data is the smallest problem. Most of this information has been screened by editorial scrutiny and peer review. Also the intellectual property rights are normally vested in the publishers that usually allow copying as long as the publication and author is cited. Scientists in general are reluctant to divulge unpublished data, but once the information is published it is in the public domain and can then be readily used as long as the original publication is cited. Why this sudden switch? The answer of course is simply recognition.

When it comes to feeding unpublished data into this warehouse, what are the pitfalls? What makes unpublished information different to published information? Not only the obvious fact that once published, information is readily available to the public, but also that it is now irrevocably linked to authorship, which automatically brings about recognition and accountability. If we could therefore build into our electronic data capturing system a way of ensuring that every bit of data entered is linked to an original source, then there would be few problems

with using this unpublished data. There is so much valuable unpublished new information out there, which would probably never be published in the conventional way simply because the individual bits of information is too little to warrant such publication. On every collecting trip that any one of us undertakes, valuable new observations are made- even if it only is distribution data.

The really exciting thing about computers is that it becomes easier all the time to capture such data and to then sort out the scattered bits and pieces to form a coherent whole. If we could capture all the bits of information that we all observe every time we are out in the field and are able to sort all this out in a coherent whole, then our knowledge and understanding of African Lepidoptera would increase in leaps and bounds as never before. This is the dream that members such as Douglas Kroon and Bennie Coetzer, who are currently developing Lepidoptera databases, have - to capture this mass of knowledge before it gets lost as has happened so often in the past.

The question of checking the validity of such information is of course a valid one. It would be impossible to check every bit of data entering such a system. But then again the present system of peer review and editorial scrutiny also has its problems. The biggest check and balance is probably traceability to source, which leads to recognition and accountability. Erroneous data would in any case work itself out of such a system eventually. Probably much faster than the time it takes presently to get rid of such erroneous data in classical printed publications.

A future *Metamorphosis* may well be nothing more than a periodic electronic halfway station. Data may stay in this vehicle for a certain period only, for member scrutiny, before it gets incorporated into the main data warehouse, which would always be available to members.

We came to the conclusion that whatever happens and whatever systems may ultimately prove to become the new norm in data storage and publishing, the three pillars of traceability, recognition and accountability must always be present. And before we knew it the six hours driving was over and we could clearly see the familiar outline of the Magaliesberg in the distance.

Hermann Staude

PRESIDENT'S COMMENTS

I would firstly like to wish you all well for 1999. May all your endeavours be successful.

The year 1999 is likely to be one where conservation issues take centre stage. The Secon International Lepidopterists' Conference of Africa will take place at Kirstenbosch Botanical Gardens in Cape Town on 4th–6th November, and the emphasis will be on conservation. All members are asked to make a special effort to attend.

The Yebbo Gogga exhibition is on during March at the Johannesburg Zoo. Please make an effort to visit or even contact Pieter Roos or myself to help out. Previous exhibits have been fun and this one will be no exception. The thems is crime as reflected in the insect world, so contact us with your ideas.

I look forward to seeing you at these and other events we have planned over the year.

GRAHAM HENNING

BUTTERFLIES OF THE PIETERMARITZBURG NATIONAL BOTANIC GARDENS, SOUTH AFRICA: A CONSERVATION PERSPECTIVE

By

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Abstract One hundred and four butterfly species in the families, Nymphalidae, Lycaenidae, Pieridae, Papilionidae and Hesperiidae were recorded from the National Botanic Gardens, Pietermaritzburg, South Africa. This represents approximately 16% of the South African butterfly fauna. Another thirteen species not listed here have been recorded by two other studies. The conservation value of this garden is briefly discussed.

Key words: Botanic Gardens, conservation, Pietermaritzburg, South Africa, species list.

Introduction

Botanic gardens have important local conservation value for butterflies. They provide refuge for many insect species (Davies, 1978; Samways, 1989) in disturbed landscapes. As a result, botanic gardens generally have a higher insect diversity and abundance than surrounding areas (New, 1984).

Butterflies are the most popular insect taxon among the public, making them important flagships for the public's perception of invertebrate protection (Feltham, 1994). As botanic gardens are visited annually by many people they are of extreme value for increasing the public's awareness towards butterfly conservation.

With this in mind, this paper aims to provide a butterfly species list for the Pietermaritzburg National Botanic Gardens, South Africa. Providing species lists is one way of introducing butterflies to the general public. As a result, the list drawn up will be submitted to the Pietermaritzburg National Botanic Gardens, and made available to visitors.

Pietermaritzburg National Botanic Gardens, South Africa

The Pietermaritzburg National Botanic Gardens (30° 20' 43" S and 29° 36' 25" E, 690m a.s.l.) is situated on the outskirts of Pietermaritzburg CBD, in the Natal Midlands. Mostly residential areas surround it. It is 49 hectares in area and comprises three main biotope types: Firstly, the gardens, which are situated on flat ground and are dominated by mowed grass areas, with numerous flowerbeds. Secondly, a natural forest patch, situated on a hill slope, separated from the

gardens by a narrow river and small dam. Thirdly, a small natural grassland patch, situated above the forest patch on a flat-topped hill.

Species list

This species list is the result of approximately four years (February 1995 to October 1998) intensive collecting. All specimens collected are housed in the private collections of James Lawrence, Mark Brown, and the Department of Zoology and Entomology, University of Natal. Addresses are given above.

Most species listed were seen numerous times. However, some species were recorded only once (denoted by [1]), very rarely (denoted by [2]), or by the finding of a wing (denoted by [3]). Using Pringle, Henning and Ball (1994), and Henning, Henning, Joannou and Woodhall (1997) the family, sub-family, species (and common name) and sub-species (where applicable) taxa are listed. The species list is as follows:

NYMPHALIDAE

DANAINAE	
Danaus (Anosia) chrysippus aegyptius (Schreber)	African Monarch
Amauris (Amaura) ochlea ochlea (De Boisduval)	Novice Friar
Amauris (Amaura) albimaculata albimaculata Butler	Layman Friar
SATYRINAE	
Melanitis leda helena (Westwood)	Common Evening Brown
Bicyclus safitza safitza (Hewitson)	Common Bush Brown
Henotesia perspicua (Trimen)	Eyed Bush Brown
Paralethe dendrophilus albina Van Son	Bush Beauty
Cassionympha cassius (Godart)	Rainforest Brown
ACRAEINAE	
Bematistes aganice aganice (Hewitson)	Common Wanderer
Hyalites (Auracraea) rahira rahira (De Boisduval)	Marsh Acraea
Hyalites (Auracraea) anacreon (Trimen)	Orange Acraea
Hyalites (Hyalites) eponina (Cramer)	Dancing Acraea
Hyalites (Hyalites) cabira (Hopffer)	Yellow-banded Acraea
Hyalites (Hyalites) esebria esebria (Hewitson)	Dusky Acraea
Hyalites (Hyalites) encedon encedon (L.)	Common Mimic Acraea
Acraea (Acraea) horta (L.)	Garden Acraea
Acraea (Stephenia) natalica natalica De Boisduval	Natal Acraea

Acraea (Stephenia) oncaea Hopffer	Window Acraea
Acraea (Acraea) acara acara Hewitson	Acara Acraea
Acraea (Rubraea) petraea De Boisduval	Blood-red Acraea
CHARAXINAE	
Charaxes varanes varanes (Cramer)	Pearl Charaxes
Charaxes candiope candiope (Godart) [1]	Green-veined Charaxes
Charaxes jasius saturnus Butler [1]	Foxy Charaxes
Charaxes brutus natalensis Staudinger and Schatz	White-barred Charaxes
Charaxes druceanus cinadon Hewitson [3]	Silver-barred Charaxes
Charaxes cithaeron cithaeron C. and R. Felder	Blue-spotted Charaxes
Charaxes ethalion ethalion (De Boisduval)	Satyr Charaxes
Charaxes karkloof karkloof Van Someren and Jackson [3]	Karkloof Charaxes
NYMPHALINAE	
Cymothoe alcimeda trimeni Aurivillius	Battling Glider
Neptis saclava marpessa Hopffer	Spotted Sailer
Neptis laeta Overlaet	Common Sailer
Sallya boisduvali boisduvali (Wallengren)	Boisduval's Tree Nymph
Byblia ilithyia (Drury)	Spotted Joker
Eurytela hiarbas angustata Lathy	Pied Piper
Eurytela dryope angulata Aurivillius	Golden Piper
Hypolimnas misippus (L.)	Common Diadem
Hypolimnas anthedon wahlbergi (Wallengren) [2]	Variable Diadem
Protogoniomorpha parhassus (Drury)	Common Mother-of-Pearl
Catacroptera cloanthe cloanthe (Stoll)	Pirate
Precis (Precis) octavia sesamus Trimen	Gaudy Commodore
Precis (Precis) archesia (Cramer)	Garden Commodore
Precis (Precis) tugela tugela Trimen	Dry Leaf Commodore
Precis (Junonia) terea elgiva (Hewitson) [1]	Soldier Pansy
Precis (Junonia) natalica natalica C. and R. Felder	Brown Pansy
Precis (Junonia) hierta cebrene (Trimen)	Yellow Pansy
Precis (Junonia) oenone oenone (L.)	Blue Pansy

