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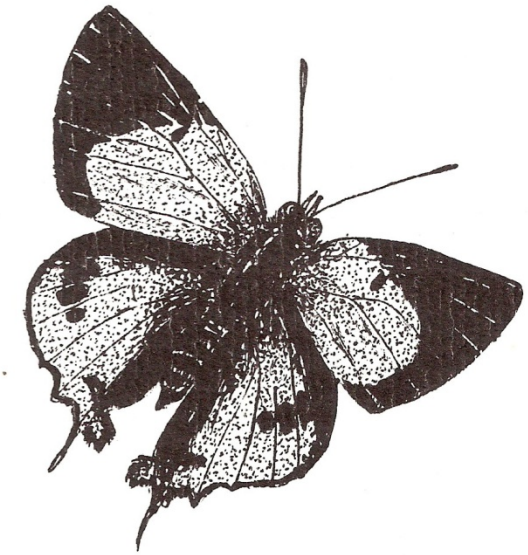

Bowkeria phosphor borealis (Lycaenidae) male
(Forewing length 13.5–14 mm)

LEPIDOPTERISTS' SOCIETY OF SOUTHERN AFRICA

EXECUTIVE COUNCIL

The **aims** of the Lepidopterists' Society of Southern Africa are to promote the scientific study and conservation of Lepidoptera in Southern Africa; and to promote the publication of original scientific papers as well as articles of a less technical nature in the journal, *Metamorphosis,* or other publications of the Society.

Membership of the Society is open to all persons interested in the study of Lepidoptera. There is no geographical limit to membership.

There are three categories of membership:

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CORRESPONDENCE

The Hon. Secretary, P.O. Box 470, FLORIDA HILLS, 1716

All drawings, unless otherwise stated, are by S.F. Henning.

EDITORIAL

The Conference and Annual General Meeting was again great success this year. What I found of particular interest was Dave Upshon's talk on the 'Butterflies of Mauritius' and Bill Steele's account of his trip to Kenya. I would have loved to accompany them on these trips. Also of interest was Rolf Oberprieler's paper on how to describe a new species.

When I see the number and variety of interesting papers presented at the conference, I wonder why it is so difficult to get contributions for *Metamorphosis*. Those of you who presented papers for the conference please put pen to paper and turn them into articles for *Metamorphosis* so that all our members can also benefit from your experiences. Some members have complained that *Metamorphosis* is getting too scientific, but we can only publish articles that are submitted to us. If you want more popular articles you must submit them as this is your Journal and we cannot continue without your support.

W.H. Henning

Cyclyrius pirithous male showing underside

COMMENT BY THE PRESIDENT

The past few months have been quite hectic for the Council with the organisation of our past Anniversary Dance, Annual General Meeting and Conference. I would like to offer a particular word of thanks to Lindsay Durham for all the time and effort she has put in to organise both events so successfully. We again had a wide variety of papers at our conference covering everything from taxonomy and photography to collecting localities and I think everybody went away satisfied with the fare.

The Entomological Society of Southern Africa also had a very successful conference at the University of the Witwatersrand in June. It was nice to see that Lepidoptera got sufficient recognition to warrant a session all to itself. I was asked by the organising committee to chair this session and it was most enjoyable. There were some excellent papers by our old stalwarts Rolf Oberprieler (Faunistic patterns of the emperor moths of Namibia) and Martin Kruger (Habitat association of geometrid moths and their suitability as indicators of environmental change). I also had the opportunity to meet one of our members from the Cape, Henk Geertsema, who presented an interesting paper on the "Flannel moths of southern Africa". Koos de Wet spoke on his research into the management and translocation of *Erikssonia acraeina*. This was a most interesting talk which I asked him to repeat at our conference. Dr M. Lee of the University of the North rounded out the session with two papers on the reflective coloration in moths. Although not in the Lepidoptera Session, Melodie McGeoch also presented a paper entitled "The microlepidoptera associated with a fungus-gall on *Acacia karoo*".

Spring is now upon us and I hope that you will all have a most successful season.

Stephen Henning

Metisells syrinx male underside

REGIONAL ROUNDUP

The last few months have seen little activity with the winter and the dry conditions not being conducive to collecting. I hope many of our members have found the time to put pen to paper and that in the next few months we will be swamped with articles for *Metamorphosis*. Some of our members have been actively writing, Jon Ball for example has been busy working with Struik's Publishers on the final cleaning up of the second edition of *Pennington's Butterflies of Southern Africa*.

The 10th Anniversary celebrations and the AGM over the weekend 7-8 August 1993 were again a resounding success with members from Zimbabwe, Rob Pare and Ian Mullin, making the effort and Ivan Bampton made the journey down from Kenya. Ivan's participation in the conference is always very well received and Ian and Rob are always eager and erudite participants. The weekend was particularly long for those of us who attended the 10th Anniversary dance on Friday night. The conference ended even later than usual on Sunday and we still did not complete the full programme. There was however much to learn and I certainly came away with my ears ringing and my mouth dry from talking. I hope members who gave talks will prepare summaries and submit them for *Metamorphosis*.

One winter observation recorded was of thousands of *Vanessa cardui* (Linnaeus) apparently migrating in Namaqualand during July. We will attempt to obtain additional information on this phenomenon as soon as possible. An inordinate number of specimens have also been seen in Cape Town during August. Stephen Henning a large number of specimens being washed up in the surf on the south coast of Natal during August.

Even at this early stage in the season it would appear that the rains which did fall earlier this year are having an impact as many of the commoner species have already been seen during August. *Acraea horta* (Linnaeus) is one species already adorning my garden.

Please note down my telephone numbers and give me a call during the current season so that your captures can be shared with your fellow members. (Home (011) 768-1949; Work (011) 474-1466).

Graham Henning

Lepidochrysops swanepoeli male underside.

SURVIVAL STRATEGIES IN THE ACRAEINAE (LEPIDOPTERA: NYMPHALIDAE)

By G.A. Henning

17 Sonderend Street, Helderkruin, 1724.

Abstract. The biology of the Nymphalid subfamily Acraeinae is discussed with regard to some of the apparent survival strategies adopted by these butterflies including population control.

Key Words: Acraeinae, predation, defensive chemicals, gregarious behaviour, migration, population control, warning stimuli.

Introduction

The survival strategies employed by the subfamily Acraeinae cover a wide range of available mechanisms such as gregarious behaviour, unpalatability, mimicry and migration. While many of these traits are found in other butterflies few exhibit as wide a range as that available to the Acraeids. Many of their unpalatable properties are attributable to their foodplants and the important biological niche occupied by them is summarised below. Having successful survival strategies could lead to the threat of overpopulation and so other controls, such as migration, are available to ensure an effective system of population control.

BIOLOGICAL NICHE

The biological niche inhabited by butterflies is usually closely aligned with their larval foodplants. The heart of Acraeinae populations is in the Afro-Tropical region and two major plant groups are utilized, these being the Passifloraceae (Tribe Acraeini: subtribe Acraeina) and the Urticaceae (Tribe Acraeini: subtribe Actinotina). These plant groups appear to be ancestral (symplesiomorphic) because, though some species use other plant families as larval foodplants, they usually have either of these respective plant groups as a secondary foodplant.

