METAMORPHOSIS

JOURNAL OF THE LEPIDOPTERISTS' SOCIETY OF AFRICA

Volume 16 June 2005 Number 2
www.lepsoc.org.za

ISSN 1018 6490

LEPIDOPTERISTS' SOCIETY OF AFRICA
www.lepsoc.org.za

MEMBERSHIP

The aims of the Lepidopterists' Society of Africa are 10 promote the scientific study and the conservation of Lepidoptera in Africa and to provide a communication forum for all people who are interested in African Lepidoptera. Please visit www.lep.soc.org.za for more information.

Metamorphosis, which is the official journal of the Society, publishes original scientific papers as well as articles of a less technical nature. Fees indicated below refer to surface postage, but if airmail is required, notify the Treasurer and add R32.00 for Africa or US $6.00 if overseas per issue.

Membership of the Society is open to all persons who are interested in the study of Lepidoptera. There is no geographical limit to membership. There are four categories of membership:

	South Africa	Rest of Africa	Overseas
Sponsor Member	R 600.00 pa	R 600.00 pa	US$ 200.00 pa
Full Member	R 200.00 pa	R 150.00 pa	US$ 60.00 pa
Juniors & pensioners	R 100.00 pa	R 150.00 pa	US$ 50.00 pa
Affiliate members (Societies, Museums. Schools, etc.)	R 100.00 pa	R250.00 pa	US$ 60.00 pa

Back issues of Metamorphosis are still available@. R30.00 per copy or USSIS.00 for outside South Africa. Fees for outside South Africa are higher due to increased postage. Membership is annual per calendar year and fees are due on January I of each year.

CORRESPONDENCE

General: The Public Relations Officer. Dave McDermott, 39 Norman Drive, Northcliff ext.9, 2195, South Africa.

Metamorphosis: The Editor. P. O. Box 12538, Onderstepoort, 0110. South Africa.

METAMORPHOSIS

ISSN 1018-6490

CONTENTS

Front cover: *Physcaeneura panda* underside, Lepsoc 2005 slide of the Year by Jeremy Dobson.
Back cover: *Precis archesia* upperside, runner up Lepsoc 2005 slide of the Year by Jeremy Dobson.

Editorial

The following is the abstract from my presentation at the 3rd International Conference on Afrotropical Lepidoptera, held in Potchefstroom, South Africa, in November 2004. I am publishing it here because I felt that it might be of interest to a wider audience – to those of you who attended the conference – my apologies for being 'repetitive'.

Most people publishing data on Afrotropical Lepidoptera are not entomologists or trained scientists; the vast majority are passionate amateurs. The essential methodology of science consists of observation, data collection and data analysis relevant to a specific testable hypothesis. 'Doing science' is not difficult but it does require training and experience.

Lepidopterists operate at a number of levels (both for individuals and between individuals): Level 1 – Collecting and identifying (classifying). Level 2 – Exploring for new taxa. Level 3 – Survey and monitoring protected areas. Level 4 – Studying ecology, including life histories, especially threatened taxa. Level 5 – Basic taxonomic studies - describing new taxa. Level 6 – Systematic studies (phylogenetics). Level 7 – Special topics - model systems for basic biology e.g. evolutionary biology, physiology, etc.

These levels are no more difficult or easy when compared to one another but the higher levels do require more specialised expertise. One level is also not 'better' than another level – all are important from different points of view and all are essential in building a body of scientific knowledge.

All seven levels are currently associated with issues that are experienced by all of us depending on the level(s) we are working at. Level 1, 2 and 3 are plagued by the dead-lock between 'collectors' and 'conservation authorities'. Levels 4 to 7 suffer from a lack of skilled manpower and, in particular, a lack of money to finance the training of people in order to equip them with the necessay skills and expertise, as well as a deficiency of money to do the research itself.

Efforts are ongoing (and have been ongoing for more than two decades) to address the problem of permission and permits associated with levels 1-3, therfore I am not going to deal with these initiatives. Nothing, however, (other than individual effort) is being done to address the problems associated with levels 4-7. A few of our members either work in academic institutions or work with highly trained scientists in such institutions but it is my view that we need to do more as a Society (now an 'adult' 21 years old!).

In the university where I work, research done by our section (Veterinary Pathology) is organized on a co-operative model. We identify 'problems' that we want to work on, or we are approached by the private

sector and asked to solve a particular problem. Whether the research is generated 'in house' or is of a contract nature, we form research teams. These teams are composed not only of staff members but often are made up of people from outside – sometimes 'outsiders' form the majority of a particular team. The greatest reward of working in these very productive teams is not so much the 'good science' that results but the great camaraderie that usually develops.

How can we apply this within our Society? The bottom line is – easily! Instead of each one 'doing his thing' (often ineffectually) it makes much more sense to come up with a tean approach to the issue that most of us consider the number one problem that needs a scientific approach – species level taxonomy!.

Butterfly conservation in the southern Cape, South Africa

Dave Edge
P. O. Box 2586, Knysna 6570, RSA

Abstract
The butterfly species and subspecies occurring in the southern Cape region are listed. The threatened red data taxa are reviewed and the ecology, biology, threats and latest conservation status are described. Six putative new taxa are identified and three of these are recommended for red data listing. The relations with the conservation authorities are discussed. The importance of participation in environmental impact assessments for new developments, particularly in the coastal zone, is emphasised and a number of case studies given. There is a need for members of our society to play a role at local level in raising public awareness and educating the younger generation about the need for butterfly conservation.

Key words: Red data species, butterfly conservation, environmental impact assessments.

Introduction

The southern Cape region, for the purpose of this article, is defined as extending from the De Hoop Nature Reserve in the west to Kareedouw in the east, and from the coast in the south to the Swartberg Mountains in the north (an area of c. 34 000 km² - Figure 1). This region contains five biomes – fynbos, forest, thicket, succulent karoo and nama karoo, with winter rainfall in the west trending towards summer rainfall in the east (Low & Rebelo, 1998). The Cape fold mountains traverse the region in an east-west direction, with the Swartberg, Outeniqua, Tsitsikamma, Langeberg, Kammanassie, Baviaanskloof and Kouga mountain ranges most prominent. With over 400 km of coastline and the largest tracts of afromontane forest in southern Africa, many parts of the region have not yet been explored for butterflies. Before the author, no lepidopterists have actually lived in the region – although Clive Quickelberge regularly visited his mother in Knysna. Despite the lure of exploration, the main challenge today is to conserve the already described butterfly fauna. All along the coastal strip particularly, there is pressure for development, often incorporating golf courses that obliterate huge tracts of viable butterfly habitat. The aim of this paper is to highlight these threats, and to describe both what is being done and what needs to be done to counter them.

Butterflies of the southern Cape

All the butterfly taxa definitely recorded from the southern Cape region are listed in Table 1. Where there is some element of uncertainty about the status of a taxon [e.g. certain *Chrysoritis* taxa that were synonymised by Heath (2001)], the precautionary principle has been adopted and these taxa are included in the analysis and the conservation effort. This approach has been advocated by many conservation biologists (e.g. Leme 2003; Terblanche & van Hamburg 2003).

Ninety-one of the 152 taxa listed are lycaenids (60 %), sometimes only known from one or two localities. Some 23 % of South Africa's species-group taxa occur in this region, which represents less than 3 % of the country's area. At least 58 of these taxa (38 %) are known to occur in protected areas controlled by Cape Nature or SANParks. The six threatened red data taxa that occur in the region are all found in the coastal strip, whose natural environment is threatened by residential and recreational developments. Superimposed on these shorter-term threats is a longer-term threat of climate change. This has been forecast to have severe impacts in the western and southern Cape on biome boundaries, composition of vegetation communities, ecosystem functioning, and on all organisms with narrow habitat requirements that are unable to migrate across an increasingly fragmented landscape (Hannah *et al.* 2002; Midgley *et al.* 2002; Rutherford *et al.* 1999).

Red data listed taxa

The taxa detailed below are included in the threatened categories (critically endangered, endangered, vulnerable – IUCN, 2001) of the latest red data listing as given on the website of the Lepidopterists' Society of Africa (LepSoc) (www.lepsoc.org.za). Details were obtained from the website, and updated or expanded where necessary.

Thestor brachycerus brachycerus

VULNERABLE (recommend upgrading to ENDANGERED)

Arrugia brachycera Trimen, 1883. *Transactions of the Entomological Society London* **1883**: 353

Type locality: Knysna, South Africa.

Distribution: Eastern Heads, Knysna.

Taxonomy: In the recent revision of *Thestor* (Heath & Pringle 2004) the Knysna population was recognised as unique.