Precis (Junonia) orithya madagascariensis Guenee [2]	Eyed Pansy
Vanessa (Cynthia) cardui (L.)	Painted Lady
Antanartia schaeneia schaeneia (Trimen)	Long-tailed Admiral
Phalanta phalantha aethiopica (Rothschild and Jordan)	African Leopard
LIBYTHEINAE	
Libythea (Jera) labdaca laius Trimen [2]	African Snout
LYCAENIDAE	
LIPTENINAE	
Alaena amazoula amazoula De Boisduval [1]	Yellow Zulu
Pentila tropicalis tropicalis (De Boisduval)	Spotted Buff
THECLINAE	
Hypolycaena (Hypolycaena) philippus philippus (Fabricius) [1]	Purple-brown Hairstreak
Capys alphaeus extentus Quickleberge [1]	Orange-banded Protea-butterfly
Deudorix (Virachola) antalus (Hopffer)	Brown Playboy
Myrina silenus ficedula Trimen	Common Fig-tree Blue
Spindasis natalensis (Westwood) [2]	Natal Bar
Axiocerses tjoane (Wallengren) [2]	Common Scarlet
POLYOMMATINAE	
Anthene definita definita (Butler)	Common Hairtail
Cacyreus marshalli Butler	Common Geranium Bronze
Zintha hintza hintza (Trimen) [2]	Hintza Blue
Tuxentius melaena melaena (Trimen and Bowker) [1]	Black Pied Blue
Leptotes pirithous (L.)	Common Blue
Lampides boeticus (L.)	Long-tailed Blue
Tarucus sybaris sybaris (Hopffer)	Dotted Blue
Lepidochrysops patricia (Trimen and Bowker) [2]	Patricia Blue
Zizeeria knysna (Trimen)	Sooty Blue
Zizula hylax (Fabricius)	Gaika Blue

PIERIDAE	
COLIADINAE	
Colias electo electo (L.)	African Clouded Yellow
Catopsilia florella (Fabricius)	African Migrant
Eurema (Terias) hecabe solifera (Butler)	Common Grass Yellow
Eurema (Maiva) brigitta brigitta (Stoll)	Broad-bordered Grass Yellow
PIERINAE	
Pinacopteryx eriphia eriphia (Godart) [1]	Zebra White
Colotis (Colotis) ione (Godart) [1]	Bushveld Purple Tip
Colotis (Colotis) danae annae (Wallengren) [2]	Scarlet Tip
Colotis (Colotis) auxo auxo (Lucas)	Sulphur Orange Tip
Colotis (Colotis) antevippe gavisa (Wallengren)	Red Tip
Belenois (Anaphaeis) aurota (Fabricius)	Brown-veined White
Belenois (Anaphaeis) creaona severina (Stoll)	African Common White
Pontia (Pontia) helice helice (L.)	Meadow White
Mylothris agathina (Cramer) [2]	Common Dotted Border
PAPILIONIDAE	
Papilio dardanus cenea Stoll	Mocker Swallowtail
Papilio echerioides echerioides Trimen	White-banded Swallowtail
Papilio euphranor Trimen [1]	Forest Swallowtail
Papilio constantinus constantinus Ward [3]	Constantine's Swallowtail
Papilio demodocus demodocus Esper	Citrus Swallowtail
Papilio nireus lyaeus Doubleday	Green-banded Swallowtail
Papilio ophidicephalus phalusco Suffert	Emperor Swallowtail
HESPERIIDAE	
COELIADINAE	
Coeliades forestan forestan (Stoll)	Striped Policeman
Coeliades pisistratus (Fabricius) [1]	Two-pip Policeman
PYRGINAE	
Celaenorrhinus mokeezi mokeezi (Wallengren)	Large Sprite
Tagiades flesus (Fabricius)	Clouded Skipper
Spialia asterodia (Trimen)	Star Sandman

Spialia diomus ferax (Wallengren)	Common Sandman
Spialia spio (L.)	Mountain Sandman
HESPERIINAE	
Metisella metis paris Evans	Gold-spotted Sylph
Kedestes mohozutza (Wallengren)	Fulvous Ranger
Kedestes wallengrenii wallengrenii (Trimen) [2]	Wallengren's Ranger
Artitropa erinnys erinnys (Trimen)	Bush Nightfighter
Acleros mackenii (Trimen) [2]	Macken's Dart
Pelopidas mathias (Fabricius)	Black-banded Swift
Pelopidas thrax inconspicua (Bertoloni)	White-banded Swift
Gegenes niso niso (L.)	Common Hottentot Skipper

Discussion

Approximately 16% of South Africa's 632 butterfly species (Henning and Henning, 1989) were recorded from the Pietermaritzburg National Botanic Gardens during this study. However, this list is by no means complete. Two other studies (both not aimed at providing comprehensive species lists) conducted in this garden have recorded a further thirteen species not noted during this study. They are: *Azanus* sp. and *Graphium morania* (1991) Angus by Wood and Samways (1991); and *Stygionympha vigilans* (Trimen and Bowker), *Acraea neobule neobule* Doubleday, *Pardopsis punctatissima* (De Boisduval), *Byblia anvatara acheloia* (Wallengren), *Cupidopsis jobates jobates* (Hopffer), *Eurema desjardinsii marshalli* (Butler), *Colotis evagore antigone* (De Boisduval), *Belenois gidica* (Godart), *Graphium leonidas leonidas* (Fabricius), *Graphium policenes* Cramer and *Graphium colonna* (Ward) by Feltham (1994).

With at least 104 species, the Pietermaritzburg botanical gardens has a very high species diversity given its size (i.e. 49 hectares) and the degree of landscape disturbance surrounding it. Comparisons with a number of South African nature reserves clearly illustrate this point. For example, Umgeni Valley Nature Reserve, near Howick (approximately 35km north-west of Pietermaritzburg), has 88 butterfly species (Curtis, n.d., unpubl.); the Natal Drakensberg Park has 92 species (N.P.B. n.d., unpubl.); and the Legalameetse Nature Reserve, near Ofcolaco (in the Northern Province) has 85 species (Niehaus, n.d., unpubl.). The species richness of these three reserves will probably increase with more intensive observations. However, what is interesting here is that these three nature reserves are larger in size and surrounded by less of a disturbed landscape than the Pietermaritzburg botanical gardens.

Clearly, the Pietermaritzburg National Botanic Gardens are important not only for introducing butterfly conservation to the general public, but also to act as a valuable refuge for many butterfly species in the urbanised area of Pietermaritzburg.

Acknowledgements

The authors would like to thank the curator, Mr. Brian Tarr for allowing us the opportunity of collecting in the Pietermaritzburg Botanic Gardens.

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A TIME TO WONDER, GASHAKA-GUMTI NATIONAL PARK, KWANO OCTOBER 1994.

By D.P. Knoop F.R.E.S.,
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In October 1994, Tahiru Aliu and I arrived at Serti at night in the middle of a tremendous tropical storm after a 800 Km and fourteen and a half-hour drive from Enugu, Eastern Nigeria. We came a long way by road from Lagos, after a two day trip on roads reasonable by African standards. We spent the early morning organising and making arrangements with the National Park staff to get us into the park, promptly and as swiftly as time allowed. We set out at noon on top of a tractor pulling a trailer, filled with a mass of humanity sitting on the back with their goods and with a month's worth of food and supplies for our expedition. Hobbling along on a dirt track maintained by the Park, Tahiru, my collector and I had been asked to do a survey of Lepidoptera (Rhopalocera) for The World Wide Fund for Nature (WWF).

Upon entry to the Park, I made a mental note of species that can be easily identified on the wing. The area is quite undulating, and the vegetation mainly guinea Savannah with occasional Riverine forests. After some hours of hobbling along and being scorched by the sun, all of us were hot, sweaty and thirsty. As we progressed I noticed the streams and vegetation getting thicker as we descended into a valley. Up ahead, a large Riverine forest came into view, and as we enter I saw a lot of butterflies fluttering about, including some at rest on the damp sand near a stream.

The tractor's momentum soon had all of them buzzing around, and as we drove through I cannot help but reflect that this must be an excellent area for *Euphaedra*, *Bebearia* and *Euriphene*. I saw the ever present bright red *Euphaedra ruspina* dart away and as we emerged into the sunshine, I turned back to look at the forest. Suddenly, I noticed a big bright yellow-greenish with white and black bordered *Euphaedra*. I shook my head, blinked my eyes and took another good look at it again at a distance of 30 metres, just before it darted away as swiftly as it had come. Seeing is believing! What was that! Nothing comes close to that!

I knew at that very moment that I had seen an *Euphaedra* that is new to Science, but then you keep on wondering what it could have been. I come back to reality and I know what I have to search for and as I rack my brain, I can only think of the *Euphaedra*'s from Shaba, Zaire that could match the size and colouration of this species. As you can well imagine, I keep reflecting on this moment (even to this day) and realize that all my trips to the Lambillionea meetings at Tervuren, where I often met Mr. Hecq and learned about the difficult *Euphaedra* genus have really paid off.

Rain set in as we continued our journey into the Park, our goal for this day is Gashaka, an ancient town now degraded to the status of a village, in the past the residence of an Emir and the location of an old German fort (in ruins) and garrison. To this day I wonder if the then Lt. Schultz ever came this way on his journey to the Adamawa Mts. further North.

We crossed two major rivers, luckily the National Park had set up vehicle relay between the various natural barriers to facilitate the journey. Crossing the last river, a Landrover took us to the Park's guesthouse with all our gear and supplies.

We spent a few days collecting around Gashaka, in Savannah and Riverine forest, but with the afternoon rains and long high green elephant grass hampering our collecting efforts.

We planned our next outing to Kwano and porters were used to help us carry the equipment to the site of an old village, whose previous owners have been ejected from the park. We set out early in the morning after receiving assurances from our Saidu Isa our guide and Sule Tukur Zarto, a Biological Research Officer that it is a suitable and good area to collect. We hiked for hours through former farmland and savannah and at approximately 10h30, I noticed the vegetation was starting to get thicker and denser. Streams were frequent here, and as the day warmed up, more and more butterflies emerged on the wing. As I crossed yet another stream, I noticed lots of "winged" activity up ahead and rushed up to investigate.