PREDATION IN BUTTERFLIES

Population fluctuation in Butterflies is apparently determined by factors other than predators. The effect of predators has not been proved to determine the population size although the scarcity of accurate data over several generations leaves the problem fairly inconclusive. There is little evidence to suggest that natural enemies are sufficiently density-dependent for them to play an important role in population regulation. High selection pressures imposed by natural enemies do not necessarily control populations but determine which individuals survive (Dempster, in Vane- Wright Ackery, 1984). The extent of predation in a population is possibly a result rather than a cause of population change.

Predators

Butterfly populations are preyed upon at all stages in their life cycles by a wide range of animals. The main vertebrate predators are birds. There can be little doubt that bird predation

has been a considerable selective force on the evolution of wing patterns of adult butterflies. Bird and other vertebrate predators are not as serious a threat in Acraeids as they are in other more palatable butterflies.

Parasitoids

All early stages of butterflies are attacked by parasitoids but there is no evidence of attacks on adults. Parasitoids are Hymenoptera (Wasps of the families Ichneumonidae, Braconidae and the tiny Chalcididae) and Diptera (Bristle flies of the family Tachinidae) which feed internally on organisms.

High proportions of parasitism have been recorded and if any natural enemy can effect populations this is it. Some parasitoids are specific and their populations are determined by the abundance of the host. As parasitoid numbers increase they eventually affect the host resulting in a peak in the parasitoid population occurring after the peak in the host population. These population oscillations can be found in one season or in annual generations. High rates of infestation can often be found later in the season. The parasitoids of *Acraea (A.) horta* (Linnaeus) have been published by Picker & Griffiths, 1989 and Claassens, 1991.

Parasites & diseases

All animals are subject to parasites and disease, and butterflies are no exception. Examples are fungi, bacteria, viruses, protozoa, nematodes and mites. Viruses are probably the most important pathogens of butterflies. Stress and overcrowding as well as bad weather can have a severe effect on populations through viral inifections.

DEFENCES IN THE ACRAEINAE

The Acraeinae are a highly specialised group of butterflies with the two primary defences being unpalatability and gregarious behaviour.

Palatability spectrum

The palatability spectrum is the measure of how unpleasant some things are to eat and how to recognise and avoid them. (Turner, in Vane-Wright & Ackery, 1984).

1. Vertebrates learn rapidly to associate particular colours and patterns with nasty experiences.
2. Patterns are made conspicuously different to avoid any confusion. It is also more retentive to vertebrates.
3. A faster rate of attack due to conspicuousness and availability encourages a faster rate of learning. Repetitive exposure without physical contact also reinforces the learning experience and ensures the retention of the pattern over a longer period. (specific search image).
4. With invertebrate predators volatile chemicals play a more important role in the palatability spectrum.

Warning stimuli

Vertebrate and invertebrate predators react to stimuli both in regard to palatable and unpalatable prey.

Warning stimuli can be recognised in five categories in the Acraeinae:

1. Smell - volatile chemicals with a nasty smell.
2. Taste - a nasty taste.
3. Toxic reaction - vomiting and nausea from poison ingested.
4. Touch - spines on larva etc.
5. Sight - visually distinct and pattern retentive.

Defensive chemicals

Smell, taste and toxic reaction are called defensive chemicals. The defensive chemicals primarily associated with Acraeids are cyanogenic glycisides. These compounds are classified as Class 1 defence chemicals due to their ability to damage the predator ie. poisonous. Class 2 defensive chemicals are innocuous chemicals which merely smell bad or taste nasty.

The Acraeid defensive chemicals are usually in the form of a yellow fluid exudant or a froth. Owen (1971) recorded hydrogen cyanide in the frothy exudant from the thorax of *Hyalites (H.) encedon* (Linnaeus). The exudant can also be released from wing veins, leg joints and antennal tips. In the larvae it is generally released from the spines.

Gregarious behaviour

Acraeids are largely gregarious at various stages throughout their life cycles. Some advantages are as follows:

1. A few individuals are sacrificed for the good of the population.
2. Concentration of individuals within the home ranges of a smaller number of predators.
3. Once sampled this unrewarding patch of habitat is likely to be avoided in future search patterns.

APPLICATION OF DEFENCES IN THE ACRAEINAE

Ova & oviposition

Eggs are normally laid in batches but some species lay their eggs singly (*A. (R.) nohara* de Boisduval and *Pardopsis punctatissima* (de Boisduval)). Batch laying is apparently a derived character as the primitive *Pardopsis*, which lays singly, indicates.

The eggs are usually yellowish when first laid becoming bright pink to purple or reddish-brown if fertile. They are conspicuous and appear to be as unpalatable as the rest of the butterfly. The bright colours are a warning to predators, various authors have recorded an odour emanating from the eggs and other stages.

Batch laying can be a single, closely packed, layer (*A. (A.) horta* and *H. (A.) induna* (Trimen)) or heaped up with several layers (*H. (H.) obeira* (Hewitson) and *H. (A.) igola* (Trimen & Bowker)).

From one observation of oviposition the following was recorded:

A fairly fresh female of *H. (A.) induna* was observed feeding on flowers in a grassy field. After feeding from several flowers she flew over to a moderately sized bush on the edge of the field in a fairly exposed site. She investigated several spots on the bush by fluttering about them and finally alighted on the underside of a leaf about 30cm above the ground. She proceeded to lay the eggs in an orderly fashion, each consecutive egg almost touching the previous ones. She laid about 80 eggs in half an hour (13.00 - 13.30). She then flew back into the field to continue feeding on flowers. Upon investigation the plant, which was about two metres in height and breadth and fairly straggly, revealed another three similar size batches of eggs situated at the various spots investigated by the female. The egg batches subsequently emerged at 3 to 4 day intervals. Similar foodplants, of which there were many in the vicinity but larger and less exposed, were thoroughly searched but to no avail.

Similar laying behaviour has been seen for *A. (A.) horta* and for *H. (H.) obeira* which has been recorded to lay well over 200 eggs in a single multi-layered batch.

From the above it appears that:

1. Females prefer to lay communally and that they actively seek out other egg batches on a plant prior to laying.
2. The plants selected may not be very large and can be fairly isolated.
3. Protection afforded unpalatable egg batches in numbers on an isolated plant is that predators tasting them unsuccessfully will generally move off the plant and the minimal number of casualties will give the greatest protection.
4. Also if the plant is isolated the predator (eg. a bird) runs the risk of exposure and predation itself.
5. Closely packed clusters of eggs which are attacked by invertebrate parasitoids (such as chalcid wasps) will probably only have the outer eggs affected as the vulnerable sides of the inner eggs are difficult to get to. The eggs themselves narrowing at the top with the closely aligned ridges giving some measure of protection.
6. If smell is a strong deterrent in Acraeids then a gregarious population produces more smell.
7. Communal laying on fairly modest sized plants has connotations other than the protection of the eggs and early gregarious instars. It may also offer a form of population control. If too many larvae survive through the dangerous earlier instars then only the fastest feeders will be able to feed through before the leaves are all consumed and the remaining larvae must make the extremely hazardous journey to other plants or go into diapause.