Ecology: Inhabits fynbos covered north, north-west and north-east facing slopes at an altitude of 10 – 180m above sea level. The underlying geology is Table Mountain Sandstone, which outcrops in places, and the soil is sandy. The insect can cope with an intermediate level of disturbance such as low intensity cattle grazing, but at higher intensities or where sheep grazing is practiced it cannot persist. The vegetation is dominated by *Erica versicolor*, with *Agathosma ovata*, *Muraltia alopecuroides*, *Phylica axilaris*

and *Erica formosa* as character species. Where grazing has been practiced, *Metalasia muricata, Restio eleocharis* and *Helichrysum cymosum* become more abundant.

Early stages: Not known, but the larvae are believed to be aphytophagous.

Threats and conservation: Refer to Figure 2. Strong colonies close to the Eastern Heads were destroyed by building activities, the most recent (2) being lost in 1996. The colony at (3) has been eliminated by the change to sheep farming in the early 2000s. The colony at (4) was lost by the building of the access road to the Sparrebosch (now Pezula) Golf Estate in 1998. The colony at (5) has been weakened by overgrazing with sheep, and was further threatened by the Fernwood development before the developers were persuaded to put aside an area for the butterfly, but it has not been seen for two years. The colony at (6) was destroyed during the building of the golf course. The colony at (7) is extant and the owners of Pezula have undertaken not to disturb it. In December 2004 the small colony at (8) was discovered during the scoping study for a development proposed in the south-west corner of Pezula. The north-facing slopes in the north-east corner of the Pezula Estate are covered by plantations, and these extend as far as the Harkerville State Forest and most of the way to Plettenberg Bay. There is little prospect of *T. brachycerus* being found there although searches are continuing.

Trimenia malagrida maryae

VULNERABLE

Argyrocupha malagrida maryae Dickson & Henning, 1980. *Entomologist's Rec.J.Var.* **92**: 297.

Type locality: Struis Bay.

Distribution: The Struis Bay colonies are extinct, but a few strong colonies were found by Pringle (1992) on a limestone ridge on the farm Ouplaas just to the north of the De Hoop Nature Reserve.

Ecology: East-west trending rocky ridges in limestone proteoid fynbos.

Early stages: Final instar larvae were found in nests of the ant *Anoplolepis custodiens* Smith. (Heath & Brinkman, 1995b).

Threats: No immediate threats at the Ouplaas locality.

Conservation: Cape Nature personnel from De Hoop have been informed of the whereabouts of the Ouplaas colonies.

Aloeides thyra orientis Pringle, 1994.

VULNERABLE

Type locality: Knysna, South Africa.

Distribution: Brenton-on-Sea, Still Bay.

Ecology: At Brenton-on-Sea *A. thyra orientis* inhabits flat sandy ground on south-facing dune terraces or hill tops at an altitude of between 40 – 240m above sea level. The underlying geology is Pleistocene aeolionite

palaeodunes that form several dune cordons parallel to the coast between Brenton and Wilderness. The soil is calcareous sands and the vegetation is disturbed asteraceous coastal fynbos, with fire being a suitable disturbance.
Early stages: Nothing is known.
Threats: Encroachment of alien vegetation. Construction of houses or roads (presently unlikely).
Conservation: Several localities are known on the Brenton peninsular and they are all on land zoned for agriculture, but not suitable for cultivation. The draft Spatial Development Framework (SDF) for the Knysna region designates this area as nature conservation and agriculture.
One of the Still Bay colonies is in the Pauline Bohne Nature Reserve and is quite secure. Another colony is on agricultural land between Still Bay and Riversdale.

Chrysoritis dicksoni
ENDANGERED
Phasis dicksoni Gabriel, 1947. *Entomologist* **80**: 60-61.
Type locality: near Melkboschstrand.
Distribution: Historically found on the Cape west coast between Melkboschstrand and Mamre, and near Witsand on the Cape south coast. Disappeared from these habitats, and now only known from near Vermaaklikheid (Pringle 1990).
Ecology: Short sand-veld vegetation with stands of 'dekriet' (*Thamnocortus* sp.) amongst which the host ant *Crematogaster peringueyi* Emery makes its nests.
Early stages: The larvae are fed by trophallaxis with the host ant, which in turn feeds on scale insect secretions (Heath & Brinkman, 1995a; Heath, 1998).
Threats: Agricultural activity or encroachment of alien vegetation. This is believed to have caused the extinction of the species on the west coast and in the Witsand area.
Conservation: Placed on the protected wild animal list of the Cape Province in 1976 (Ordinance 19 of 1974, modified in 1976). This has had no practical results in terms of preserving the remaining habitat. Close co-operation with the landowners where the remaining colonies are found is essential.

Chrysoritis thysbe mithras
VULNERABLE (should be upgraded to ENDANGERED)
Poecilmitis mithras Pringle, 1994.
Type locality: Knysna, South Africa.
Distribution: Brenton-on-Sea, between Still Bay and Riversdale.
Ecology: At Brenton-on-Sea *C. thysbe mithras* inhabits gently sloping south-facing dune terraces overlooking the sea at an altitude of 80 – 120m

above sea level. The underlying geology is Pleistocene aeolionites forming several palaeodune cordons parallel to the coast between Brenton and Wilderness. The soil is calcareous sands and the vegetation is disturbed asteraceous coastal fynbos, with the dominant species being *Chrysanthemoides monilifera*.

Early stages: Pringle, 1994. The host plant is believed to be *Chrysanthemoides monilifera* L. since both Pringle (pers. comm.) and subsequently the author have observed the females active on these bushes. The host ant is most likely to be a *Crematogaster* species.

Threats: Encroachment of alien vegetation.

Conservation: The single fairly strong colony that was known at Brenton-on-Sea appears to have been lost by encroachment of alien vegetation (*Acacia cyclops* = rooikrans and *Acacia mearnsii* = black wattle). However, the butterfly seems to be quite mobile and a large area of suitable habitat still exists. The draft SDF for the Knysna region designates this area as nature conservation and agriculture, although it is not suitable for cultivation owing to the poor soils and the steepness of the slopes.

The locality between Still Bay and Riversdale appears to be a very weak colony, and too few specimens are available to be certain that it answers to the same subspecies (Pringle, pers. comm.).

Orachrysops niobe

CRITICALLY ENDANGERED

Lycaena niobe Trimen, 1862. *Transactions of the Entomological Society London* **3** (1): 282.

Type locality: Knysna, South Africa.

Distribution: Brenton-on-Sea, near Knysna and an extinct colony at Nature's Valley.

Ecology: Inhabits fairly steep south-facing slopes overlooking the sea at an altitude of 95 – 120m above sea level. The underlying geology is Pleistocene aeolionites, which form several palaeodune cordons parallel to the coast between Brenton and Wilderness. The locality at Nature's Valley has a similar geology but the dunes are not as extensive and are lower. The vegetation is a mosaic of asteraceous coastal fynbos and coastal thicket. *Orachrysops niobe* inhabits the ecotone between the two vegetation types. The dominant plant species are *Pteridium aquilinum* (in lightly disturbed areas, which *O. niobe* seems to prefer), *Pterocelastrus tricuspidatus, Tarchonanthus littoralis* and *Rhus lucida* (in the thicket patches) and *Ficinia ramosissima, Helichrysum petiolare, Erica speciosa* and *Helichrysum cymosum* (in the fynbos areas).

Early stages: Ball, cited by Henning and Henning, 1989; Williams, 1996; Edge & Pringle, 1996; Edge 2002, 2005.

Larval food: *Indigofera erecta* Thunberg. Larvae feed on leaves in earlier instars and on the rootstock in later instars (Edge 2005). The ant

association is predominantly with *Camponotus baynei* Arnold (Edge 2005), but also sometimes with *Camponotus* undescribed species near *berichti* (Edge 2005). Butterfly is trivoltine, with October-November, January-February and April broods.

Conservation: The colony at Brenton-on-Sea has been secured, after a prolonged campaign, by proclamation of a 1.4 hectare Special Nature Reserve managed by Cape Nature. The colony is stable and the population of adults per brood is approximately 150.

At Nature's Valley a small fynbos reserve (0.5 hectare) was established at the original site, where *O. niobe* was breeding. In recent years the reserve has been actively managed and there is now a good population of host plants, *I. erecta.* Re-introduction of *O. niobe* to Nature's Valley will be attempted during late 2005.

Threats: Failure to manage the Brenton-on-Sea reserve so that host plant populations are not sustained. Stochastic risks to the small population – that could result from severe drought or an uncontrolled fire. Loss of genetic diversity due to small population inbreeding effects.

New taxa discovered

In the course of exploration and site surveys for environmental impact assessments (EIA's) six putative new taxa have been discovered. These taxa are all probably at sub-species level and are listed in Table 2. Three of these taxa deserve consideration for red data listing:

***Aloeides pallida* ssp. novum**

Recommended status: VULNERABLE

Type locality: The Lakes, near Rondevlei, 10km north-west of Sedgefield.