The whole area is covered with small fruits, with multitudes of Nymphalid's feeding on the ground. Butterflies everywhere, I swung at something yellow, gingerly grabbed a large yellow *Euphaedra* and a large and strange *Euphaedra* unfolded from the pinch of my fingers . As I look and stare wide eyed and full of surprise, my heart pumping in my throat, I know that I am staring at something new! This is more than what I would call a primary experience! Not a new specimen for my collection, not a new record, but a new *Euphaedra*, but to recognize it as a new species! African *Euphaedra*'s are a difficult group to say the least! I am utterly and totally speechless (after 20 years of collecting!) and look once again, but I am distracted as more exotic bugs buzz around! With no time to waste, I netted another *Euphaedra*, this particular specimen has more blue than yellow (that's strange) and as Tahiru arrives, I pull out the two specimens and ask him to concentrate on this "type". Having recovered from my initial excitement, I walk up the valley slope and notice many other butterflies sitting and feeding over a large area. The leaves on the ground make some of them hard to spot and I gingerly step foot by foot looking for the different species. Even so, *Euphaedra*'s are highly sensitive to any type of movement and more often than not they dart away before you can even come close.

I soon realized that the species composition and diversity is not as broad as in a typical forest but it is more than I had dreamed possible for such a

locality this far North.

Collecting some more *Euphaedra*, I realised that there is another species that I cannot place, the other big surprise to me is *E. losinga* usually restricted to the rain forests. Tahiru and I spend two hours collecting there, catching close to 25 specimens of a mixed variety, where-upon we continued to Kwano. To my elation, I found it is a walk of only about twenty minutes, and near our main camp.

I ate a really quick lunch of local bread, and drank litres water to quench my thirst, as you can well imagine I was starving and a bit thirsty by this time!

I took a good look around, and facing due North, saw that we were right at the base of a steep mountain range and plateau that consisted of the mountains Chappel Shirgu and Chappel Hendu, which rise more than a kilometre in elevation. To the right of our camp was a large stream that came rushing down from the plateau above, and in the prolonged dry season this far north is the lifeline of this magnificent Riverine and Gallery forest.

After a quick bite, I hastily returned to the familiar spot and netted the following species: *Euryphura chalcis, Euriphene milnei, E. barombina, E. amicia, Bebearia guineensis, B. sophus, B. phantasiella, Euphaedra zaddachi, E. ceres*, *E. harpalyce* ssp. *evanescens, E. losinga, E. medon, E. themis, E. eleus, E. ruspina, Aterica galene, Evena erithea, E. angustata, Pseudoneptis ianthe* and *Pseudacraea eurytus,* just as the rain set in. Later that the afternoon, I open the papered specimens briefly and can only conclude that a second species is involved.

REGIONAL ROUNDUP

The season has moved quickly to mid-summer and the hot weather is hopefully bringing out butterflies in abundance. During this season my main concern has been studying *Poecilmitis aureus* and Pieter Roos and myself have had tremendous fun doing conservation research. I found it amazing that there are wonderful mountains within 100 kilometres of Johannesburg which are still to be explored and still yield valuable information on butterfly distribution. These mountains are also great fun to explore and make copious notes about vegetation, habitats and ants. An additional colony of *Poecilmitis aureus* was discovered just below 1800 metres on the farm Malanskraal, near Balfour, but just 100 metres inside Mpumalanga. This colony has a different host-plant, also a *Clutia*, and apparently a different ant! Pieter Roos, Keith Roos, JP Niehaus and myself made this discovery after travelling most of the way in Keith's 4X4.

I must admit that conservation research has become great fun but it does not add much to the collection besides larvae in alcohol and pupal cases. The interesting thing about conservation research is that even when you return completely empty handed you have been successful in elucidating distribution information.

I was also very pleased to see beautiful perfect specimens of *Aloeides dentatis* sitting on white scabious flowers at Ruimsig Entomological Reserve in Roodepoort. There has been very few recorded over the past couple of years so I was pleased that they have returned with the rains. I counted about twenty specimens which is average for the colony at any one time.

We had a society get-together at Rustenburg Game Reserve which was a lot of fun. We did not record a great number of species but roaming among the animals in these hills was worth the effort. The mothing proved better than the butterflies! Also some goliath beetles *Goliathus albosignatus* were seen on sucking trees in the camp, along with some *Charaxes.* A memorable sighting was of a leopard crossing the road on one of the nocturnal jaunts to the moth traps.

Messrs Curle and Collins went down to Margate during December and recorded a number of *Durbania amakosa albescens, Lepidochrysops ketsi leucomacula, Pseudonympha wichgrafi grisea* and *Thestor basutus basutus.* Their assessment of the conservation potential of this locality was not good. This project will have to be followed up during the course of 1999.

Please let the council know of any conservation issues that you come across.

GRAHAM HENNING

FURTHER ASPECTS ON THE LIFE HISTORY OF THE MYRMECOPHILOUS SPECIES *CHRYSORITIS DICKSONI* (GABRIEL), (LEPIDOPTERA: LYCAENIDAE)

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Abstract: Further information is given on the life history of *Chrysoritis dicksoni* (Gabriel), with an illustrated description of the final instar caterpillar and its ecology, indicating that it probably subsists entirely upon regurgitations obtained from the ant *Crematogaster peringueyi* Emery and that the presence of scale insects (Homoptera) appears to be essential to the caterpillar through the trophic activities of the ant. It is confirmed that the final instar has a functional DNO as well as TOs; also that it is capable of emitting drumming sounds.

Key Words: Lepidoptera, Lycaenidae, Lycaeninae, Aphnaeini, *Chrysoritis*, myrmecophily, trophallaxis, drumming, life histories.

INTRODUCTION

The endangered species *Chrysoritis dicksoni* (Gabriel, 1946) was placed in *Phasis* Hübner, 1819 in its description. It was subsequently placed in a monotypic genus *Oxychaeta,* erected for it by Tite & Dickson (1973). In my revision of the tribe Aphnaeini (Heath, 1997) it was placed in the genus *Chrysoritis* Butler, 1898, due to its morphological affinity to that genus. Subsequent DNA sequencing at Harvard University (Rand, 1998) has justified this decision by indicating that it may be the closest relative of *Chrysoritis oreas* (Trimen, 1891), the type species for *Chrysoritis.*

The life history of *dicksoni* has long remained an enigma, Clark & Dickson (1971) concluding that the insect (as *Phasis dicksoni*) was aphytophagous. They described and illustrated the egg and first instar caterpillar noting that a pair of rudimentary TOs (tenacle organs) were present. They also described and illustrated the pupa and final instar, however, the photograph did not show any useful detail. It was still not known what the caterpillar's diet was, nor if any instar had a DNO (dorsal nectary organ). They recorded that a very large number of final instar caterpillars and pupae had been found inside one of the nests of the ant *Crematogaster peringueyi* Emery.

Heath & Brinkman (1995) described and illustrated the second larval instar and the pupae. We showed that in addition to a pair of TOs, a DNO appears in the second instar and that ant regurgitations appear to form its only diet during the first two instars. We also suggested that scale insects (Homoptera, Coccidae) play a vital but as yet unknown role in the ecology of the butterfly.

Recent attempts to obtain caterpillars for study have been hampered by the demise of the Cape Town population. In September 1990, a colony was discovered by E.L.L. & A.E. Pringle near Vermaaklikheid, on the Cape south coast (cf. Pringle, 1990) and so a visit to the site was planned for mid-winter 1998.

Materials and methods

The newly discovered locality of *C. dicksoni* was visited on 30th May 1998. A *Crematogaster peringueyi* ants' nest within the flight area was selected for examination. In order to locate caterpillars, sections of the nest were removed with a large knife, starting from the top of the nest, working halfway down; the nest was then turned on its side and the lower portion examined closely for *dicksoni* caterpillars. A segment of the nest was collected, including a limited quantity of brood and four *dicksoni* caterpillars. The nest was quickly piled together again and lightly moistened to facilitate repair work by the ants. Four short sections of stem infested with scale insect were collected from a nearby plant. All collected scale, nest, ants and caterpillars were transported home in plasic food containers.

The ants were divided into two groups. One group consisting of nest sections, was placed in a formicarium arena consisting of a rectangular glass fish tank 25mm x 27mm x 27mm high with a sealing lid of perspex. The other group consisted of the scale infested stems together with attendant ants and a few brood placed in a shallow plastic food container 185mm x 110mm x 4mm high with a sheet of glass laid on top to prevent escape but to facilitate study under magnification. Both groups were provided with a small amount of dilute veld honey. Following a week of study, two of the caterpillars were photographed and then preserved in alchohol.

A sound amplification device (drum) was constructed to determine if the caterpillars were capable of emitting sounds. It consisted of a tube of thick cardboard 50mm diam.x 300mm long (as used for mailing maps). A piece of brown paper was taped tautly over one end to form the drum membrane. A caterpillar was placed on the membrane and allowed to obtain a firm grip on the substrate before placing the other end to the ear. Listening was done in five minute spells, firstly without ants and then repeated with two ants which had previously attended the caterpillar, placed beside the caterpillar.

In order to compare sounds emitted by *C. dicksoni* with those of related species, a short field trip was made to veld near Melkbos Strand where two final instar caterpillars of *C. thysbe osbecki* (Aurivillius) were collected, each with a few attendant *C. perengueyi* ants. Two larvae of *Aloeides* species were also obtained, *A. pallida grandis* Tite & Dickson and *A. pierus* (Cramer). After sound emission tests were completed, a preserved caterpillar of each species was sent to M.A. Travassos at Harvard University for examination by scanning electron microscopy to determine the source of the sound.

The terms pupa, caterpillar and instar in this paper apply to the immature stages of a lycaenid butterfly; the term brood applies to immature ants.

Results

ECOLOGY: The ants' nest was of a carton type typical of the species, measuring approximately 180mm diameter by 250mm high and located on the ground. During a search of the ants' nest it was noted that some brood were present but in small quantity only. Four *dicksoni* caterpillars were found below the ants' nest in the debris caused by it being overturned, by which time the ants had made further detailed study very difficult. Later examination of the collected portion of

ants' nest revealed yet another final instar caterpillar resting within an exposed passage or compartment [Fig.1]. The compartment was open-ended and partially silk-lined. A nearby woody plant *Metalasia calcicola* Karis (Asteraceae) about one metre from the nest was heavily infested with scale. The scale infested stems were partially covered in a cryptically coloured grey fibrous material, constructed to allow ants passage and space to attend the scale beneath this protective covering with one or two openings for ant access. No caterpillars were found under these fibrous coverings. The habitat consisted of mature limestone fynbos, however, the colony in question was very close to where the vegetation had been shortened to form a firebreak. Another plant in the area found to be similarly infested with scale was *Metalasia pungens* D.Don (Asteraceae).