Larval defences

The larvae of batch layers emerge within a few hours of each other. In species where several layers are laid the lower layers, although laid first, emerge last and eat their way to the top through the empty remnants of egg shells. The small larvae eat the eggshell as the first meal and thereafter communally feed on the surface of the leaves of the foodplant nearby. Such leaves are generally reduced to a fine mesh-like structure and these leaves are joined by silken threads and frass to form a web in which the earlier instars secrete themselves at night. The web is enlarged and replaced in due course.

The larvae appear to be somewhat sticky in the first couple of instars and secretions have

been recorded from the spines. These defensive chemicals can be derived from the foodplants but in the Acraeids are also produced by the insect itself (Owen, 1971).

The communal nature of the earlier instar larvae along with the exudants and webs afford them reasonable protection but they also exhibit active defensive mechanisms. If a group of young larvae are disturbed individuals will thrash their heads about. This will not be done in unison but individuals appear to do it at random. This display of aggression is likely to confuse a predator which is viewing the mass of larvae as a single meal. It may also serve to spread the odour around and may even dislodge invertebrate predators.

From the penultimate instar the larvae are not gregarious and disperse over the foodplant. In later instars the larvae still thrash about and the spines on the front part can cause a predator to discontinue its attack. Some species may also lift the anal segment as well.

In *H. (H.) cerasa* Hewitson the spines on segments 3 to 6 are longer than the other spines and only have branches at the end, they are laid down over the head of the larva and the foreparts are lifted aggressively. This defensive posture is also utilised by the genus *Pardopsis* which has only the first segment spines greatly elongated. So far only these two species have recorded movement of spines (symplesiomorphic character).

The larvae can go through a variable numbers of instars from 5 to 7 depending on the prevailing conditions. There are often five, six or seven instar groupings, even from the same batch of eggs. Each group will go at its own pace and change instar together. Larvae not able to keep up with their respective groups attempt to moult prematurely and die.

The larvae are generally conspicuously marked with recognisable warning colours. The later instar larvae are usually prominently situated on the foodplant.

Larval diapause

If the foodplant runs out and the larvae do not migrate to alternative sources they may go into diapause. In this state they can wait for new growth on the foodplant. Diapause larvae usually find a sheltered spot to hide in and live on stored fat. They can lose a large proportion of their body weight and still survive and can apparently remain in diapause for several months. A large proportion of the diapause larvae do not survive in captive conditions, only the strongest surviving long enough to return to the foodplant. This again is effective population control in the late larval instars.

Cannibalism

Cannibalism is another factor in population control. Particularly the eating of pupating larvae or soft pupae by final instar larvae. Being gregarious in the earlier larval instars cannibalism has not been noticed but in later instars this may be another form of natural control in overpopulated conditions.

In some species where the foodplant is fairly small it may be that the larger individuals may have to resort to cannibalism to survive.

Pupation

When the larva is ready to pupate it moves off the foodplant and finds itself a convenient vertical surface and prepares itself for pupation. Some species pupate communally, again finding safety in numbers. They also often make no attempt to conceal themselves and will

pupate in the most prominent positions available. Pupae are conspicuously marked black, white and yellow to allow easy recognition by predators.

Adult defences

Migration. Should all the above be successful the Acraeid population faces another serious threat, adult overpopulation. Adult overpopulation in the Acraeids is countered by migration. Migration has been written about for many years but we still need to identify the triggers which cause the mass movement of individuals away from the hatch site and the direction taken.

The migration method for population control is reduction migration (Henning, 1984). Migrants are going away from a particular site but do not have a planned destination. Migration as a means of population control is found everywhere populations of Acraeids occurs. Usually the forest species have such a well developed system that serious overpopulation seldom occurs. It is the semi arid areas where imbalances usually occur and population explosions require migration to solve the population problem.

Mimicry. Mimicry in the Acraeids is dealt with in Henning 1993.

SUMMARY OF POPULATION CONTROL

1. Eggs and early instar larvae are protected by chemical and other defences and particularly by their gregarious behaviour; batch laying, communal laying and communal feeding. (POPULATION BUILDING STAGE)
2. Later instars are controlled by availability of foodplant due to communal batch laying on fairly small and isolated plants, resulting in migration of larvae to alternate foodplants or diapause until the leaves grow back on the foodplant. Cannibalism on overpopulated plants may also occur. (PRIMARY POPULATION CONTROL STAGE).
3. If the control of overpopulation in the final larval stages fails and causes an overpopulation in adults then the excess populations migrate from the habitat. (FINAL POPULATION CONTROL).

Discussion

These conclusions may be considered fairly hypothetical even though they are based on observations and research. As with most biological data the interpretation of events may be largely up to the researcher. I do hope that this paper will stimulate Lepidopterists to observe and record their observations.

Acknowledgments

I thank my brother Stephen and father Bill Henning for assistance, also Ivan Bampton for advice and information.

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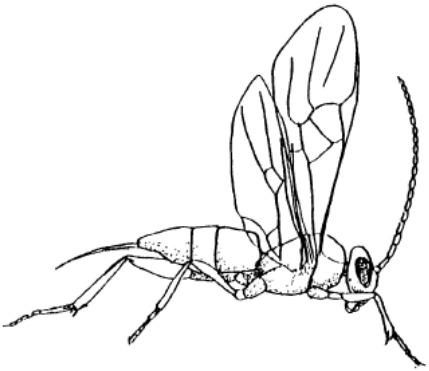

Apantales sp. female (Braconidae).

HOW EACH ADULT FEMALE PRODUCES AN AVERAGE OF ONLY ONE ADULT OFFSPRING OF EACH SEX AS SHOWN BY A STUDY OF THE POTATO TUBER MOTH (Phthorimaea operculella (Zeller.)).

By R.H. Watmough

Plant Protection Research Institute, Private Bag X134, Pretoria 0001.

Abstract. A study on the potato tuber moth, *Phthorimaea operculella* (Zeller) on the Highveld of the southern Transvaal to demonstrate how each adult female produces on average only one adult offspring of each sex.

Introduction.

The potato tuber moth was present in South Africa before 1900 (Broodryk 1967) and came from South America without its parasitoids. These were therefore introduced in an attempt to reduce its status as a pest in potatoes, tobacco and, to a lesser extent, in tomatoes and eggplant. The tuber moth also feeds on many other plants of the family Solanaceae. It is a small grey moth belonging to the family Gelechiidae with well over 200 species in southern Africa. Tuber moth-larvae feed entirely by tunnelling inside all parts of the foodplant including the tubers of the potato.

In South Africa research on the potato tuber moth only started in the early sixties (Daiber 1991), the present work on the Highveld of the southern Transvaal at Bapsfontein being done between 1966 and 1971. In the six years seven potato fields were sampled through the growing season to gain information on the population dynamics of the moth.

Methods.