Preliminary diagnosis: This subspecies shows characters intermediate between *A. pallida littoralis* and *A. pallida juno*. It shows some similarities to another *A. pallida* subspecies recorded from Nature's Valley (Pringle, personal communication).

Ecology: Grassy fynbos, 205m above sea level - fairly level ground, disturbed by past agricultural and silvicultural practices.

Early stages: Not known.

Conservation: No measures in place, although a butterfly survey recommended that the landowner should preserve the habitat.

Threats: Alien plant encroachment. Destruction of the habitat through the proposed construction of a golf course and residential units on the site.

***Lepidochrysops ketsi* ssp. novum**

Recommended status: VULNERABLE

Type locality: The Heads, Knysna. This butterfly may be the insect referred to by Cottrell (1965) from Brak River, and there is also an old unsubstantiated record of "*L. ketsi*" from Plettenberg Bay.

Preliminary diagnosis: Specimens have been compared with *L. ketsi ketsi* and *L. robertsoni* and the Knysna entity has characteristics intermediate between these species.
Ecology: Grassy fynbos, *Leucadendron salignum* dominated, degraded by grazing and burning practices (Avierinos, 1997). *L. ketsi* ssp. novum occurs on north-west facing slopes below hilltops at altitudes of 80-120m.
Early stages: Females were observed ovipositing on *Selago corymbosa* L., which is a pioneer plant that proliferates after disturbances such as grazing or fire.
Conservation: The landowner built his house on top of the only known colony. Searches are continuing at similar sites to locate further colonies.
Threats: Intensification of grazing practices (sheep farming). Residential and golf course developments on the Pezula site to the east.

***Lepidochrysops littoralis* ssp. novum**
Type locality: Paradise Coast, Mossel Bay.
Preliminary diagnosis: Swanepoel & Vári (1983) referred to the Mossel Bay insect (discovered by Trimen) in their description of *L. littoralis*, but did not examine any specimens. Comparison between Still Bay specimens of *L. littoralis* and the Mossel Bay specimens reveals consistent differences in the underside markings.
Ecology: Flies along an east-west trending ridge in disturbed proteoid fynbos, which has been grazed in the past and is now dominated by grassy elements.
Early stages: The host plant is suspected to be a *Selago* species that occurs at the site in the area where females were seen.
Conservation: The butterfly habitat is on land owned by the Mossel Bay municipality. The proposed access road to the Paradise Coast development site would destroy much of the habitat and a scoping study has recommended that the route of this road should be changed.
Threats: Alien plant encroachment (*Acacia cyclops* = rooikrans); and construction of the above-mentioned access road.

Conservation authorities

Cape Nature

After a number of years of close co-operation with Cape Nature in the management of the Brenton blue butterfly reserve, good credibility has been gained for the Lepidopterists' Society (LepSoc). Cape Nature have embarked on a programme to do a complete biodiversity inventory of all their reserves. The author has undertaken to train Cape Nature personnel in the techniques of butterfly collecting, so that each reserve in the Gouritz region can assemble its own reference butterfly collection. A permit has been issued which allows the author, and upon request other authorised LepSoc personnel, to enter the reserves to pursue this objective.

Excellent relations also exist with personnel at the De Hoop and Grootvadersbos reserves through the efforts of Ernest Pringle.

South African National Parks (SANParks) and Forestry

The main SANParks' reserves are currently at Knysna, Wilderness and Storms River. The Department of Water Affairs and Forestry (DWAF) have agreed to transfer all their southern Cape forests to the control of SANParks. This has enormous implications for the future of conservation in this region. When the transfer process is complete, SANParks will be approached by the author with an offer to assist with butterfly surveys in these vast areas of forest and mountain fynbos.

Environmental impact assessments

The author has carried out butterfly surveys for a number of scoping reports and environmental impact assessments (EIAs) for developments along the Garden Route, with the outcomes described below.

Sparrebosch (now renamed Pezula) (1997-2002)

This development (Figure 2) was found to contain a number of rare and endangered butterflies, notably *Aloeides pallida littoralis* (now very scarce in the Knysna area) and *Thestor brachycerus brachycerus* (see account above). The developer chose to only partially implement the report recommendations, and this resulted in the loss of the *A. pallida littoralis* colonies and the loss of all but one of the *T. brachycerus brachycerus* colonies.

Fernwood (2001-2003)

This land to the west of Sparrebosch/Pezula (Figure 2) has a viable colony of *Thestor brachycerus brachycerus*. The developer has been persuaded to modify the layout of the development to minimise the impact on this colony.

Roodefontein (2001-2004)

The methods used by the owner of this proposed development near Plettenberg Bay to secure approvals resulted in a high profile criminal case following the alleged bribing of two prominent Western Cape politicians. Ironically, no significant butterflies were found on the site during the butterfly survey.

The Lakes Eco and Golf Resort (2003-2004)

As mentioned in the account above, *Aloeides pallida* ssp. novum was discovered on this site north of Swartvlei near Sedgefield during the butterfly survey for the scoping report. It is anticipated that a full EIA will be ordered by the authorities, and further investigations of the distribution and biology of the butterfly will be necessary.

Paradise Coast (2004-2005)
This proposed development site west of Mossel Bay has good populations of *Chrysoritis thysbe thysbe* and was where *Lepidochrysops littoralis* ssp. novum was discovered (refer to account above). The developer has agreed to protect the locality of this butterfly, and more details should emerge during the full EIA that is expected to be called for by the authorities in Cape Town.

Pierpoint Estate (2004-2005)
This site is on a hilltop overlooking the Knysna lagoon. The significant finding of the butterfly survey was that the site hosts a strong *Aloeides almeida* colony. Knysna is the type locality for this species and no other strong colonies are known of the species in the Knysna district. Consequently, the owner has been persuaded to establish a 2ha butterfly reserve on the crest of the hill to protect the colony.

Pezula@Hunters (2004-2005)
During the butterfly survey of a site in the south-west corner of Sparrebosch/ Pezula (Figure 2), a colony of *Thestor brachycerus brachycerus* was discovered just to the east of the proposed development.

Uitzicht 216 (2004-2005)
Developers are proposing to convert this 255ha site currently utilised as pine plantations into a large new residential development. Botanists have advised that this land could be restored to fynbos if the plantations are removed. The butterfly survey therefore focused on the potential for this land to become suitable habitat for *Orachrysops niobe* in the future. The host plant for *O. niobe* grows prolifically on the adjacent land, which has been identified as a site to re-introduce the butterfly.

Threats to butterfly populations

Property development

All along the Western Cape coastline there has been an explosion of property development, driven by soaring property prices. This has already destroyed significant areas of habitat for coastal species.

Alien vegetation

Alien plants have been identified as one of the most critical threats to the Cape floral kingdom, with lowland fynbos being the most extensively invaded vegetation type in southern Africa (Richardson *et al.* 1997). Many butterfly habitats in lowland sites are prone to this threat, in the short or long term. Invasions are often triggered by some initial disturbance such as

road building or clearance of land for agricultural or property development. Fortunately, some progress is being made through biological control of certain species, and the Working for Water Programme in catchment areas, but alien invasions remain a massive problem on private land.

Loss of natural processes

Many butterfly habitats require periodic natural disturbances in order to promote host plant growth or to create suitable microhabitats for their host ants. Fire is one such disturbance, which has been shown to play a critical role in the regeneration of fynbos (Bond, 1997). Other significant disturbances were historically caused by indigenous grazing or browsing mammals (from elephants to porcupines). These processes are excluded partially or fully by the proximity of human dwellings or agricultural activities with consequent impacts on ecosystem function and structure. Over time sites that host butterflies with a narrow range of habitat requirements can become unsuitable.

Climate change

The inevitability of climate change brought about by the increase in atmospheric "greenhouse" gases and its impact on terrestrial ecosystems in South Africa has already been explored (Hannah *et al*. 2002; Midgley *et al.* 2002; Rutherford *et al.* 1999). Butterfly species that are likely to be threatened are those that have one or more of the following characteristics – high montane position; position near a biome boundary; position close to the south coast; specialisation on a host plant with a restricted range; and/or adult emergence in the cooler months (April – August).

Public awareness and education

Public support is essential for us to achieve our butterfly conservation aims. Developers have substantial financial resources and the ability to influence political decision makers with promises of job creation and economic development. However, during the Brenton Blue campaign the enormous power of the printed media and television coverage played critical roles in winning over the public to the cause of butterfly conservation. Lectures to civil society groups and NGOs are continuing to re-emphasise these messages at local level. Much remains to be done, particularly through working with schools – giving educational presentations and encouraging school projects on butterflies, as well as offering guided tours of butterfly reserves.