CATERPILLAR: All *C.dicksoni* caterpillars found appeared to be in the final instar; one of them, assumed to be a little younger than the others, was 14mm and the others were approximately 16mm long (unextended). Each caterpillar possessed a functional DNO and a pair of TOs [Fig.2]. They had a dull, scaly appearance to the naked eye, greenish-grey in colour and onisciform (woodlouse-shaped), the distal two segments partially flattened, the head capsule retracted beneath the prothorax. The most common posture was of constriction of the proximal third of its body with a slightly swollen distal portion [Fig.3]. Under magnification the exposed larval skin was seen to be densely covered by mushroom-like setae with little or no space between them [Figs.5 & 6]. Most of these setae were slightly convex with a glossy upper surface but some were concave. They were either black or transluscent, their rims being smooth or slightly serrated. An uncommon seta of a specialised type was located singly on some segments, this seta was very small, orange-brown and shaped like a curved bottle-brush [Fig.6]. Beneath the mushroom-like setae were numerous short, minute, black, needle-like setae. The inter-segmental joints, were greeny-yellow and mostly glabrous, their margins having dendritic setae with three to nine pointed branches emanating from a single swollen point along their length [Fig.7].

BEHAVIOUR: When exposed to light, the caterpillar found inside a section of carton nest made no attempt to move away, despite showing signs of alarm by continuously vibrating the setae within its TOs throughout the observation. It was attended by two to three ants close to its head; the caterpillar's head being withdrawn beneath its carapace and the proximal third of its body was constricted so that each segment was compacted. Its distal two thirds were inflated, revealing the pale inter-segmental joints. When this caterpillar was re-examined ten days later it was found to have pupated inside its compartment; it emerged as a female on 18th July.

One of the other caterpillars was placed together with three attendant ants beside a few ant brood of different sizes and observed under magnification. The caterpillar seldom moved from its position but, when it did so, it took no interest in the brood. A similar test with scale insects indicated no interest in scale either. These tests were later repeated with each of the caterpillars but the results were the same. During the first four days of observations the DNO was occasionally seen to produce a droplet of honeydew which was consumed eventually by a

nearby ant, however, the attention paid to the DNO was not as continuous or intense as experienced for other *Chrysoritis* caterpillars (own obs.). After the first five days, no further honeydew was observed.

The other three *C. dicksoni* caterpillars were left in a plastic food container with three stems infested with scale together with a few broken portions of the carton nest containing ants and brood. Daily observations during daylight hours were made of one caterpillar which remained fairly visible; it was continuously attended at its head by one to three ants, whilst the DNO was attended infrequently. The main portion of the caterpillar's body sometimes had one or two ants standing upon it; they would spend most of the time motionless but sometimes appeared to groom the caterpillar. The caterpillar remained in the one place for several days, moving little more than 10mm during this period. On one occasion, an ant attempted to nibble at a small object on the caterpillar's skin and would appear to tug at it; it is assumed that the object was one of the bottle-brush setae.

Trophallaxis was initiated by the caterpillar raising its front portion and head toward a passing ant. The mouthparts would meet and be locked together for almost half a minute at a time [Fig.4]. Prior to and during this process one or two of the attending ants were seen in a hunched-up posture, grooming themselves almost continuously; these particular ants seemed to have difficulty walking, exhibiting jerky movements which slowed them down considerably. The unaffected ants were often seen to groom and pass food between each other. Trophallaxis with the *C. dicksoni* caterpillars was not seen after the first week of captivity despite attempts by caterpillars to solicit food; these attempts took place in the evenings and was followed by a restless behaviour as if the caterpillars were searching for food or applying silk to the substrate. During this searching behaviour, a caterpillar would move very slowly, whilst remaining within a radius no more than its own body length from its original position. Two days later it would still be found in the same place.

Pupation was observed on 15th June in one caterpillar, having spent the previous two days in a hunched position. After shedding its skin it was a creamy-white colour which changed to brown overnight and took on the normal pupal shape (pupa illustrated by Heath & Brinkman, 1995); it emerged on 29th July. During observations of all the caterpillars, none were seen to wander from their positions at all. On several occasions a caterpillar was deliberately removed from its normal position and placed in a totally new position, where it would remain, day after day. When placed on the brown paper drum for the drumming test the caterpillar remained almost stationary; it was still on the drum two days later, having moved no more than a few millimetres and on one occasion was seen to accept ant regurgitations, whilst there.

LARVAL DRUMMING

When the *C.dicksoni* caterpillar was placed on the outer paper surface of the 'drum', a series of tapping or drumming sounds were heard, which did not correlate with any movement detectable to the naked eye. These drumming

sounds occurred frequently, both with, and without ants being present; they occurred as single taps and as bursts of rapid double, triple or quadruple taps. Under microscopic examination, the proximal portion of the caterpillar (the only portion examined) was seen to produce minute, fast, short jerks in a distal direction which corresponded well in frequency, to the drumming sounds emitted.

Very similar drumming sounds were heard from each of the caterpillars of *C. thysbe osbecki*, *A. pallida grandis* and *A. pierus* which were, in turn, placed on the drum; but in one of two specimens of *C. thysbe osbecki* these sounds were occasionally interrupted by short bursts of a fairly high-pitched buzzing sound, analogous to the sound produced by a fly trapped within a crystal wineglass.

Discussion

Clark & Dickson (1971) showed that first instar caterpillars would not eat any plant on which the adult oviposited; this together with the reluctance to feed upon ant brood during the first two instars (cf. Heath & Brinkman, 1995) or the final instar (this study), suggests another diet. The reluctance of the caterpillars to wander in search of food in either the first, second or final instars suggests that food is normally brought to them, this was eventually confirmed when trophallaxis was observed. The first two instars are sustained solely by trophallaxis (cf. Heath & Brinkman, 1995) and this study suggests that this is also true for the final instar. Nothing is known of the presumed three instars between second and final but it seems possible that their diet would remain the same. It is probable therefore, that the caterpillar survives entirely on the food provided by its host ant. Cottrell (1984: 25) doubted that homopteran secretion passed on by the ant would constitute a complete diet for a caterpillar. Although the total extent of the ants' diet in this study is not known, it would appear that the homopteran secretion must have formed a significant, if not major part.

Elmes *et al.* (1991) studied behaviour of the caterpillar of a palaearctic 'Large Blue' butterfly *Maculinea rebeli* Hir. whose host ant is *Myrmica schenki* Emery. They noted a functional DNO was present and showed that under laboratory conditions, the caterpillar rarely went in search of food, only doing so when hungry, it preferred to be fed directly by the host ant; their liquid food consisting of ant regurgitations and their preferred solid food being ant-eggs, some of which were believed to be infertile 'trophic' eggs. However, Fiedler (pers. com.) stated that ant eggs are seldom used as food by *M. rebeli*. The final instar caterpillars of *Aloeides pallida grandis* Tite & Dickson which lacks a DNO (pers. obs.), appears to subsist mainly on ant regurgitations but on one occasion were seen to feed on eggs of the host ant (Claassens, pers. com.). During the first two instars (cf. Heath & Brinkman, 1995) and the final instar (this study), the *C. dicksoni* caterpillars showed no interest in ant brood, despite exposure to them. Larsen & Pittaway (1982) when studying *Cigaritis acamas* (Klug) concluded that the caterpillars subsisted wholly on food provided by the ants, observing only regurgitations being supplied. They also noted the existence of a DNO in the final instar.

The first and second instar of *C. dicksoni* showed an affinity toward scale insects by staying close to them (cf. Heath & Brinkman, 1995), however, it is not known how the caterpillars move from the scale insect on the plant stem into the

ants' nest. It is possible that they are carried by the host ants as is done in *Lepidochrysops* and *Maculinea* species.

The scale insects in this study were almost certainly deprived of sap after a few days in captivity because of the host plant stems being cut; also the ants were unable to forage freely in the normal way, hence the crop contents passed-on to the caterpillars would have changed. This might have affected the behaviour of caterpillars whilst in captivity.

It should be noted that tests for drumming sounds done on the last remaining caterpillar took place two weeks after its collection, hence its condition had probably suffered. It is just possible that sounds other than drumming might have been produced had the tests been conducted earlier.

Heath & Brinkman (1995a) describe the appearance of the DNO in the second instar, which is typical of the *Chrysoritis* and unlike other genera within the tribe Aphnaeini (Heath, 1997), the DNO normally appearing in the third instar. Although the DNO was visibly active and moist in the second instar it was not seen to exude fluid. It was thought to produce a volatile substance which affected behaviour of the ants (Heath & Brinkman, 1995), although it is also possible that the PCOs (pore cupola organs) could have been responsible. They noted that nearby ants were seen to cringe and walk in a jerky manner as if under the influence of alcohol. Similar behaviour was observed in some of the ants attending the final instar in this study. It seems probable that an attractive or passifying chemical is produced which causes the ants to remain in attendance and to behave in the described manner.

The very local, fragmented populations of *C. dicksoni* begs the question. Why so fragmented? The host ant is abundant almost everywhere in the Western Cape Province and, since the butterfly does not appear to rely directly on any plant for survival, it follows that one or more other factors must limit its distribution. Heath & Brinkman (1995) suggested that the scale insect played an important role in the butterfly's distribution and life history. They also showed that although the adult was stimulated to oviposit in the presence of ants from its nursery nest or from close by, it would not do so in the presence of the same ant species from a totally different locality. It seems likely that the secretion of the scale, when regurgitated by the ant, is an essential dietary ingredient for the caterpillar. It is also possible that an adult female can detect this when ovipositing, however, both scale insects and *C. perengueyi* ants are fairly widespread but the butterfly is known to be exceptionally local.