The following methods were used to study the tuber moth populations:

1. The potato leaves and stems were sampled separately and placed in Berlese funnels for the extraction of the tuber moth larvae using a 600 Watt heating element in the top of each funnel to dry out the samples and drive the larvae downwards into a jar of 70% alcohol sealed onto the bottom of each funnel. The Berlese funnels were connected in series in groups of four with a 40 Watt neon tube illuminating the alcohol collecting bottles as the larvae leaving the samples were found to be attracted to light. An alternative arrangement developed later involved a group of four funnels linked to a closed box containing a Vent Axia fan driving air from an air intake into the funnels over two 600 Watt heating elements. The potato leaf or stem sample should not weigh more than about 100 g for the best extraction results. The tuber moth larvae extracted were counted and separated into instars by measuring head capsule widths. The numbers of larvae per 100 g of leaves and stems were converted to numbers per m^2 using an estimate of the weight of potato growth per m^2 obtained by throwing a wire quadrat.
2. The population of adult potato tuber moths per m^2 was estimated by counting the numbers trapped under a net placed randomly on the potato field.
3. The numbers of adult tuber moths and parasitoids of the tuber moth larvae emerging from each m^2 of ground surface in the potato crop were estimated by placing 0.25 m^2 metal boxes each with a hole in the side leading into a glass jar which trapped all insects emerging from that 0.25 m^2 of soil surface.
4. Percentage parasitism of tuber moth larvae was estimated by dissecting larvae collected

from the potato crop. The parasitoid larvae inside the tuber moth larvae were identified.

5. Tuber moth pupae, in their sand and silk cocoons, from a laboratory culture of the tuber moth were planted in the potato field and later examined to see how many had been taken by predators. The cases where predators were still actually present were used to guess what predators had taken the rest because the damage done by each predator to the tuber moth pupa was often characteristic.

All the above five procedures were repeated twice each week to obtain a run of data on tuber moth population fluctuations through the growing season of the potato crop. The only stages of the tuber moth not sampled were the eggs and pupae, both difficult to count because they are on or in the soil surface. The mean number of eggs present was therefore calculated from the known mean fecundity of the tuber moth (154 eggs per female. Çardona & Oatman 1975). As there was a mean of 0,9 adult females present per m^2 (Table 1) the number of eggs laid per m^2 was 0,9 x 154=139. As the mean length of the egg stage at Bapsfontein mean summer temperatures (+20°C) is 7 days the mean number of eggs present per m^2 at Bapsfontein was 139 x 7 = 973 (Table 1).

Results.
The factors found to be important in regulating potato tuber moth populations were as follows. A rough preliminary life table incorporating mean values for these factors as far as was possible is shown in Table 1. The tuber moth shows two population peaks corresponding to generations during the summer potato growing season at Bapsfontein.

1. **Parasitoids**: There are five indigenous parasitoids of tuber moth, three ich-neumonids *Diadegma mollipla* (Holmgren), *Diadegma sp*., *Temelucha picta* Holmgren and two braconids, *Chelonus curvimaculatus* Cameron and *Orgilus parcus* Turner. All except *Chelonus* lay their eggs in young tuber moth larvae the exception being in tuber moth eggs (Daiber 1991). Then in 1965 - 67 *Copidosoma uruguayenisis* Tachikawa, a polyembryonic encyrtid, and *Apanteles subandinus* Blanchard, a braconid, were imported from South America and rapidly established and spread throughout southern Africa almost completely displacing the indigenous parasitoids. This displacement occurred probably because the two introduced parasitoids are better adapted to the tuber moth larva as a host than the introduced parasitoids which evolved in other hosts in the absence of the tuber moth before man brought it to southern Africa. Parasitism also was higher on average after *Copidosoma* and *Apanteles* were imported.

Mortality of tuber moth caused by parasitoids averaged 59% in the first generation and 72% in the second in the 7 Bapsfontein sites studied in 1966 - 1971 (Table 1). Parasitism was higher in the second generation because the parasitoid population required time to build up from low winter levels as the summer proceeded. After the introduction of the South American parasitoids *Apanteles* was dominant in the first part of the season and was replaced by *Copidosoma* later when the potato foliage formed a more closed canopy resulting in the higher humidity required by *Copidosoma* (Kfir 1981). Before the introductions from South America *Diadegma mollipla* was by far the dominant parasitoid. All the parasitoids kill the tuber moth host in the prepupal stage when the maximum amount of host tissue is available

for conversion into parasitoid tissue.

2. **Predators**: Another important mortality factor of the tuber moth is predation on prepupae and pupae in the soil by army ants (*Dorylus* spp.), Cardiophorinae (Elateridae - click beetles) larvae, spotted maize beetle, *Astylus atromaculatus* Blanchard, larvae and mice, mostly *Mastomys natalensis* Smith. Predation was closely correlated with the number of potato tuber moth adults emerging per m^2 of soil surface ($P > 0,01$) which was an indicator of the number of pupae present. Lower tuber moth pupa numbers were therefore accompanied by lower predation, a compensatory process tending to population stability.

Predation and parasitoids together caused 90,1 and 95,0% mortality of tuber moth prepupae and pupae in generations one and two respectively in the seven sites studied at Bapsfontein. The tuber moth larvae feeding inside the potato plants were apparently relatively safe from predation. This was suggested by the numbers of instar one being similar in generation 1, but the following two mortality factors affected generation 2 (Table 1).

3. Starvation is important at the end of the season when the potato plants stop growing and die down. At this stage the farmer often also ridges the plant rows up killing tuber moth pupae by burying them too deeply.

4. Excessive rainfall can be a dominant mortality factor of the tuber moth killing larvae by drowning or disease in their tunnels inside potato plants (Whiteside 1980). Starvation and excessive rainfall together caused an average of 36% mortality of larvae in generation 2 (Table 1).

The tuber moth population increased on average 1,8 times in generation 1 and decreased by 22% in generation 2 at Bapsfontein (observed adult female to maximum mean adult female numbers. Table 1.). In spite of this calculated total mean mortality varied from 99,7 to 99,8% which exceeds the equilibrium level of mortality (98,7% for population stability. Table 1.). This discrepancy was caused by the calculation of mean maximum adult female numbers from instar 4 numbers (e.g. 33,2 instar 4 - ([0,59 x 33,2] + [0,76 x 13,6]) = 3,3 Adults. Table 1) and total mean mortality from egg numbers (e.g. 973 -3,3 / 973 = 99,7% total mortality. Table 1). Mortality in the egg stage appears to be very important because the numbers of the first instar larvae are only 0,03 to 0,04% of assumed egg numbers, (30,0 to 44,2 instar one larvae per adult female present per m^2 Table 1). Although instar one larval numbers were 47% higher in generation two compared with generation one heavier parasitism, predation starvation and excess rainfall prevented any increase in observed adult female numbers. The difference between the maximum mean number of adults and the observed mean number of adults was caused possibly by emigration from the study area.

Discussion.

In an insect like the tuber moth with a high fecundity very high mortality will still allow a viable population and small changes in mortality cause big changes in the multiplication rate. The winter is a time of low population numbers for potato tuber moth on the Transvaal Highveld because there are no growing foodplants and temperatures are low.