Conclusions

The situation with regard to butterfly conservation has improved in some respects but there are still many threats to butterflies in the southern Cape region, particularly in the coastal strip. The region is very large to be

covered by one person, and a strategy of concentrating on the crisis areas and involvement in the development planning process has had to be pursued. Developers who are prepared to consider butterflies during the environmental planning process, and to implement measures to protect rare species, seem to be growing in numbers and this gives hope for the future. LepSoc members who are planning to visit or collect in the southern Cape are encouraged to contact me since I may be able to arrange access to reserves and protected areas. The authorities will co-operate as long as full details of all the butterflies collected or seen are provided.

Acknowledgements

The co-operation of the various conservation authorities in allowing access to their reserves is gratefully acknowledged. NGOs such as the Wildlife and Environment Society of SA, the Botanical Society, the Endangered Wildlife Trust, the Green Trust and the Worldwide Fund for Nature have also done much to further the cause of butterfly conservation. The contribution of responsible developers is also acknowledged. Amongst my colleagues in LepSoc, particular mention should be made of Ernest Pringle and Reinier Terblanche, both regular visitors to the southern Cape region, who have made several significant discoveries and assisted me in this work.

References

AVIERINOS, C. 1997. Vegetation survey and vegetation sensitivity analysis for the proposed development of the Sparrebosch, Knysna. Unpublished report KNY96/60/04 prepared by Hilland Associates, George.

BOND, W.J. 1997. Fire. Chapter 18 *in*: *Vegetation of Southern Africa* (eds. Cowling, R.M., Richardson, D.M. & Pierce, S.M.). Cambridge University Press, Cambridge, U.K.

EDGE, D.A. 2002. Some ecological factors influencing the breeding success of the Brenton Blue butterfly, *Orachrysops niobe* (Trimen) (Lepidoptera : Lycaenidae). *Koedoe* **45(2)**: 19-34.

EDGE, D.A. 2005. Ecological factors influencing the survival of the Brenton Blue butterfly, *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). PhD thesis submitted to North-West University, Potchefstroom, RSA.

EDGE, D.A., & Pringle, E.L. 1996. Notes on the natural history of the Brenton Blue *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Metamorphosis* **7(3)**: 109-20.

HANNAH, L., MIDGLEY, G.F., LOVEJOY, T., BOND, W.J., BUSH, M., LOVETT, J.C., SCOTT, D., & WOODWARD, F.I. 2002. Conservation of biodiversity in a changing climate. *Conservation Biology* **16**: 264–268.

HEATH, A. 1998. Further aspects on the life history of the myrmecophilous species *Chrysoritis dicksoni* (Gabriel), (Lepidoptera: Lycaenidae). *Metamorphosis* **9(4)**: 160-172.

HEATH, A. 2001. New synonymies and taxonomic notes on the genus *Chrysoritis* Butler (Lepidoptera: Lycaenidae). *Metamorphosis* **12(3)**: 85-98.

HEATH, A., & BRINKMAN, A.K. 1995a. Aspects of the life history, distribution and population fluctuations of *Oxychaeta dicksoni* (Gabriel) (Lepidoptera: Lycaenidae). *Metamorphosis* **6(3)**: 117-127.

HEATH, A., & BRINKMAN, A.K. 1995b. Notes on the early stages of *Argyrocupha malagrida maryae* (Dickson & Henning) (Lepidoptera: Lycaenidae). *Metamorphosis* **6(4)**: 167-173.

HEATH, A., & PRINGLE, E.L. 2004. A review of the southern African genus *Thestor* Hübner (Lepidoptera: Lycaenidae: Miletinae). *Metamorphosis* **15(3)**: 89-151.

HENNING, S.F., & HENNING, G.A. 1989. *South African red data book: butterflies*. Pretoria: Council for Scientific and Industrial Research, National Scientific Programmes Unit. (South African National Scientific Programmes Report no. **158**).

IUCN (International Union for Conservation of Nature and Natural Resources) 2001. 2001 IUCN red list categories and criteria. [Web:] http://www.iucn.org/themes/ssc/redlists/RLcats2001booklet.html [Date of access: 7 June 2005].

LEME, E.M.C. 2003. Nominal extinction and the taxonomist's responsibility: the example of Bromeliaceae in Brazil. *Taxon* **52**: 313-317.

LOW, A.B., & REBELO, A.G. 1998. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.

MIDGLEY, G.F., HANNAH, L., RUTHERFORD, M.C., & POWRIE, L.W. 2002. Assessing the vulnerability of species richness to anthropogenic climate change in a biodiversity hotspot. *Global Ecology and Biogeography* **11**: 445-451.

PRINGLE, E.L. 1990. Report on a recent trip to the south-west Cape, and on other matters. *Metamorphosis* **1(27)**: 11.

PRINGLE, E.L. 1992. A hunt in the western Cape. *Metamorphosis* **3(2)**: 55-57.

PRINGLE, E.L. 1994. Four new Lycaenidae from the Cape province, South Africa. *Metamorphosis* **5(3)**: 107-114.

RICHARDSON, D.M., MACDONALD, I.A.W., HOFFMAN, J.H., & HENDERSON, L. 1997. Alien plant invasions. Chapter 22 *in*: *Vegetation of Southern Africa* (eds. Cowling, R.M., Richardson,

D.M., & Pierce, S.M.). Cambridge University Press, Cambridge, U.K.

RUTHERFORD, M.C., POWRIE, L.W., & SCHULZE, R.E. 1999. Climate change in conservation areas of South Africa and its potential impact on floristic composition: a first assessment. *Diversity and Distributions* **5**: 253-262.

SWANEPOEL, D.A., & VÁRI, L. 1983. Three new species of *Lepidochrysops* Hedicke from the Cape Province (Lepidoptera: Lycaenidae). *Annals of the Transvaal Museum* **33(21)**: 323-336.

TERBLANCHE, R.F., & VAN HAMBURG, H. 2003. The taxonomy, biogeography and conservation of *Chrysoritis* (Lepidoptera: Lycaenidae) in South Africa. *Koedoe*: **46(2)**:1-17.

WILLIAMS, M.C. 1996. Report on research findings concerning the life history and ecology of the Brenton blue (*Orachrysops niobe)*. *Metamorphosis* **7(1)**: 3-7.

TABLE 1 BUTTERFLIES OF THE SOUTHERN CAPE REGION

TAXON	LOCALITIES	RED DATA STATUS
NYMPHALIDAE		
DANAINAE		
Danaus chrysippus chrysippus (Linnaeus)	Widespread, common	
Amauris echeria echeria (Stoll)	Knysna Forest, George, Harkerville, Sedgefield	
SATYRINAE		
Melanitis leda (Linnaeus)	Wilderness, Goukamma?	
Bicyclus safitza safitza (Westwood)	Common in all forests	
Aeropetes tulbaghia (Linnaeus)	Swartberg, Kammanassie Mountains	
Dira clytus clytus (Linnaeus)	Widespread, common	
Dingana bowkeri kammanassiensis SF & GA Henning	Kammanassie Mountains	
Tarsocera cassus outeniqua Vári	Ladismith, Calitzdorp, Outeniqua Pass, Oudtshoorn	
Tarsocera fulvina Vári	Uniondale	
Cassionympha cassius (Godart)	Widespread, common	
Pseudonympha hippia (Cramer)	Swartberg, Outeniqua Pass	
Pseudonympha trimenii trimenii Butler	Swartberg	
Pseudonympha magus (Fabricius)	Widespread, common	
Cassionympha detecta (Trimen)	Still Bay	
Stygionympha vigilans (Trimen & Bowker)	Swartberg	

ACRAEINAE		
Acraea horta (Linnaeus)	Widespread, common	
CHARAXINAE		
Charaxes varanes varanes (Cramer)	Widespread, common	
Charaxes pelias (Cramer)	Swartberg, Kammanassie Mtns, Prince Alfred's Pass	
Charaxes brutus natalensis Staudiger	Keurbooms River	
Charaxes xiphares xiphares (Stoll)	Knysna Forest, Saasveld, Keurbooms River	
Charaxes xiphares occidentalis Pringle	Grootvadersbos	
Charaxes jahlusa jahlusa (Trimen)	Huis River Pass	
Charaxes karkloof trimeni Rydon	Hoogekraal Pass, Gouna Forest, Saasveld	
LIMENITIDINAE		
Cymothoe alcimeda alcimeda (Godart)	Gouna, Saasveld, Montagu Pass, Grootrivierspas	
NYMPHALINAE		
Hypolimnas misippus (Linnaeus)	Scattered records	
Precis archesia archesia (Cramer)	Prince Alfred's Pass	
Junonia hierta cebrene Trimen	Widespread, common	
Junonia oenone oenone (Linnaeus)	Widespread, scarcer	
Vanessa cardui (Linnaeus)	Widespread, common	
Antanartia hippomene hippomene (Hübner)	Knysna Forests	
LYCAENIDAE		
LIPTENINAE		
Durbaniella clarki clarki (Van Son)	Seveweekspoort, Swartberg, Kammanassie, Huis River Pass	
Durbaniella clarki jenniferae Ball	Keurbooms Forestry, Prince Alfred's Pass	
MILETINAE		
Thestor rossouwi Dickson	Still Bay, Puntjie, Vermaaklikheid, De Hoop	
Thestor braunsi Van Son	Uniondale, Swartberg, Willowmore	
Thestor pictus Van Son	Garcia's Pass, Tradouw's Pass	
Thestor rooibergensis Heath	Rooiberg Mountains near Calitzdorp	
Thestor murrayi Swanepoel	Outeniqua Pass, Swartberg, Keurbooms Forestry, etc.	
Thestor brachycerus brachycerus (Trimen)	Knysna eastern Heads	Endangered
Thestor brachycerus dukei Van Son	Swartberg Pass, Elandsberg	
Thestor petra tempe Pennington	Seveweekspoort	
Thestor penningtoni Van Son	Swartberg Pass, Elandsberg, Seveweekspoort	
Thestor barbatus SF & G A Henning	Paardeberg, Herold	