Conclusion

It is probable that the entire larval phase of *C. dicksoni* relies on ant regurgitations as its only food source and that the scale insect secretions, when regurgitated by the ant, form an essential ingredient in the caterpillar's diet. The addition of ant eggs to its diet remains a possibility although it seems unlikely in view of the caterpillar's sedentary behaviour.

ILLUSTRATIONS
Final instar myrmecophilous caterpillar of C. *dicksoni*

Fig .1 Final instar caterpillar as found in the ant's nest and which later pupated there.

Fig .2 Distal portion of a caterpillar showing the two tubercle organs on the 8th abdominal segment and the dorsal nectary organ which can be seen between the 7th and 8th segment.

Fig.3 Final instar caterpillar in the resting state, with its proximal portion constricted.

Fig.4 Trophallaxis taking place between the host *Crematogaster peringueyi* ant and final instar caterpillar.

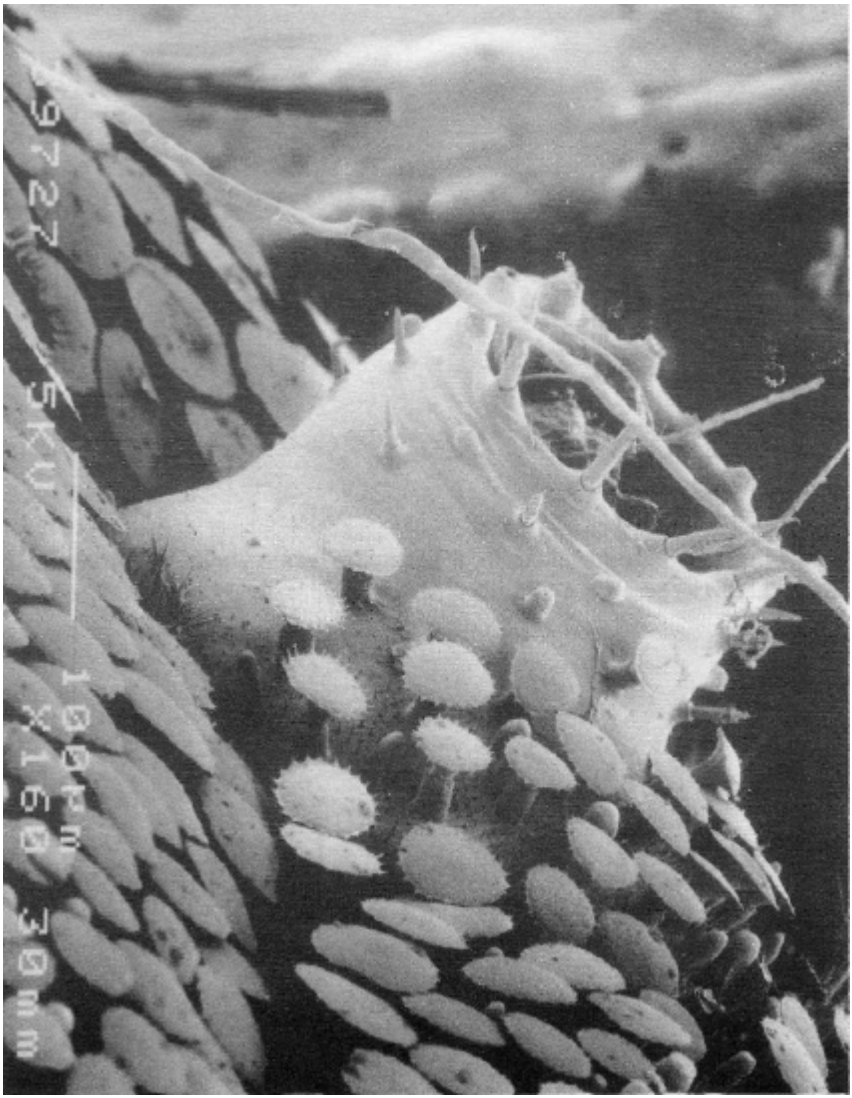

Fig .5 One of the two tubercle organs on 8th abdominal segment (the 16 spikes located on the rim of the turret suffered damage during SEM preparation). Densely packed 'mushroom' and other setae surround the base of turret.

Fig.6 Uncommon specialised 'bottle-brush' seta, surrounded by a protective armour of 'mushroom' setae.

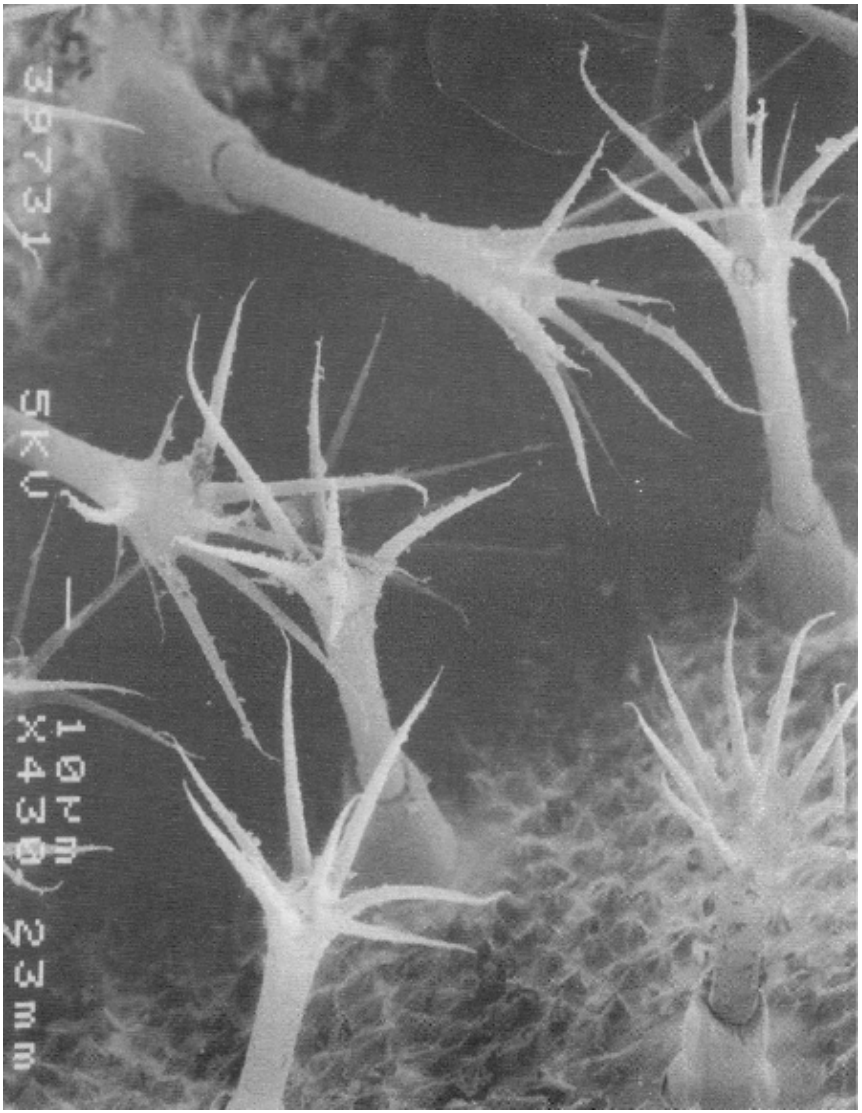

Fig .7 Dendritic setae typical of those located between segments.

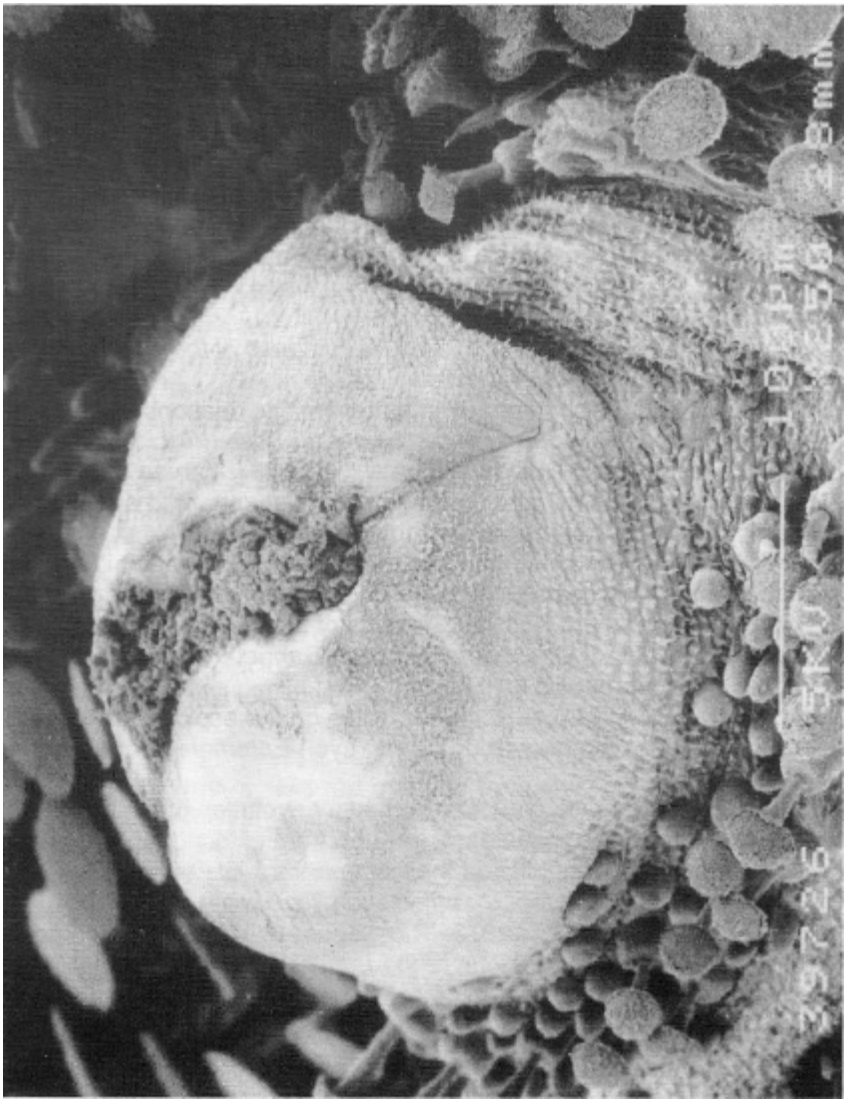

Fig.8 Everted ONO of mature caterpillar surrounded by pore cupola organs and other small specialised setae.