Table 1. A life table for the potato tuber moth on the southern Transvaal Highveld (Bapsfontein) in the summers of 1966 to 1971. The numbers of instar 4 per m^2 in generation 1 is slightly higher than the numbers of instar one because of sampling error.

	Mean number of stage present per m^2		Mortality and its cause in 1st & 2nd generations respectively
Stage	Generation 1.	Generation 2.	
Eggs (Derived from observed no. female moths present per m^2)	973	973	
Instar 1 Larvae	30,0	44,2	
Instar 4 Larvae	33,2	28,3	Starvation & excessive rainfall 0-36%
Maximum mean number of Adults (Adult females in brackets)	313 (1,6)	114 (0,7)	Parasites 59-72% Predation 76-82%
Observed Adult females.	0,9	0,9	
Total mortality at Bapsfontein. (egg-max. mean no. Adults	99,7	99,8	
Total mortality necessary for stability (no population increase with fecundity = 154 eggs per female).	98,7%	98,7%	
Reduction in calculated total mortality necessary at			

Bapsfontein For stability. (derived from maximum mean number of adults present)	-1,0% -1,1%	

In spring numbers are therefore back to where they were the previous spring and each female tuber moth of a year before is represented by only one female in the new season.

The stability seen in potato tuber moth populations regulated by various mortality factors operating separately and together is seen in the populations of all living things including butterflies. This stability is vital in the long term existence of natural populations which must remain in the safe zone between excess numbers which deplete the food supply to a non viable level and too sparse numbers where meeting of the sexes for reproduction and decreasing genetic diversity become problems. The great majority of species that have ever existed have become extinct because this stability failed for them as they were unable to cope with climatic change or competition with new more efficient species. In the past species which become extinct were replaced by new envolving species if the habitat was a viable space for them. With the dominance of man on the earth we are on the brink of a mass extinction of species which will be replaced only by the decreased diversity of a planet ever more suited to basic human needs. During the most severe crisis ever for life on earth in the late Permian period about 240 million years ago it is estimated that about 95% of marine invertebrate species became extinct without being replaced before millions of years of new evolution (Clarkson 1986). Man may be able to achieve this now. In spite of this the butterfly and moth collectors may pursue their activity on the whole so long as population stability with a viable habitat is assured for the insects. The high fecundity of more than 100 eggs per female in butterflies and moths allows plenty of scope for compensatory survival when competition, parasitism and predation are reduced with lowered population density. The larger vertebrates with their much lower fecundity are much more vulnerable to overcropping than Lepidoptera.

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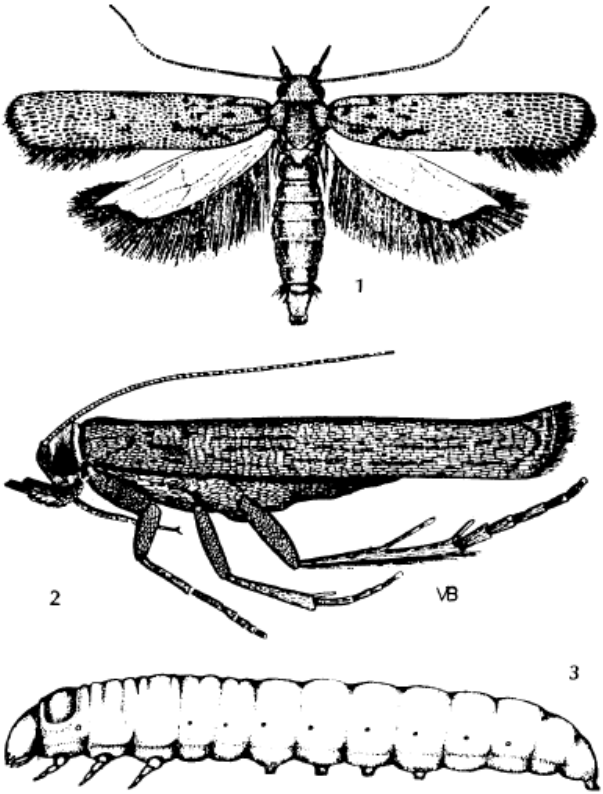

Phthorimaea operculella 1. male upper-side. 2.Male side view.
3. Final instar larva (after Broodryk & Zimmermann, 1967)

NEW RECORDS OF LYCAENIDAE FROM KENYA : A POSTSCRIPT

By Haydon Warren-Gash

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Following a trip to the Taita Hills (in S. E. Kenya) earlier this month (June) I have a couple more insects to add to the list in my earlier article.

Lipaphnaeus aderna spindasoides (Aurivillius) I took a fresh female at the summit of the Mbololo Hills (5,000 ft). Ssp *pan* (Talbot) occurs sparingly in S. W. Kenya, from where I have a worn pair. The occurrence of ssp *spindasoides* is not that surprising, since it is found in the nearby Usambara Mts of Northern Tanzania. But it is a new record for Kenya.

Anthene sp. nr otacilia (Trimen). I found a singleton female at the foot of the Taita Hills on the Taveta Road. The conundrum is this. *A. otacilia kikuyu* (Bethune Baker) is a reasonably common and widespread insect in Kenya. I have a good series from a number of localities, mostly in Central Kenya but also from precisely the same location in the Taita Hills. Females vary on the upperside, but are typically a warmish brown, with blue scaling at the base, especially on the fw. The underside of both sexes matches the illustration in Larsen's 'Butterflies of Kenya'.

This particular insect, however, looks like *Triclema nigeriae* on the upperside. The underside matches typical *A. otacilia* - with clearly defined bands of dots on the hindwing, as opposed to the irregular striae of *ssp kikuyu* from Kenya. It corresponds well with the underside illustration of "*ssp kikuyu*", that appears in Kielland's 'Butterflies of Tanzania' (plate 53).

What we have here is a muddle. The evidence suggests that Kielland's "*ssp kikuyu*", from N. W. Tanzania, is not the same insect as that occurring in Central Kenya (from where *kikuyu* was described). Furthermore it, or something very like it cohabits with *kikuyu* in the Taita Hills. On normal criteria, therefore, *kikuyu* cannot be a sub-species of *otacilia*, and the two should be separated. This may leave a northern subspecies of *otacilia* matching Kielland's material (and my singleton) needing a new name.

Mike Prettejohn and I spent only one and a half days in the Mbololo Hills. In addition to the above we picked up a number of *Charaxes* found only in that part of Kenya (*Ch. b. baumanni*; *Ch. a. aubyni*; *Ch pollux mirabilis*; *Ch. druceanus teita*; *Ch. acuminates teitensis* and the scarce *Ch. xiphares desmondi*, among others). *Ch. aubyni* was the dominant 'black' *Charaxes*. But there was another apparently different one flying, which we did not manage to catch, with a deep red brown underside, and a white banded female form quite different to *aubyni*. Could it have been *Ch. usambarae*? It may be worth further investigation!

LEPIDOPTERA OF SANTA CAROLINA

By F.C. Donnelly

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Abstract. A report on the Lepidoptera recorded on the island of Santa Carolina off the coast of Mozambique between January and April 1993.

I was fortunate enough to be able to visit the island of Santa Carolina (Paradise Island) four times between January and April 1993 and was able to record some of the Lepidoptera on the wing at that time.