Thestor claassensi Heath & Pringle	Still Bay, Puntjie, Vermaaklikheid	
Thestor overbergensis Heath & Pringle	De Hoop	
THECLINAE		
Iolaus bowkeri bowkeri Trimen	Huis River Pass	
Leptomyrina lara (Linnaeus)	Widespread, common	
Capys alphaeus alphaeus (Cramer)	Swartberg Pass, Avontuur	
Myrina silenus ficedula Trimen	Knysna, Mossel Bay	
Phasis thero thero (Linnaeus)	Brenton-on-Sea	
Tylopaedia sardonyx sardonyx (Trimen)	Oudtshoorn	
Argyraspodes argyraspis (Trimen)	Little Karoo	
Trimenia argyroplaga argyroplaga (Dickson)	Huis River Pass	
Trimenia macmasteri macmasteri (Dickson)	Outeniqua Pass	
Argyrocupha malagrida maryae Dickson & W A Henning	Struis Bay, De Hoop	Vulnerable
Aloeides thyra orientis Pringle	Brenton-on-Sea, Still Bay, Knysna	Vulnerable
Aloeides pallida grandis Tite & Dickson	Seveweekspoort, Garcia's Pass	
Aloeides pallida littoralis Tite & Dickson	Still Bay, Knysna	
Aloeides pallida jonathani Pringle	Kammanassie Mountains	
Aloeides pallida juno Pringle	Kareedouw Pass, Nature's Valley	
Aloeides vansoni Tite & Dickson	Swartberg	
Aloeides juana Tite & Dickson	Little Karoo	
Aloeides quickelbergi Tite & Dickson	Outeniqua Pass, Prince Alfred's Pass	
Aloeides oreas Tite & Dickson	Outeniqua Mountains?	
Aloeides clarki Tite & Dickson	Prince Alfred's Pass	
Aloeides depicta Tite & Dickson	Swartberg, Kareedouw Pass, Uniondale	
Aloeides carolynnae aurata Pringle	Witsand, De Hoop	
Aloeides damarensis damarensis (Trimen)	Little Karoo	
Aloeides pierus (Cramer)	Swartberg Pass, Mossel Bay	
Aloeides trimeni southeyae Tite & Dickson	Mossel Bay - Gouritz River	
Aloeides aranda (Wallengren)	Widespread, localised	
Aloeides aranda f. mars Trimen	Outeniqua Pass, Keurbooms Forestry, Prince Alfred's Pass	
Aloeides almeida (Felder)	Knysna, Swartberg, Keurbooms River, Roodefontein	
Aloeides macmasteri Tite & Dickson	Kammanassie Mtns, Keurbooms Forestry	
Chrysoritis dicksoni (Gabriel)	Witsand, Vermaaklikheid	Endangered
Chrysoritis chrysantas (Trimen)	Oudtshoorn, Ladismith	

Chrysoritis zeuxo (Linnaeus)	Still Bay	
*Chrysoritis cottrelli** Dickson	Buffelsnek Forestry	
Chrysoritis chrysaor (Trimen)	Widespread, localised	
Chrysoritis felthami dukei Dickson	Huis River Pass	
Chrysoritis palmus margueritae Dickson	Buffelsnek Forestry, Keurbooms Forestry, Brenton, Nature's Valley	
Chrysoritis pyroeis hersaleki Dickson	Sedgefield?	
Chrysoritis thysbe thysbe (Linnaeus)	Still Bay, Rhein's Nature Reserve, Mossel Bay	
Chrysoritis thysbe mithras Pringle	Brenton peninsular, Knysna	Endangered
Chrysoritis brooksi tearei Dickson	Still Bay turn-off from N2, near Riversdale	
*Chrysoritis henningi** Bampton	Huis River Pass	
Chrysoritis plutus Pennington	Swartberg Pass, Cango Caves, Uniondale	
Chrysoritis beulah Quickelberge	Willowmore	
Chrysoritis swanepoeli Dickson	Swartberg Pass, Schoeman's Poort	
*Chrysoritis hyperion** Dickson	Swartberg Pass	
Chrysoritis pyramus Pennington	Swartberg Pass	
Chrysoritis daphne Dickson	Kammanassie Mountains	
*Chrysoritis balli** Dickson & G A Henning	Kammanassie Mountains	
Chrysoritis nigricans zwartbergae Dickson	Swartberg Mtns, Kammanassie Mountains	
Chrysoritis adonis Pennington	Elandsberg	
LYCAENINAE		
Anthene definita definita (Butler)	Widespread	
Cacyreus lingeus (Stoll)	Widespread	
Cacyreus tespis tespis (Herbst)	Widespread, common	
Cacyreus marshalli Butler	Widespread	
Leptotes pirithous (Linnaeus)	Widespread, common	
Leptotes brevidentatus (Tite)	Widespread	
Lampides boeticus (Linnaeus)	Widespread, common	
Tarucus thespis (Linnaeus)	Widespread, common	
Lepidochrysops variabilis Cottrell	Widespread, mountains	
Lepidochrysops robertsoni Cottrell	Swartberg Pass, Prince Alfred's Pass, Kammanassie Mtns, Outeniqua Mtns	
Lepidochrysops dukei Cottrell	Swartberg Pass, Elandsberg	
Lepidochrysops australis Tite	Huis River Pass	
Lepidochrysops swartbergensis Swanepoel	Swartberg Pass	
Lepidochrysops outeniqua Swanepoel & Vári	Avontuur, Uniondale	
Lepidochrysops littoralis Swanepoel & Vári	Still Bay	

Lepidochrysops balli Dickson	Kammanassie Mtns	
Lepidochrysops oreas junae Dickson	Outeniqua Pass, Langeberg	
Lepidochrysops pringlei Dickson	Swartberg Pass, Seveweekspoort, Toverwater	
Lepidochrysops braueri Dickson	Prince Alfred's Pass, Kammanassie Mountains	
Lepidochrysops asteris (Godart)	Prince Alfred's Pass, Swartberg Pass	
Orachrysops niobe (Trimen)	Brenton-on-Sea	Critically endangered
Orachrysops brinkmani Heath	Kammanassie Mtns	
Eicochrysops messapus messapus (Godart)	Widespread, common	
Cupidopsis cissus (Godart)	Widespread	
Zizeeria knysna (Trimen)	Widespread, common	
Brephidium metophis (Wallengren)	Little Brak	
Oraidium barberae (Trimen)	Mossel Bay	
Azanus jesous (Guérin-Méneville)	Widespread in Acacia veld	
PIERIDAE		
Pinacopteryx eriphia eriphia (Godart)	Widespread migrant	
Colias electo electo (Linnaeus)	Widespread, common	
Catopsilia florella (Fabricius)	Widespread migrant	
Eurema brigitta brigitta (Stoll)	Widespread	
Colotis antevippe gavisa (Wallengren)	Wilderness, Great Brak	
Colotis euippe omphale (Godart)	Montagu	
Colotis evagore antigone (De Boisduval)	Wilderness	
Belenois zochalia zochalia (De Boisduval)	Widespread in forests	
Belenois aurota (Fabricius)	Scarce migrant	
Belenois creona severina (Stoll)	Widespread	
Belenois gidica abyssinica (Godart)	Widespread	
Dixeia charina charina (De Boisduval)	Widespread, common	
Pontia helice helice (Linnaeus)	Widespread, common	
Mylothris agathina (Cramer)	Widespread, in or near forests	
Pieris brassicae (Linnaeus)	Widespread, common	
PAPILIONIDAE		
Papilio dardanus cenea Stoll	Widespread, in or near forests	
Papilio demodocus demodocus Esper	Widespread, common	
Papilio nireus lyaeus Doubleday	Widespread, common	
HESPERIIDAE		
Eagris nottoana knysna Evans	Knysna Forests, George	
Eretis umbra umbra (Trimen)	Great Brak River	