The provision of regurgitated food by the ants may be induced by chemical signals emitted by the caterpillar, which mimic ant brood pheromones, these signals may possibly be emitted by PCOs located around the DNO and the spiracles. It is suggested here, that the DNO, as a nectar source, may be in the process of becoming a redundant organ in *C. dicksoni*.

Acknowledgements
I would like to thank the Department of Zoology, University of Cape Town, through the Charles Dickson Research Grant for financial assistance in this study. I would also like to acknowledge Jan Vlok for the identification of the two plants. Finally I wish to thank Mark Travassos and Yuan Lu, Harvard University for the scanning electron microscope photographs.

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VARIATION IN THE LARVAE OF *ALOEIDES DEPICTA* TITE & DICKSON

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Introduction

A number of final instar *Aloeides* larvae were found under a small stone on the farm Huntly Glen in the Bedford district during July and August 1997; they were associated with *Acantholepis* ants - probably *Acantholepis capensis* Mayr. These larvae were identified as those of *Aloeides depicta* Tite & Dickrnn, which is the only *A!oeides* known from the site upon which they were collected.

They were compared with final instar larvae of *depicta,* as illustrated by Gowan Clark, and certain small differences were noted. In addition, variation was observed between larvae in the same colony - a fact which has not, until now, been noted for this genus of Lycaenid. A brief description of the dominant colour variety is given hereunder, followed by details of differences with the larvae illustrated in Clark and Dickson, as well as details of variability in larvae from the same colony. Unfortunately, repeated disturbance of the stone under which the colony was found resulted in the ants relocating themselves and the larvae within a period of two weeks; not withstanding an intensive search, it was not possible to find their new nest. This curtailed further observations into their biology.

Description

Final instar larvae of *Aloeides depicta* Tite & Dickson. (Fig. 1)
Length 16mm. Head black, with light stripe down the centre, splitting into a Y shape above the mandible; small yellow patch on each side of this stripe. Thoracic segment with blackish plate, bisected in the centre by a light line. Plate dark in centre, becoming lighter, with a dark patch on the outer edge. Black spiracle on each side of plate, with a faint red marking frontally. Ground-colour blue-green, becoming green ventrally. A well-defined but irregular dark red mid-dorsal double stripe runs from the rear of the thoracic shield to the anal shield. These mid-dorsal striae are flanked on segments Ill to X by.another thin irregular red line running to a conspicuous yellow spot at the rear of each segment. Below this is a broad, broken, irregular red band, and beneath this band a series of red patches on both sides of a black spiracle. Just above the legs and prolegs, a faint yellow line runs the length of the larva. Setae bold, black, positioned as illustrated in Clark and Dickson; rear setae longer, as are the setae below the spiracles.

Conspicuous white-centred black tubercles are on both sides of segment XI; tubercle hairs thin , elongated, and not spined. Anal shield flattened, covered in irregular reddish markings, and with a small black patch in the centre rear.

There is no honey gland.

Comparisons with the illustration in Clark & Dickson

The head is not plain black, but has a central stripe, with a single yellow patch on each side of the stripe, as mentioned.

There are no white markings in front of the thoracic plate, or light patches

Fig. 1. *Aloeides depicta* Tite & Dickson final instar larva variety A.

Fig. 2. *Aloeides depicta* Tile & Dickson final instar larva variety B.

behind it. Reddish markings more distinctly linear in conformation, particularly the mid-dorsal double line. Nevertheless, these comparisons have been made with water-colour paintings, and the possibility of inaccuracies in the paintings cannot be excluded.

Comparisons with a second variety (Fig. 2.) of larva found in the same ants nest.

This variety is structurally identical, but has a lighter, greener ground-colour. The reddish markings are comparatively suppressed and vaguely defined. The conspicuous yellow spot on both sides cf the mid-dorsal striae on segments Ill to X is absent, as is the faint yellow line above the legs and prolegs.

Discussion

Variability among the imagines of this genus has resulted, over the years, in serious taxonomic problems. It has always been assumed that a detailed study of the larval stages of these *Lycaenid* butterflies may solve these problems. These findings indicate that colour differences in *Aloeides* larvae should, like colour variations of the imagines, be treated with great caution: before any taxonomical conclusions can be drawn from such differences, these should be well defined, consistent and structural in nature.

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1998 CONFERENCE AND AGM 24-25 OCTOBER 1998

A QUICK LOOK AT THE PROCEEDINGS

By Steve Woodhall
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It was a bit strange for August to pass and no Lepsoc Conference. We normally get so fired up at this event that we end up visiting various spots way too early and spend the time drinking too much Castle because nothing is flying. And after these disappointments, we would ease our way gently into the season. This time we were well into the season and on the whole this was a success. We had a good attendance and saw some people who hitherto never made it to the AGM. It was good to see Colin Congdon again and at long last I met Ernest and Anne Pringle. And last but not least, Stephen Henning made it from the UK and graced us with his presence. I have to say it was sad that this was the first AGM without Bill Henning – we missed him and I'm sure all will join me in wishing him a return to good health. Rolf Oberprieler also left a void with no Saturnid Soap Opera at the conference – let's hope he can make it over from Oz soon with some pix of Antipodean Emperors.

I have to own up to a ghastly case of cocktail flu on the Saturday morning, this really having nothing to do with Martin Lunderstedt's 39th birthday which was celebrated at my place the night before…

We kicked off with the usual AGM, which was "Curle-tailed" with Alf having to squeeze in the treasurer's report at the end in a matter of seconds. I had to admire his technique – I always ended up in the middle of proceedings with a lot of explaining to do! I was impressed with the level of professionalism in the council, and that we are joining the great circle of lepidopterists around the world. It was an eye-opener that Steve Collins had attended a Lepidoptera conference in the US at which he was the only "amateur"!

The timing of the proposed next ABRI conference in Cape Town was discussed at some length. This promises to be the party of the decade as well as a pretty good conference – we will be able to introduce our international guests to the delights of Chrysoritis, Thestor and Cantina Tequila. I don't envy the working group the task of choosing the best date. As long as I can wangle a business trip to coincide with it…

After tea, we had an interesting mini-conference on lepidoptera databasing. Douglas Kroon, Alan Gardiner, Bennie and André Coetzer had all approached this topic from different angles. I suspect that at the end of the day it doesn't matter whose database design you use as long as it works for you! Each system had its own pros and cons, and all I can say is it is a very long way from the messy little Q&A database I used to use. Full marks to all for the effort put in, and for rekindling my flagging enthusiasm for getting my bugs & pix catalogued properly. One surprise was young Pierre du Toit who exhibited a very professional knowledge of such esoterica as JPEG and TIF and BMP files. I thought these denoted which of my friends were sending me naughty pix on the Internet, but there are important differences and in pointing them out Pierre neatly volunteered himself for the job

of Lepsoc Webmaster… Joking aside, I was at the ABRI conference when Dick Vane-Wright articulated the dream of a worldwide lepidoptera database to which we could all submit data and extract information. This was a great step towards this becoming reality.

However, as our secretary pointed out, all of this is academic if we continue to hoard information to ourselves and not share it freely. Not only this, but we collectors face our hobby becoming more and more circumscribed. The authorities always seem to see us as being part of the problem rather than part of the solution, and collecting permits are harder and harder to come by. This is not helped by those of us who know of the localities of rarities and appeal to the authorities to protect them, not only from habitat destruction, but also from our fellow collectors! All this does is to destroy the careful work of the council in developing co-operative relationships with the authorities. As was pointed out, if you do this, you are not only stabbing your society in the back, you are ultimately stabbing yourself in the back as well.

Lynn Fisch of the National Botanical Institute then gave us the low-down on plant collecting and curation. How many of us have picked specimens of new foodplants and let them get all bedraggled in plastic packets instead of treating them with the same respect as our butterfly specimens? Come on, we've all done it. I know I have. At least I will know how to put my bits of plant between sheets of newspaper before I use Pennington's to press them! The labeling procedure followed by Lynn is exhaustively complicated but again, many of us could learn from it, for the labeling of our lepidoptera. Her method is as far away as "Near Stutterheim, Cape, Nov.19XX" as one can get!

After lunch, Alf and Neville Curle took us through a travelogue of their exploits over the past year. I thought Alf was remarkably kind to certain individuals – he mentioned nothing of early morning physical jerks or walks back up mountains to retrieve car keys left up there…One could really see how active the pair of them have been and how much ground has been covered. Having been lucky enough to accompany Alf on some of these trips there were many happy memories recalled here. The excellent photographs helped bring the insects and localities to life for the audience.

Esther van der Westhuizen then gave us an idea of the value of lepidoptera in education. I wish there had been establishments like hers in the wet, sodden north of England when I was a lightie. Kids don't know they're born today… when I wuz a lad, we had to make do with cabbage whites and only could dream of such wonders as Morpho peleides. We had to find it all out for ourselves, whereas any parent taking youngsters to Butterfly World walks away with budding FRES's!