This island is positioned off the east coast of Southern Africa and lies in Mozambican waters, about 20 km off shore. If forms part of a group of islands which penetrates the Mozambique channel, namely Bazaruto (north), Benguela (central) and Marzuruque (South).

Santa Carolina is approximately three kilometres long by a half a kilometre wide and is shaped like a boomerang. It has white sands, coconut palms and coral reefs. In addition to the coconut palms the island also contains the usual assortment of coastal and dune bush, as well as certain exotic plants such as Bougainville and Casuarina (trees).

In 1973, when Mozambique gained independence, Santa Carolina was nationalised and consequently Frelimo troops were stationed there for several years. During this time they dynamited some of the coral reefs and stripped much of the sea life from the shores. The buildings on the island are in a state of neglect and most are now totally beyond repair. The remains of the old fort are still clearly visible (about 17th Century) but are not protected. Tourists and fishermen may once again visit this island but facilities are poor to non-existent.

While on the island I observed both *Danaus chrysippus* and *Hypolimnas missipus* flying across the sea at about one metre above the waves towards Bazaruto Island on a regular basis. Also seen doing this were *Catopsilia florella* and *Belenois aurota*. This regular migration across the sea accounts for the presence of most of the larger species on the island. I presume that the smaller weaker flying species such as *Eurema hecabe* and some of the lycaenid species were blown on the wind to the island during a storm.

Only three species of moths were recorded one of which I have not yet identified. This small unidentified species appeared in numbers at dusk around the lights in March 1993. Many of them remained on the walls until daylight, when they were picked off by Black-eyed Bulbuls (Toppies).

LIST OF SPECIES RECORDED ON SANTA CAROLINA

BUTTERFLIES

Family PAPILIONIDAE

Papilio demodocus (Esper)

Family PIERIDAE

Belenois aurota (Fabricius)
Eurema hecabe senegalensis Boisduval
Catopsilia florella (Fabricius)
Colotis ione (Godart)
Colotis antevippe gavisa (Wallengren)
Mylothris agathina (Cramer)

Family NYMPHALIDAE

Subfamily Nymphalinae
Junonia oenone (Linnaeus)
Hypolimnas missipus (Linnaeus)
Hypolimnas anthedon wahlbergi (Wallengren)
Byblia ilithyia (Drury)
Phalanta phalantha aethiopica (Rothschild & Jordan)
Vanessa cardui (Linnaeus)
Catacroptera cloanthe (Stoll)

Subfamily Acraeinae
Acraea neobule Doubleday
Hyalites encedon (Linnaeus)

Subfamily Satyrinae
Melanitis leda africana Fruhstorfer
Henotesia perspicua (Trimen)

Family LYCAENIDAE

Subfamily Theclinae
Hypolycaena phillipus phillipus (Fabricius)

Subfamily Polyommatinae
Anthene definita (Butler)
Lampides boeticus (Linnaeus)

Family HESPERIIDAE

Tagiades flesus (Fabricius)
Spialia spio (Linnaeus)

MOTHS
Family Noctuidae

Subfamily *Ophiderinae*
Othreis fullonia (Clerck)

Subfamily Catocalinae
Cyligramma latona (Cramer)

VISIT TO THE PILANSBERG

By Nonah du Toit

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Abstract. A report on a weekend trip to the Pilanesberg in November 1992.

The Lepidopterists' Society of Southern Africa was asked to do a comprehensive survey of the Lepidoptera of the Pilanesberg Nature Reserve. Several trips were planned to survey the Pilanesberg at different times of the year. The first of these trips was organized to take place during November 1992.

Our family, with new member Stan Nevill in tow, got to Manyane Camp on Friday 6th November 1992 at about 17h00, to find a lovely shaded area under the trees cordoned off for the Lepsoc group. John Joannou, Steve Woodhall and Hermann Staude had already arrived and set up camp. Mark Williams drove up later, and he and his two daughters pitched their tent most efficiently in the dark. The Camp Supervisor, Daniel, made everybody welcome, and throughout the weekend was near at hand to assist in any way he could. As it turned out, camping was for free, and our gate entrance fee was refunded.

After some late arrivals on Saturday morning, the whole group was made up of: tour leaders Mark Williams and Graham Henning (plus 2 daughters and 2 sons respectively). Lindsay Durham, Peter Ward, Hermann Staude (with 1st, 2nd and 3rd "instars"), Steve Woodhall, John Joannou, Peter and Keith Roos (plus wife/mother), the du Toits (Andre, Pierre (10), Charl (7) and myself), Stan Nevill all the way from Howick, and Dave Molesworth, who is a keen photographer.

We all gathered outside the Manyane entrance gate at 08h15 on Saturday, and divided ourselves into two groups between the two very helpful guides assigned to us, Samuel and Petrus. Mark's group headed for the koppies at the far end of the park, and we joined Graham's group to recce the area next to the Mankwe Lake. Samuel was doing his best to assist, and took great pains to point out every passing dragonfly, and also a couple of hippo wallowing in the water about 75 metres upstream!. There was not much on the wing, possibly due to the late arrival of the rainy season; this was a wee bit disappointing after the abundance of butterflies seen by our family in April.

However, there was great excitement when Steve, in Mark's group, found what he believed was a new species of *Spindasis*, and the gathered a few larvae for further propagation at home. We look forward to his report in the near future! Peter Roos found some unrecognizable hawkmoth larvae on an equally unrecognizable foodplant, and these should also prove interesting.

I must make an apology here to the members of Graham's group, for the following (our only excuse is that this was the du Toit family's first field trip):

We had all moved on to a small koppies up Korwe Link Road, and John and Andre stayed in the road with Charl (I went back to camp - I am definitely no longer of suitable shape or stamina for bundu-bashing) while Pierre accompanied the rest up the koppie. This elder son of mine later went down to the road to fetch his trap, and couldn't locate the group when he went back up. Soon, Graham and the rest returned to the road without Pierre, to Andre's consternation. So Andre went up, followed by Graham, both just missing Pierre on his way down, of course. Andre and Graham returned Pierre-less, only to find him waiting in the road. A much chastened Pierre stayed in camp on Sunday. The opinion of some people that Lepsoc

members have more than one screw loose, could have been endorsed by this episode of playing human yo-yo up and down the koppie. I wonder what stories Samuel the guide had to tell around the campfire that night!

Over both nights, Hermann and Peter (Roos) put up moth traps. As with butterflies, the catch was a bit disappointing, but some spectacular beetles and other bugs at least put in an appearance. The bird life was quite varied, including weavers (2 kinds), hornbills (3 kinds), doves, waxbills, larks, shrikes (3 kinds), cuckoos, and many others. One black rhino and one elephant were also seen.

Poor Lindsay almost got netted by Pierre (him again!) while he was in pursuit of this first *Charaxes jahlusa rex* in the field - she got away, the butterfly did not.

Finally, we have an additional convert, one of the lady wardens who wishes to join the Lepsoc. This may also be a helpful contact. Further trips to the Pilanesberg are being planned for 1993 and 1994, so get in early with your bookings! We struck camp during Sunday afternoon, and all returned home tired but happy.