Spialia sataspes (Trimen)	Paradise Coast	
Spialia asterodia (Trimen)	Robinson Pass, Plettenberg Bay	
Spialia diomus ferax (Wallengren)	Widespread	
Spialia spio (Linnaeus)	Widespread	
Gomalia elma (Trimen)	Knysna, Mossel Bay	
Metisella metis paris Evans	Knysna forests, Grootvadersbos, Mossel Bay	
Tsitana uitenhaga Evans	Seven Weeks Poort, Heidelberg	
Tsitana tulbagha kaplani Dickson	Seven Weeks Poort, Swartberg	
Zophopetes dysmephila (Trimen)	Brenton-on-Sea	
Pelopidas thrax inconspicua (Bertoloni)	Widespread	
Gegenes niso niso (Linnaeus)	Widespread	

* = synonymised by Heath (2001)

TABLE 2 PUTATIVE NEW BUTTERFLY TAXA OF THE SOUTHERN CAPE REGION

TAXON	LOCALITIES	PROPOSED RED DATA STATUS
Torynesis magna ssp novum	Swartberg, Kammanassie Mountains	
Aloeides pallida ssp. novum	The Lakes, Sedgefield	Vulnerable
Chrysoritis lycia ssp novum	Huis River Pass	
Chrysoritis turneri ssp novum	Huis River Pass	
Lepidochrysops ketsi ssp novum	Knysna eastern Heads, Brak River	Vulnerable
Lepidochrysops littoralis ssp. novum	Mossel Bay	Vulnerable

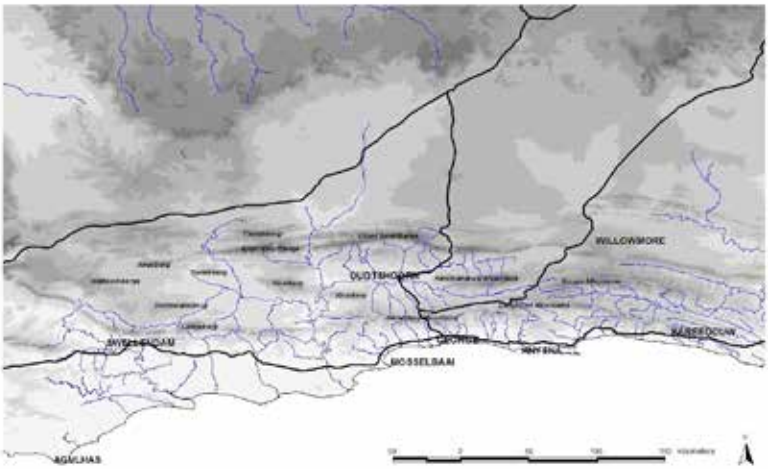

Fig. 1 The southern Cape region of South Africa

Fig. 2 Knysna Eastern Heads, Sparrebosch and Pezula Estate

Butterfly fauna of the Mpenjati Nature Reserve, KwaZulu-Natal, South Africa

Richard Dobson
Impenjati Butterfly Farm
P.O. Box 14854, Palm Beach, 4275, KwaZulu-Natal

The Mpenjati Nature Reserve (30.56 S 30.18 E) is controlled by the KwaZulu-Natal Nature Conservation Service (KZN-Wildlife), and is approximately 66ha in extent. The reserve is situated 20km south of Margate. It is a small coastal reserve, with the main feature being the Impenjati River estuary. The reserve is of interest to conservationists and people who appreciate unspoiled natural areas. It is one of the very few remaining undeveloped estuaries on the KwaZulu-Natal south coast. The reserve consists of several habitats, which are important for both conservation and ecological reasons, these are: coastal grassland, coastal forest, wetlands, dune and estuarine. Bird life in the reserve is abundant, with well over 250 species being recorded. Mpenjati is dominated by coastal grassland and forest. The coastal grasslands are intersected by numerous wetlands. The forest can be further categorized into coastal and dune forest. The only management actions which affect the vegetation in the reserve are the control of alien invasive vegetation, and the biennial use of fire for the maintenance of the grasslands. The number of species of butterflies in the Mpenjati Nature Reserve currently stands at 119.

A survey of butterflies in the reserve took place from the 1st of October, 2003 to 30th of September, 2004. The objective was to obtain initial data on the composition of the butterfly fauna and to compile the first-ever checklist for the Mpenjati Nature Reserve. Species observations were made using the butterfly transect method, which involves the establishment of a fixed route across the various habitat types within the boundaries of the Mpenjati Nature Reserve. The route was divided into a number of sections, which varied in length, depending on the habitat. Each week, walks were carried out along the transect, with each butterfly species noted in each section. Transects were walked at a slow, steady pace. Counts were only made during the day and when certain weather criteria were met (warm, bright, and light winds). The study has provided valuable information on the butterfly ecology, including population trends, the effects of habitat management, changing distribution patterns (spread/decline), population dynamics, migration and the effects of the weather. It was, however, concluded that it was also too early to detect annual population trends, as the project would have to be carried out over a period of at least 3 to 5 years. For that reason, an initial aim is to develop

protocols and a formal repeatable procedure that will allow future transects to be carried out, with accurate count figures on butterfly populations.

The actual butterfly specimens were identified by using *Pennington's Butterflies of Southern Africa*. Where possible specimens were identified to family, sub-family, species and sub-species. A total of 119 species (refer to Appendix 1) were identified within the boundaries of the reserve. The capturing of butterflies was not possible as the Mpenjati Nature Reserve is a 'protected area'. The most abundant butterfly species is the African Migrant (*Catopsilia florella* Fabricius, 1775). The reason here was the large amount of peanut butter cassia (*Cassia didymobotrya*) along the northern boundary of the reserve, which has also been classified as an invasive alien invader. In an open area within the coastal forest a large colony of the small striped swordtail, (*Graphium policenes* Cramer, 1775) was also discovered. On the negative side, a colony of the coastal copper (*Chrysoritis natalensis* Van Son, 1966) was almost destroyed by fire, as much of the host plant, the tick berry bush, (*Chrysanthemoides monilifera*) was burnt. It was observed that this bush is very susceptible to bush fires.

It is probable that the reserve contains more species of all families than were observed during this survey and, if the bias is addressed in the future, the checklist of the butterflies of the Mpenjati Nature Reserve will be longer. For the record, some areas of the reserve undergo a control burn every two years. Therefore, the vegetation composition of a particular area will determine whether butterflies will inhabit or visit the area and also what the density of the poulation in these particular areas will be in the future, at any point in time. The removal of lantana *(Lantana camara)*, a category '1' alien invader in the reserve, will also have an impact on butterfly populations, as the adult butterflies rely heavily on the high nectar content of the flowers. The lantana should be removed, and at the same time it should be replaced with an indigenous alternative. In some areas butterfly numbers are sufficiently low enough to suggest failure in colonizing a suitable area. This can be explained by the fact that the forest alone does not provide conditions for their survival. Most of the forest species encountered prefer forest clearings, forest edges and forest paths, where there are a large supply of nectar plants. All of the aforementioned scenarios occur at Mpenjati, however, the butterflies are visibly absent, due to the fact that the lantana has been removed, and not replaced with a suitable alternative.

The most important alien plant invader threat to the biodiversity of the Mpenjati Nature Reserve is triffid weed *(Chromolaena odorata*). Triffid weed swamps indigenous vegetation. It is a scrambling shrub that grows up to four metres high. It is native to South and Central America and was introduced to South Africa in the 1940's. This plant has since spread along the east coast of KwaZulu-Natal and as far south as Port St. Johns in the Eastern Cape. Infestations of this weed have now reached critical

proportions in the Limpopo Province, Mpumalanga, Swaziland, and now also Mozambique.

Butterflies can also be used as indicators of forest quality. Although there are sufficient host plants in the forest, the absence of some species indicates that some unknown factor is influencing the species distribution in that particular area. It was also found that this stretch of coastal forest is in the initial stages of degradation and if the advance of these alien plants is not stopped in the near future it could turn out to become a major catastrophe.

In conclusion, it is hoped that this short study will provide a better understanding of the natural history of the butterflies of the Mpenjati Nature Reserve, as well as the range, distribution, and affinity for the different types of habitat. This study represents an important first step in identifying likely sites to concentrate conservation efforts, based on the changing composition of species within the butterfly community. Areas where degradation has occurred, or is beginning to take place, should be targeted for initial conservation measures. The study can also be improved through additional research over longer periods of time to cover seasonal ranges within the habitat types. A key question that remains to be answered is whether or not using butterflies as indicators will enable researchers to predict the presence of other taxa and thereby contribute immensely to studies of overall ecosystem health in the Mpenjati Nature Reserve.