After the photographic competition (more of that later) all of us repaired to Mark and Tildie Williams' home for the braai. This was rather a decorous affair compared to previous years, probably due to the usual suspects having expended their energies the night before. The emphasis was more on quiet conversation and making friends than on dancing to wild music and falling over… perhaps we are getting older, after all!

The next morning saw Lundy and I missing Ernest Pringle's report back on the Brenton Blue. Aha, I hear you say – overindulgence! But you are wrong…we

simply had to go and get the prizes for the photographic competition. Sorry I missed your presentation, Ernest!

Esther then shared with us her experience of the International Congress of Butterfly Exhibitors and Suppliers in Florida. It was fascinating to see the level of professionalism in this field, and the worldwide scope of the business. The sustainable use of lepidoptera is the other side of the conservation coin, and it was instructive to see how well developed it is outside Africa. There were also some great slides of Neotropical lepidoptera, which it was nice to see for a change!

Herman Staude has been doing sterling work with the geometrid genus *Callioratis*. The discovery by Andrew Mayer of the new species from Queenstown in the same year Herman got up to Kenya to find *C. apicisecta* was really something, as he showed us in his "On realising a dream…" slide show later. I really don't think of these beautiful insects as moths – they should be called butterflies! The trip Herman and Steve Collins undertook to find *C. apicisecta* was really something and it made me decide that in 1999 I will DEFINITELY go on another safari up north. Herman's photography is superb and I'm sure a few of us resolved to have a go at the other 24 superfamilies in the lepidoptera soon…

Alan Gardiner did a wonderful job of confusing us all with his pictures of the bewildering variety of colour forms of Lepidochrysops he has collected. The lesson was, just because we might find a population of blues with a slightly different colour to others, it doesn't mean another new species! And yet… perhaps all these insects are in the process of speciation right now… there was food for thought here.

Remaining with things lycaenidous, Alan Heath next showed us some of the amazing things he has been photographing down in Cape Town. At last someone is starting to get inside the weird life histories of *Chrysoritis dicksoni* and the genus *Thestor*. Having been to Alan's place and seen the trophallaxis of *Thestor* larvae with *Anaplolepis* ants, all I can do is to marvel at his patience in getting photographs of this.

Before lunch, Steve Collins showed us some of the latest mouthwatering acquisitions of ABRI. That new *Charaxes fournierae* from Ghana…phew! And all those gynandromorphs, and gorgeous long tailed *Iolaus* species… sometimes I think Steve is a bit of a sadist, I saw him chuckling to himself at the tortured moans of envy (some of them mine, I admit) emanating from the audience! He was also able to give us a report back on developments at ABRI, with the new buildings beginning to take shape. How he manages to do all this and be a captain of industry as well is a mystery – I think he actually has a secret identical twin!

I then shared a few pix of the localities I had visited during the past year. Those of you who missed the conference will be glad to know that you also missed such revelations as the real spot for *Chrysoritis adoni*s…

Pierre le Roux, after lunch, gave us some insights into the joys and pitfalls of large-scale lepidoptera breeding. One hazard I had thought unique to Planet Woodhall was lepidopterophagous canines. I had a sleeveful of *Charaxes vansoni* larvae fall victim to a Labrador once and I put it down to the white netting acting as an irresistible plaything. Apparently not – dogs actually eat larvae!

Martin Krüger was scheduled to talk about "Entomology, etymology, and the formation of names". This started out informative but a little dry, with a good summary of how the Linnaean system works. Then Martin's sense of humour started to take over and some of the weirder names people have given to poor unsuspecting organisms were unveiled. I spent the second half of the talk doubled up with laughter and unfortunately I can only remember the examples we really could not print here, even if they are genuine scientific names!

Finally we had Herman's account of his year's successes, already alluded to above. The only problem with having such a red-letter year is… what do you do next year?

The conference was wrapped up by the results of the photographic competition, with prizes donated by persons anonymous. I am sure the rest of the Society joins me in thanking them, whoever they are… We used peer judging again, which seems to work very well, except that no one remembered to write down the names and authors of the winning slides – oops! This year some new talents emerged, notably Alan Gardiner's friend……., and Keith Roos came into his own. The trend seems to be away from record shots and towards behavioural photography. Keith won Slide of the Year with his stunning shot of a *Lachnocnema bibulus* adult milking aphids with attendant ants. Something I have wanted to photograph for years – and perfectly exposed and focussed as well. Well done Keith!

A NEW SUBSPECIES OF *TYLOPAEDIA SARDONYX* FROM NAMIBIA

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Abstract: The genus *Tylopaedia* is discussed and a new subspecies is described from near Windhoek, Namibia.

The genus *Tylopaedia* was described by Tite and Dickson to contain the species *Zeritis sardonyx* Trimen , 1868.

Tylopaedia Tite and Dickson, 1973.
Bull. Br. Mus. nat. Hist. (Ent.) **29**: 232.
Palpi: smooth, second segment covered with scales of uniform length. Legs: spur at lower extremity of tibia absent on all legs. Venation, fore wing: vein 5 arising much nearer origin of vein 6 than that of vein 4; vein 10 arising far from origin of vein 7; vein 7 arising well beyond junction of vein 6 and discocellular vein. Wing shape: fore wing distal margin only slightly produced at vein 5; hind wing with distinct tooth at vein 4, and another at vein 1, margin between slightly concave and crenulate. Larval characters: egg flattened; club-like dorsal setae in early instar larvae.
Life history by Clark & Dickson (1971), Schlosz & Brinkman (1991).

Tylopaedia sardonyx Trimen
Zeritis sardonyx Trimen, 1868. *Trans. ent.* Soc. *Land.* 1868:83.

Tylopaedia sardonyx sardonyx
In November 1864 two specimens were forwarded to Roland Trimen, one by D. Kannemeyer from Burghersdorp and the other by J. Muskett from Murraysburg. The nominate race is usually large with strongly angular wings, broad black markings and a reddish-orange ground colour on the upperside. The underside hind-wing is usually pinkish fawn with a distinct silvery white postdiscal line edged with black.

Distribution
Inhabits the Karoo biome in the Western Cape, from as far west as Montagu to the southern Free State, Northern Cape and Namaqualand.

Tylopaedia sardonyx form knobeli van Son
Tylopaedia sardonyx form knobeli van Son, 1959. *Koedoe,* 2:56.

This population was described as a form from a male and two females collected in the Nossob River bed, 12 miles north of Twee Rivieren , Kalahari Gemsbok National Park.
It is a lighter orange than the nominate and consistently has the dark markings of dry specimens. The colouration is in keeping with the arid habitats where it is found.

Distribution
It has been recorded at various localities in the Northern Cape; Uppington, Olifantshoek, Sishen, Kuruman and in south-western Botswana. Inhabits Kalahari thornveld.

Tylopaedia sardonyx peringueyi Aurivillius
Phasis sardonyx ab. *peringueyi* Aurivillius, 1929. *Macrolep. of World* 13:430.

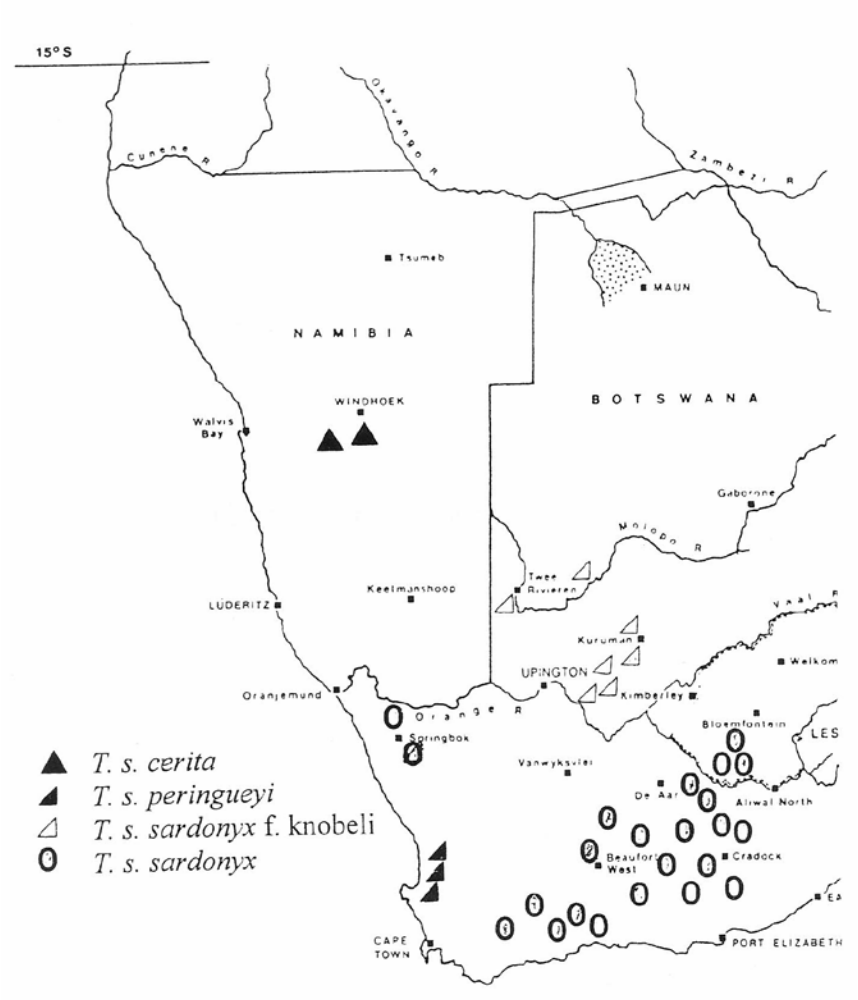
This subspecies is smaller and more richly coloured than the nominate with squarer wings and characteristically lacking the postdiscal line on the hind-wing underside.

Distribution
It inhabits fynbos from north-western parts of the Western Cape, from Piketberg to Klawer and southern Namaqualand.