The list of species caught on this particular trip was published in the March 1993 issue of *Metamorphosis*.

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Charaxes jasius saturnus male upperside.

PILANESBERG LEPIDOPTERA SURVEY

By Mark C. Williams

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Results of the survey conducted by members of the Lepidopterist's Society of Southern Africa on the weekend of the 27th and 28th of March 1993.

Family PAPILIONIDAE
Papilio demodocus [Citrus Swallowtail]

Family PIERIDAE
Belenois aurota [Brown-veined White]
Appias epaphia [Diverse Rainforest White]
Eurema brigitta [Broad-bordered Grass Yellow]
Catopsilia florella [African Migrant]
Pinacopteryx eriphia [Zebra White]
Colias electo [African Clouded Yellow]
Colotis eris [Banded Gold Tip]
Colotis regina [Queen Purple Tip]
Colotis antevippe [Red Tip]
Colotis evippe [Smokey Orange Tip]
Colotis danae [Scarlet Tip]
Colotis evagore [Small Orange Tip]
Colotis vesta [Veined Tip]
Colotis evenina [Common Orange Tip]
Colotis subfasciatus [Lemon Traveller Tip]

Family NYMPHALIDAE

Subfamily Nymphalinae
Junonia hierta [Yellow Pansy]
Junonia oenone (Blue Pansy]
Hypolimnas missipus [Common Diadem]
Byblia ilithyia [Spotted Joker]
Phalanta phalantha [African Leopard)
Hamanumida daedalus [Guineatowl]
Neptis saclava (Spotted Sailer]
Precis archesia [Carden Commodore]
Vanessa cardui [Painted Lady]

Subfamily Charaxinae
Charaxes vansoni [Vansons' Charaxes]
Charaxes jasius [Foxy Charaxes]
Charaxes jahlusa [Pearl-spotted Charaxes]

Subfamily Acraeinae
Acraea neobule [Wandering Donkey Acraea]

Acraea natalica [Natal Acraea]
Acraea anemosa [Broad-bordered Acraea]
Acraea axina [Little Acraea]

Subfamily Satyrinae
Henotesia perspicua [Eyed Bush Brown]
Physcaeneura panda [Dark Webbed Ringlet]

Family LYCAENIDAE

Subfamily Lipteninae
Alaena amazoula [Yellow Zulu]

Subfamily Miletinae
Lachnocnema durbani [D'Urbans Woolly Legs]

Subfamily Theclinae
Anthene amarah [Black-striped Hairtail]
Anthene definita [Common Hairtail]
Spindasis natalensis [Natal Bar]
Spindasis ella [Elia's Bar]
Axiocerses tjoane [Common Scarlet]
Axiocerses amanga [Bush Scarlet]
Myrina ficedula [Common Figtree Butterfly]
Iolaus bowkeri [Bowker's Sapphire]
Iolaus trimeni [Trimen's Sapphire]
Iolaus mimosae [Mimosa Sapphire]
Deudorix antalus [Brown Playboy]
Aloeides taikosama [Dusky Copper]

Subfamily Polyommatinae
Azanus jesous [Topaz Spotted Blue]
Eicochrysops mesappus [Cupreous Small Blue]
Tuxentius melaena [Black Pie]
Zintha hintza [Hintza Pie]
Zizula hylax [Gaika Blue]
Tarucus sybaris [Common Dotted Blue]
Freyeria trochylus [Grass Jewel Blue]
Lampides boeticus [Long-tailed Pea Blue] .PA
Leptotes species

Family HESPERIIDAE

Coeliades pisistratus [Two-pip Policeman]
Caprona pillaana [Ragged Skipper]
Sarangesa phidyle [Small Elfin]
Spialia species

ON INFRASUBSPECIFIC TAXA ONCE AGAIN

By Rolf Oberprieler

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I have on two occasions (*Metamorphosis* 21:17-24 of 1988 and *Metamorphosis* 24:56 and 25:20 of 1990) discussed the nomenclatorial status of taxa below the subspecies level, and specifically that of varieties and forms. Varieties and forms are somewhat special types of infrasubspecific taxa and the subject of a separate article - 45(g) - of International Code of Zoological Nomenclature (ICZN). I have cited this entire article in *Metamorphosis* 24:5 on occasion of the *Thestor yildizae* saga and therefore do not want to repeat it here; also, the complicated part of this article deals with varieties and forms that were published before 1961, and those are not the ones concerning me here. On varieties and forms published after 1960, the Code is very clear and simple: they are always of infrasubspecific rank. Infrasubspecific names are explicitly excluded from all the provisions of the Code (articles 1(b)(5) and 45(e)), which simply means that the Code does not recognize them. Such names therefore are not valid under the rules of the Code, they cannot enter into priority, homonymy etc. with species group names, and their types have no standing whatsoever. This exclusion o names below the subspecies level is, as a matter of interest, not a recent innovation but has been in effect since the 2nd Edition of the ICZN of 1964.

Precisely such forms were, however, described in a recent issue of *Metamorphosis* (Vol. 3, No. 3), on page 117 in an article on two new subspecies of *Charaxes*. It is imperative to clarify the status of these two names, *Charaxes xiphares staudei* form *louisae* and *C. xiphares staudei* form *arikae*. From the review above it follows quite clearly that these two names are not valid under the rules of the ICZN. But what does that mean in practice?

It firstly means that they simply do not exist as far as the Code is concerned, and I can use the same names again for any new species or subspecies of *Charaxes*, in which case they will take my name as author. It also means that they cannot be cited in the synonymy of *Charaxes xiphares*, and if someone later decides that the two forms are, indeed, "good" subspecies or species of *Charaxes*, they will have to be redescribed and renamed with another or the same name. If the same names are used, they will be credited to that other person. In other words, if Brown in 1995 decides that form *louisae* is, in fact, a "good" subspecies of *C. xiphares*, he will have to redescribe it and name it *C. xiphares louisae* Brown, 1995. Of course, he could also name it *C. xiphares bloubergi* Brown, 1995 or anything else. The name *louisae* Henning & Henning, 1992 is simply of no concern to him, as it does not exist in the zoological nomenclature.

It thirdly means that the holo- and paratypes of these two forms have no standing as such in nomenclature. What standing do they have? Well, they could either be ordinary paratypes of the subspecies like the others, or, if they are excluded from the description and type series of the subspecies, they would have no type status whatsoever and simply be additional specimens. In this particular case there is some confusion, as the description of the subspecies *C. xiphares staudei* does not include these specimens (one of the results of describing a species or subspecies on individual specimens rather than the entire type series), but they are included in the "material examined" of the subspecies. Does this make them part of the type series of the subspecies or not? Article 72(b)(i) of the ICZN defines a

type series as those specimens "... included by the author in the new nominal taxon, except any that the author ... refers to as distinct variants (e.g., by name, letter, or number), The specimens of *louisae* and *arikae* are clearly treated as distinct variants of the subspecies *C. xiphares staudei* and thus not part of its type series. This is a sensible restriction of the type series, as such a series 2 cannot have two or more holotypes included in it. The holo- and paratypes of forms *louisae* and *arikae* are thus excluded from the type series of *C. xiphares staudei* and therefore have no standing whatsoever. They are just ordinary specimens, and the curators of the collections in which they are housed (specifically that of the Transvaal Museum, in which the holotypes are deposited) have to disregard the type labels of these specimens.