A map of the Mpenjati Nature Reserve is available on my web site: http://impenjati.tripod.com

References

PRINGLE, E.L.L., HENNING, G.A., & BALL, J.B. 1994. *Pennington's butterflies of southern Africa*. Second Edition. Struik, Cape Town.

MIGDOLL, I. 1994. *Field guide to the butterflies of southern Africa*. Second Edition. Struik, Cape Town.

Appendix 1. Checklist of Butterflies of the Mpenjati Nature Reserve (R. Dobson 2004)

HESPERIIDAE

Coeliades forestan forestan (Stoll, 1782)
Netrobalane canopus (Trimen, 1864)
Spialia spio (Linnaeus, 1767)
Tagiades flesus (Fabricius, 1781)
Metisella metis (Linnaeus, 1764)
Artitropa erinnys erinnys (Trimen, 1862)

Moltena fiara (Butler, 1870)
Gegenes hottentota (Latreille, 1824)

PAPILIONIDAE
Papilio constantinus constantinus Ward, 1871
Papilio dardanus cenea Stoll, 1790
Papilio demodocus demodocus Esper, 1798
Papilio nireus lyaeus Doubleday, 1845
Papilio ophidicephalus phalusco Suffert, 1904
Graphium colonna (Ward, 1873)
Graphium leonidas leonidas (Fabricius, 1793)
Graphium policenes (Cramer, 1775)

PIERIDAE
Catopsilia florella (Fabricius, 1775)
Colias electo electo (Linnaeus, 1773)
Eurema brigitta brigitta (Stoll, 1780)
Eurema desjardinsii marshalli (Butler, 1898)
Eurema hecabe solifera (Butler, 1875)
Appias epaphia contracta (Butler, 1888)
Belenois aurota (Fabricus, 1793)
Belenois creona severina (Stoll, 1781)
Belenois gidica abyssinica (Lucas, 1852)
Belenois thysa thysa (Hopffer, 1855)
Belenois zochalia zochalia (de Boisduval, 1836)
Colotis antevippe gavisa (Wallengren, 1857)
Colotis erone (Angas, 1849)
Colotis ione (Godart, 1819)
Colotis regina (Trimen, 1863)
Dixeia charina charina (de Boisduval, 1836)
Dixeia pigea (de Boisduval, 1836)
Eronia cleodora cleodora Hübner, 1823
Eronia leda (de Boisduval, 1847)
Nepheronia argia varia (Trimen, 1864)
Pinacopteryx eriphia eriphia (Godart, 1819)
Pontia helice helice (Linnaeus, 1764)
Mylothris rueppellii haemus (Trimen, 1879)

LYCAENIDAE
Alaena amazoula amazoula (de Boisduval, 1847)
Baliochila aslanga (Trimen, 1873)
Pentila tropicalis tropicalis (de Boisduval, 1847)
Lachnocnema bibulus (Fabricius, 1793)
Thestor basutus basutus (Wallengren, 1857)

Myrina dermaptera dermaptera (Wallengren, 1857)
Myrina silenus ficedula Trimen, 1879
Leptomyrina gorgias gorgias (Stoll, 1790)
Hypolycaena buxtoni buxtoni Hewitson, 1874
Hypolycaena philippus philippus (Fabricius, 1793)
Iolaus pallene (Wallengren, 1857)
Iolaus sidus Trimen, 1864
Iolaus silas (Westwood, 1852)
Deudorix antalus (Hopffer, 1855)
Deudorix dinochares Grose-Smith, 1887
Chrysoritis natalensis (van Son, 1966)
Cigaritis natalensis (Westwood, 1851)
Anthene butleri livida (Trimen, 1881)
Anthene definita definita (Butler, 1899)
Anthene lemnos lemnos (Hewitson, 1878)
Azanus jesous (Guerin-Meneville, 1849)
Cacyreus lingeus (Stoll, 1782)
Cacyreus marshalli Butler, 1898
Leptotes pirithous (Linnaeus, 1767)
Eicochrysops hippocrates (Fabricius, 1793)
Eicochrysops messapus mahallakoaena (Wallengren, 1857)
Chilades trochylus (Freyer, 1843)
Lampides boeticus (Linnaeus, 1767)
Lepidochrysops patricia (Trimen & Bowker, 1887)
Tuxentius melaena melaena (Trimen & Bowker, 1887)
Zizula hylax (Fabricius, 1775)

NYMPHALIDAE
Libythea labdaca laius Trimen, 1879
Acraea cabira Hopffer, 1855
Acraea eponina eponina (Cramer, 1780)
Acraea esebria esebria Hewitson, 1861
Acraea horta (Linnaeus, 1764)
Acraea natalica (de Boisduval, 1847)
Acraea neobule neobule Doubleday, 1847
Acraea petraea (de Boisduval, 1847)
Acraea acara Hewitson, 1865
Acraea aganice aganice Hewitson, 1852
Pardopsis punctatissima (de Boisduval, 1833)
Phalanta phalantha aethiopica (Rothschild & Jordan, 1903)
Lachnoptera ayresii Trimen, 1879
Danaus chrysippus chrysippus (Linnaeus, 1758)
Amauris albimaculata albimaculata Butler, 1875
Amauris ochlea ochlea (de Boisduval, 1847)

Melanitis leda (Linnaeus, 1758)
Bicyclus safitza safitza (Westwood, 1850)
Heteropsis perspicua perspicua (Trimen, 1873)
Charaxes brutus natalensis Staudinger, 1885
Charaxes candiope (Godart, 1824)
Charaxes cithaeron cithaeron C. & R. Felder, 1859
Charaxes drucenaus druceanus Butler, 1869
Charaxes ethalion ethalion (de Boisduval, 1847)
Charaxes varanes varanes (Cramer, 1777)
Charaxes zoolina zoolina (Westwood, 1850)
Cymothoe alcimeda trimeni Aurivillius, 1912
Pseudacraea boisduvalii trimenii Butler, 1874
Pseudacraea eurytus imitator Trimen, 1873
Pseudacraea lucretia tarquinia (Trimen, 1868)
Neptis saclava marpessa Hopffer, 1855
Sevenia boisduvali boisduvali (Wallengren, 1857)
Eurytela dryope angulata Aurivillius, 1898
Eurytela hiarbas angustata Aurivillius, 1894
Hypolimnas misippus (Linnaeus, 1764)
Hypolimnas anthedon wahlbergi (Wallengren, 1857)
Hypolimnas deceptor deceptor (Trimen, 1873)
Precis archesia archesia (Cramer, 1779)
Precis octavia sesamus Trimen, 1883
Junonia terea elgiva Hewitson, 1864
Junonia hierta cebrene Trimen, 1870
Junonia oenone oenone (Linnaeus, 1758)
Junonia natalica natalica (C. & R. Felder, 1860)
Junonia orithya madagascariensis Guenee, 1865
Catacroptera cloanthe cloanthe (Stoll, 1781)
Antanartia hippomene hippomene (Hübner, 1823)
Protogoniomorpha anacardii nebulosa Trimen, 1881
Protogoniomorpha parhassus (Drury, 1782)
Vanessa cardui (Linnaeus, 1758)

How to kill caterpillars (by an expert)

Colin Congdon
with added wisdom from Ivan Bampton

In the course of our wanderings around Africa we have found and killed hundreds, probably thousands of innocent caterpillars. (guilty ones too, no doubt). These notes are a few do's, don'ts and how-to's we have picked up on the way.

The two easiest ways to kill caterpillars are to cook them or to zap them with insecticide.

Cooking your caterpillars. In hot sun on a hot day, put them into a small plastic pot as you find them on the foodplant, and then put the pot in the top of your backpack. Then just keep walking. Or you can leave the backpack in the sun as you have your lunch. You can achieve the same effect by leaving them in a plastic box on a sunny window sill, or in the back of the car. We carry a coolbox; it doesn't have to be big. If the weather won't oblige, and it's tipping down in buckets, you can try drowning them. Just put your pot of caterpillars in the outside pocket of your waterproof as you walk home. With a bit of luck by the time you get there – caterpillar soup.

Insecticides. These come in various disguises. For instance, if you are working in an area infested with mosquitoes you will be eaten alive if you don't put on a repellent. Most repellents contain 'deet' (Diethyltoluamide), a powerful insecticide. They don't draw attention to this, so you have to read the small print. The mozzies zoom in and bite, you apply the repellent, absentmindedly scratch the itch, and transfer the insecticide to the next caterpillar you find. And the next, and the next... 'Mosi-Guard' does not contain 'deet'. Another way to achieve a kill is to forget, in the heat of the moment when you find your sitting-room full of red ants, that you have a sleeve of pupae on the mantelpiece. Same applies to red ants in your tent. Another option is to put your papered specimens (protected with insecticide) into the coolbox with your caterpillars, to save space. Or try storing your empty caterpillar boxes in with your spare insecticide: the poison will soon impregnate the plastic. The possibilities are endless.