Tylopaedia sardonyx cerita **ssp. n.**

Type material
Holotype male. Namibia: Regenstein, 4.xi.1995, F. Swart. Paratypes 20 ♂, 11 ♀ same data; 1 ♂ Kupferberg Pass, W of Windhoek, 5.iii.1988, R.D. Stephen.

Description
Male. Fore-wing length: 15.0-21.8mm, mean 18.4mm (n=9); antenna-wing ratios: 0.45-0.50 mean 0.47 (n=9).
Wings, upperside. Fore-wing: Ground colour orange becoming paler distal to narrow black discal band. Outer marginal band black widening at apex and tornus Irregular discal band crosses wing from costa and bends distally in CuA_1 to meet marginal band at costa. A large rectangular black subcostal spot at distal end of sell and smaller one medially. Cilia white. Hind-wing: Scalloped outer margin bordered narrowly with black extending down postdiscal area to vein M_3 or occasionally to CuA_1.
Underside. Fore-wing: Ground colour orange basally becoming paler along costa with a yellowish-brown outer marginal band. Three subcostal black bordered silver spots in cell and a series of black bordered silver spots extending down discally from area Rs to CuA_1. Hind-wing: Ground colour pale coppery-brown with two white streaks in $SC+R_1$, one subbasally and the other medially. Postdiscal area with a curved white line extending from vein Rs to inner margin.
Female. Fore-wing length: 18.5-24.2mm, mean 21 .5 (n=6); antenna-wing ratios: 0.41-0.44, mean 0.33 (n=6). Wing shape much more rounded than male.
Wings, upperside. Similar to male but orange ground colour paler. Underside. Similar to male but ground colour paler; silver and black spots of fore-wing reduced and hind-wing white line narrower.



Distribution of *Tylopaedia sardonyx*

Distribution
Only recorded from mountains 30km to the south-west of Windhoek and to the south of Windhoek at high elevation.

Etymology
Named after Cherry Stephens, the discoverer's wife, cerita =cherry.

Diagnosis
Both sexes come closest to nominate *T. sardonyx* form knobeli from which they differ ty the narrower upperside black markings (not climatically induced) The narrower fore-wing discal and marginal bands create a large pale-orange submarginal patch which is characteristic in comparison with the postdiscal areas of nominate *sardonyx* and *peringueyi.* The patch is paler than the basal portion, while in the other subspecies the orange colour is generally uniform. The hind-wing discal band is similarly reduced when compared with the other subspecies. The underside is similar to *sardonyx* but with the postdiscal line not curving as much and the ground colour is paler with the silvery markings reduced. The wing-shape is distinctly rounder, with the fore-wing shorter and not as attenuate. The cilia are relatively unmarked and paler than *sardonyx* form *knobeli.* The fore-wing upperside discal band is complete and evident no matter how dry the specimen.

Acknowledgements
We thank Richard and Cherry Stephen and Francois Swart for their contributions.

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SCHLOSZ, M. & BRINKMAN, T. 1991. *J. ent. Soc. sth. Ar.* **54(1)**:81.

A NEW PARASITOID AND HOST-PLANT OF THE LARVAE OF *PIERIS BRASSICAE* (L) (LEPIDOPTERA: PIERIDAE) IN THE WESTERN CAPE, SOUTH AFRICA

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Abstract: A new parasitoid of the larvae *Pieris brassicae* is recorded together with a description of its biology. Its expected contribution to biological control of the butterfly, 2 major pest of cabbage crops in the Western Cape, is discussed. A new host-plant of the butterfly is recorded.

Introduction.

Two tachinid flies, a *Winthemia* sp. and an *Exorista* sp. have been recorded parasitizing final instar larvae of *Pieris brassicae,* killing them prior to pupation (Claassens, 1995).

These parasitoids do not appear to have contributed much to the control of the butterfly. A chalcid wasp, *Pteromalis puparum,* is known to kill very many pupae of *Pieris brassicae,* especially those in exposed positions where they are easily noticed by the parasitoid (Claassens, 1996). This parasitoid has contributed a great deal to the control of the butterfly, but **it** was not until spring and early summer of 1998 that a definite decline in the number of *Pieris brassicae* imagines was observed. However, at present the butterfly is still quite common and its larvae have defoliated most of the very many Nasturtium plants in my garden.

A new parasitoid

In early September of this year I found another parasitoid, this time a braconid wasp, killing larvae in my garden. Dr. S. van Noort of the SA Museum identified the wasp as a species of *Cotesia,* expecting it to be undescribed. This black wasp with orange-brown legs measures about 4mm in length and has antennae of about the same size as its body.

It attacks the early instar larvae killing them in the third or fourth instar, that is before they do their greatest damage. The mature parasitoid larvae on leaving the host larvae (Fig. 1), immediately commence to spin yellow cocoons of silk, attaching themselves to neighbouring cocoons, thus forming a tight cluster (Fig. 2). Batches of these cocoons inside which the parasitoid larvae pupate, can be found on walls and other man-made supports, but also on the larval food-plants. Up to 20 cocoons have been counted in one cluster. The parasitized larva remains next to the cluster of cocoons and slowly dies. During the present observations adult wasps have emerged from the cocoons within about two weeks.

After mating the females fly off to parasitize more host larvae, usually found in the immediate vicinity. As soon as a female *Cotesia* lands on a batch of the gregarious first instar larvae, they thrust the anterior end of their bodies upwards attempting to scare off the intruder. The parasitoid, at first startled by the sudden reaction of the larvae, soon returns to oviposit in the larvae.

Fig. 1 *Cotesia* larvae emerging from the host *P. brassicae*

Fig. 2. *Cotesia* cocoons from which some parasitoid imagines have emerged.

INSTRUCTIONS TO AUTHORS OF SCIENTIFIC PAPERS

Metamorphosis publishes short scientific papers in lepidopterology, with special emphasis on biological, systematic and faunistic studies of the lepidopteran fauna of Africa. Only papers in English and reporting on original research are published, and submission of a manuscript is taken to imply that the work reported has not been published previously and is not being considered for publication elsewhere.

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The title should be succinct and include suitable attribution to the order and family of the genus or species treated but not the names of any new taxon. The full names and addresses of all authors should appear underneath each of them.

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The literature references must be in alphabetical order and adhere to the following format, with multiple authors linked by an ampersand (&) and the journal names in full and not abbreviated:

SMITH, J.K. & BROWN, A.B.1985. New species of *Papilio* from southern Africa (Lepidoptera: Papilionidae). *Journal of the Entomological Society of Southern Africa* **72**: 112-123

VAN DER MERWE, P.P.J. 1986. *The Swallowtails of Africa.* Bushveld Press, Pretoria.

SMITH, J.K, BROWN, A.B. & VAN DER MERWE, P. P. J 1991.Migratory patterns of Pieridae in southern Africa. In: C. Black & F. Miller (Eds.) *Butterfly Behaviour,* Bushveld Press, Pretoria, pp. 234-256.

Citation of references in the text is compulsory and should appear in the following form: Smith (1990), Smith & Brown (1985), (Smith *et al.*1991) for more than two authors; (Smith 1985a, 1987; Brown 1986, 1991) in chronological order for multiple references. References to unpublished sources should be cited as: Smith (in press), Brown (pers comm.) or Miller (unpubl.); only the first of these is to be included in the reference list.

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Descriptions of taxa should be furnished consistently in telegram style (i.e. without active verbs), and should be followed by a section indicating the main diagnostic characters of the taxon and giving a comparison with its closest relatives and other similar taxa. A formal diagnosis should normally not be given *in addition* to a description, but rather in its place when a full description or redescription is unnecessary. Descriptions of species should be based on the entire type-series, not only on the holotype, and new species should not be described from single specimens without some justification (e.g. stating the steps taken to locate/collect more). Names given to new taxa should be simple and euphonic, and species names based on geographic entities with complicated local names (e.g. *townbushensis, skoorsteenkopensis)* should be avoided.

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All Specimens examined should be included in a section 'Material examined', citing all specimens and their depositories. The data on the specimen labels should be cited *verbatim* in the case of types but standardised for all other specimens examined, arranging the localities in alphabetical order within countries or provinces. Label data should include the following information: *Country, Province, number and sexes (symbols of sexes) of specimens, locality, latitude and longitude co-ordinates, altitude, date, collector, and depository (in brackets). Map co-ordinates should be given for all localities and follow the convention used by the Time Atlas of the World, e.g. 26.13S 29.41 E.* Co-ordinates can instead be listed in a gazetteer at the end of the paper, especially where there is a repetition of many localities. For a large number of specimens, dates and names of collectors can be arranged at the end of the *Material*

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Genus species **sp. n.**	Genus species Author
Figures	Figures
TYPE MATERIAL	Original references
DESCRIPTION Adult	RE-DESCRIPTION. Adult
Variation (optional)	Variation (optional)
Male genitalia	*Male genitalia*
Female genitalia	*Female genitalia*
DIAGNOSIS	DIAGNOSIS
BIOLOGY	BIOLOGY
DISTRIBUTION	DISTRIBUTION
ETYMOLOGY	Material examined
REMARKS (optional)	REMARKS (optional)

The discussion or remarks section should be placed last. The use of figures to illustrate descriptions is strongly encouraged and should permit some reduction of the length of the description of the parts illustrated.

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A hard copy of the manuscript, and the originals of illustrations, and the computer diskette must be submitted to the editor. The text should be printed on A4 paper, with double line spacing, and a margin of at least 2cm on each side. The pages should be numbered consecutively, beginning with the title page, and including those carrying references, tables and legends to figures. All figures and tables must be referred to in the text. If a computer diskette is not available, then tables are to be typed on A5 paper, exactly as found in the printed journal.

Figures must be boldly drawn in black waterproof ink, and arranged in clear and logical plates on stiff, white, preferably A4-sized board. All figures must be numbered in a common sequence in Arabic numerals, irrespective of whether they are line drawings, photographs, diagrams, graphs or maps. Magnifications should be indicated by scale bars on the figures.

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