Of course, you don't have to kill your caterpillars; you can simply throw them away. This is easy to do, particularly with the very smallest ones. They are quite good at hiding (had a few million years' practice, so they should be), and are easily dumped at the next change of foodplant. To avoid this we stick a strip of parcel tape (not the shiny sort) onto the lid of

the box, and note the number of caterpillars and other important details about them in waterproof ink. Then we count the caterpillars onto the fresh foodplant. We keep the old foodplant to one side until we have accounted for all the caterpillars, so we can easily go through it again if one of them has gone missing.

You can try enlisting the help of the caterpillars themselves. Put a selection of different sizes into the same box. With a bit of luck they will be cheerfully eating each other in no time. They particularly like their friends who are just pupating. Some lycaenids are really good at this.

We find it best to cut out the bit of foodplant with the caterpillar on it, having checked underneath the leaf to ensure we are not cutting another one in half. This is because they shed their heads from time to time (ecdysis). When they are ready to do this they spin a pad to sit on while they wait for their old heads to come off. Then they walk out of their old skin, and start eating again. But if you move them, their old feet are no longer anchored to the pad, and they can't walk out of their old skin - it just comes along too. So if you find a caterpillar immobile on the side of the box, leave it alone.

Hot tip #1. When you open the box, check inside the lid. Then use stamp tweezers to pick up the foodplant. Look carefully before you act, as small caterpillars are often on the end of the stalk. Then before you put the lid back on, check that there are no caterpillars on the rim of the box.

When we are on the move we always keep our caterpillars in plastic freezer boxes with snap-on lids. The foodplant does not wilt, and no, the caterpillars do not suffocate (these boxes are not really airtight). But we do have to check them regularly. Best is in the cool of the morning but in full daylight. And remember that a box that was big enough for a dozen or so just out of the egg will only take one or two in the final instar. When travelling, the plastic boxes are packed into a coolbox. On their own. If you put anything liquid in with them it will escape and drown them. I promise. Anything in powder form will burst and smother them.

If we are going to be in one place for any length of time, we try to 'bag out'. To do this, we enclose a branch of growing foodplant in a mesh bag, put in a few caterpillars, and let them get on with it. This is a very good opportunity to feed your favourite caterpillars to the spiders. Check the bag for holes, check the branch for spiders, and don't put too many in one bag or the frass will attract wasps. These will cheerfully chew their way into almost anything, and cart off the caterpillars. If you can find the stuff, encircle the base of the branch with py-grease. This is a mixture of pyrethrum and grease used by fruit growers, and will keep ants from climbing up into the bag. It stains bright orange, and has an amazing ability to get onto everything, but it does keep the ants out. We pin a note onto each bag saying what is in it and where it came from.

Empty boxes should be scrubbed and disinfected, particularly if the box is empty because the last occupant died in it. Sometimes you get an epidemic which will wipe out all your caterpillars. You can induce one by poor hygiene, overcrowding, putting in wet foodplant, abrupt changes in temperature (particularly from hot to cold), failing to change stale foodplant, or feeding the wrong foodplant. This last is particularly easy if you have just moved out of the area where the right one grows. In this case, check the literature: sometimes the information in the books is correct, and you can change the caterpillars onto an alternative diet.

Pupae are a different matter. We make a box frame from heavy gauge wire, stick a 25mm slab of expanded polystyrene (the white stuff that screams when you cut it) to the back, and cover the whole thing in mozzie netting, leaving some spare at the front. Pupae are dated and labelled, a pin is pushed through the label and stuck into the polystyrene. Then the spare material at the front of the box is gathered in a twist, and clipped shut with a clothes peg. Keep closely related species in different boxes, or all manner of mix-ups can happen. It gets tricky when you are on the move. Pupae are easily damaged by being bounced around in a box. Recently pupated ones can be packed in cotton wool, but the ones that might emerge just have to take their chance.

Hot tip #2. As often as not, your prize caterpillar will decide to pupate on the side of its plastic box. You can try to scrape the pupa off, but be very careful not to damage it at the base (cremaster). We find that if we stick a strip of parcel tape (not the shiny sort) up against the base of the pupa, we can peel it off the box, and the pupa comes too. We write the data on the strip before we stick it onto the box, then all we have to do is fold it sticky side inwards, shove a pin through it, and stick it into the expanded polystyrene.

Hot tip #3. Occasionally you get an awkward customer who pupates on the floor of the box unattached to anything. We write its details on a piece of paper, put a dab of white wood glue (no other kind will do) onto the paper, and manoeuvre the tail end of the pupa into the glue. When dry, you can trim the paper and pin to the polystyrene as usual.

Moment of joy! Your butterfly emerges. Wait at least a couple of hours before zapping it (overnight if it is a big species), to let the wings dry thoroughly. Meanwhile put the box into a cool dark cupboard. Then, if you are at home, shut all the windows as a precaution, slide a hand into the box, and tickle the butterfly into a small pot. Slam the lid, and rush to the fridge. Leave it there for an hour or two and then transfer to the freezer. We find that if you go direct to the freezer they tend to turn inside out, and are then difficult to handle. On the move you just have to kill them like netted specimens.

One last thing. Eggs. Don't put these into a (nearly) airtight pot or the plant they are on will go mouldy before they hatch, and the mould will

spread all over the eggs. Use those transparent slide top boxes meant for pins and so on. The plant will dry out, but that doesn't matter as long as you keep an eye on things. We try to tally the empty eggs with the first instar caterpillars, so we remove empty eggs every morning. Then if we see an empty egg we know there is a little caterpillar hiding in there somewhere. Oh, and don't forget to label the egg box.

Basic Toolkit.

Absorbent paper. For drying foodplant and wiping condensation from the insides of caterpillar boxes.
Parcel tape (you know the sort). For labels on boxes, bags and pupae.
Stamp tweezers. For handling foodplant.
Kitchen scissors. For cutting out the bits of leaves with caterpillars on when changing foodplant. They have lots of other uses, so if they go missing, check in the kitchen.
Pins.
Fine camel-hair paintbrush. For moving really small caterpillars.
Larger artist's paintbrush. For sweeping out frass.
Wood glue. Hot tip #3
Fine felt-tip drawing pen. We use size 01 black. For labels. Carry a spare.
Hand lens.

And then of course there's all the other stuff like freezer bags, plastic boxes, digital cameras, laptops and so on. A 4 X 4 helps, too.

LEPIDOPTERISTS' SOCIETY OF AFRICA
www.lepsoc.org.za

EDITORIAL POLICY

Manuscripts dealing with any aspect of the study of Afrotropical Lepidoptera will be considered.

Manuscripts not conforming to the instructions below may be rejected and returned to the author. All manuscripts of scientific papers will be evaluated by at least one reviewer. Proofs will be returned to the author if necessary, and only printer's errors may be corrected. Ten (10) offprints are provided free to the author or senior author on request, and only if the manuscript has been submitted on CD or E-Mail in a word processing format that the editor/s are able to convert. Authors should contact the editor to enquire if the software that they are using can be converted by the editor, as the situation changes constantly. Additional offprint numbers can be ordered, at cost, at the proof stage.

A hard copy of the manuscript, and the originals of illustrations, and the CD or E-Mail must be submitted to the editor. The text should be printed on A4 paper, with double lined spacing, and a margin of at least 2 cm 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 and references must be referred to in the text. If a CD is not available, then tables are to be typed on A5 paper, exactly as found in the printed journal. To facilitate proper alignment of tables, or landscape orientation, even if a diskette is used, it would be appreciated if these can be arranged in A5 format (text dimensions having a width of 4,5 inches and length of 6,5 inches (114mm x 165mm).

Figures must be boldly drawn in black waterproof ink, and arranged in clear and logical plates on stiff, white, preferably A4-sized board. All the 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.

Any opinions expressed in *Metamorphosis* are those of the contributors and not of the editor or the Lepidopterists' Society of Africa.

Additional, expanded author's instructions are available on request from the editor.

NOTE: The *International Code of Zoological Nomenclature* (ICZN), Ed. 4, states that infrasubspecific names applied to a taxon are invalid and have no standing in terms of the Code. However, some forms and aberrations - curiosities - are of general interest to our readership. Articles utilising such terms may occasionally be published in *Metamorphosis*; however, this does not imply that *Metamorphosis* or the editor accept or endorse such descriptions. To the contrary, these names remain invalid, and should not be italicised when in print and when applied to a particular "taxon" of infrasubspecific status.

Layout and Print by GLOBAL PRINT • 083 601-2643 • andrew@globalprint.co.za