What now are we to do with the names *louisae* and *arikae*? Nomenclatorially, we have to ignore and forget them, as they simply do not exist as far as the ICZN is concerned. We could only use them informally, if we really want, to denote the female colour forms. We could say "form *louisae*" instead of "blue female form" and "form *arikae*" instead of "yellow female form", if we think that these names are any more descriptive (which is debatable), but in view of the nomenclatorial confusion that exists because the names were formally described, it would be better for all of us if we would forget these names altogether.

There are several other fairly recently established infrasubspecific and hence invalid names among the butterflies of southern Africa, and we have to ignore all of these as well. One can only hope that all of these will not appear in the new version of PENNINGTON'S BUTTERFLIES, as their inclusion in such a standard reference book will only perpetuate and confound the confusion that this unfortunate and outdated practice has already sown.

I would finally like to make an appeal to the lepidopterists in South Africa not to indulge in this confusing practice of formally describing infrasubspecific forms any longer, wherever they may appear. This is not the way to get your name into the scientific literature (if that's your ambition), it only makes life worse for everyone else and someone later has to sort out the nomenclatorial mess such names have created over time. It's a futile exercise and a waste of time and publishing space to establish them in the first place. Zoological nomenclature is practised according to certain rules, and we have to stick to these in order to have a uniform and stable system of scientific names. Deviating from these rules is like ignoring the rules of soccer - you can score as many goals from an offside position as you want, they simply don't count and you can't win the game this way!

Thestor yildizae male upperside

ESCAPE TO THE CAPE

By Steve Woodhall

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After a few years' collecting in the Transvaal, I've now hit the "law of diminishing returns", as each trip brings fewer and fewer species I haven't seen before, or as my friend Brian Sawford in the UK liked to call them, "primary experiences"! Butterfly hunting has changed from a question of "what shall we look for this weekend?" to "what is there to look for this weekend?". I've found myself going on more and more speculative jaunts after things like *Bowkeria phosphor*, or exploring promising looking hills for new colonies of *Lepidochrysops*, which leads to a lot of walking but not many primary experiences!

At the end of a particularly gruelling 1992, our batteries needed recharging and what better place to go than one offering daily primary experiences? After considering the various options, the western Cape seemed to be the best bet. Advertisements in Getaway were perused, bookings made and consultations sought as to the best legendary spots to visit! We decided to wend our way down to the Cape Peninsula via Sutherland in the Karoo and Ceres, where we would again seek the elusive *Poecilmitis adonis*.

The 23rd of December saw Jayne and I loading up the Meteor and setting course down the N 1 for our first overnight stop at Richmond, at the Karoo Oasis guest farm. This is situated in some pristine Karoo country with lots of interesting-looking koppies. Simon and Anja Brokke, the couple who run the farm, expressed interest in knowing what butterfly species fly on their property, so we resolved to overnight there again on the way back on January 2nd, and if possible spend a day collecting.

On the next day, we set off bright and early, and by 1100 hrs we had reached the top of the Verlatekloof Pass. While Jayne admired the magnificent desolation, I leapt out of the car in search of *Poecilmitis azurius* and *P. violescens*, as Steve Henning had told me they flew in a gully at the top of the pass. Perhaps I looked in the wrong place but I didn't find any. After finding a pair of *Trimenia wykehami*, we decided to move on the Swaarweerberg where we knew all the species we wanted had been found. Consulting the farmer at Geelhoek, Mnr. Esterhuyse, on whose property the mountain sits, produced the welcome news that a good dirt road led from Sutherland to the peak. No climbing required! Another 10 mins' drive saw us next to the new air-traffic control radar on the summit, which looks like a giant golf-ball on its tee. Flying around the top were more *T. wykehami*, some *Aloeides vansoni* and one battered *A. kaplani*, and a couple of *Poecilmitis beaufortia beaufortia*. Working through the bossies, I flushed out a few *Thestor pringlei*. This led to shaking hands and thumping heart, as it was my first ever yellow *Thestor*. They were deceptively hard to follow and catch, whizzing fast between the low bossies. Then I found a low rocky ridge below which were growing some low shrubs with small yellow flowers. These were being visited by *Poecilmitis turneri turneri* and the odd *T.wykehami.*

Flushed with these successes, I next decided to explore some huge monolithic rocks in the middle of the plateau-like top of the mountain. On the way to these, I found a broad, flat, bare rocky patch o ground which was home to several male blue *Poecilmitis*. These were also very difficult to net, spying me whenever I got within range. Eventually I found the best way to defeat them was to sneak up on their blind side and have a hopeful swipe at the side of the

bossie on which I hoped they were sitting. I was conscious of time passing and the remaining 150-odd kms of dirt road to Ceres and cold beers! As I packeted them I hoped I was getting a good selection of the various *Poecilmitis* species found at Sutherland, but when I got them home I found that they were all *P.b.beaufortia* except for one *P.violescens*.

Finally I reached the big rocks, and noticed that the gaps between them were covered in *Melianthus major*. I remembered Mark Williams telling me he had found the rare *Phasis pringlei* on this plant at Voelfontein a couple of years earlier, so I began poking around. To my everlasting joy a big brown thing shot up, a lucky "Chinese swipe" had her in the net, a perfect female *P.pringlei*. Thoughts of cold beers and Ceres faded somewhat, as a REALLY intensive search began. Alas, a male eluded me, this insect seems to have a much faster and more agile flight than other *Phasis*, or perhaps it was just Woodhall's Law in operation - the ease of capture of a butterfly is in inverse proportion to its rarity! We set off for Ceres, vowing to return on the way back to Joeys - the Richmond karoo would just have to wait!

As we drove along the interminable, desolate dirt road to Ceres, I reflected on the trip so far. Eight primary experiences on one day - including one I had never dreamed of finding – wonderful! And Gydo Mountain awaited on the morrow.

Our hotel, The Mill and Oaks, was situated at the bottom of Mitchells Pass where the Worcester road splits off from the Ceres - Wolseley route. Never were hot showers and cold pints of Mitchells' draught more welcome. Roy and Shelagh Anderson, the new owners of this hotel, made us feel at home and allowed me to put my Tupperware box of captures into their bar freezer! The next day was Christmas Day, a day of which my childhood memories are of temperatures like those in that freezer. If anyone had told me when I was a kid in the UK that I would spend a Christmas Day climbing a huge mountain in hot sunshine, catching butterflies, I'd have told them they were mad. After a merry Xmas breakfast we set off for Gydo, home of legendary bugs!

We decided to climb the long spur on the western end of the north side of the mountain, which had been most productive during a November visit a few years ago with Cameron McMaster. As we left the protea forests, the dirt track which runs part way up this spur ran past some gently sloping, very green meadows with many flowers in bloom. Great excitement was caused by the presence of some very fresh *Lepidochrysops gydoae* of both sexes feeding at flowers. These were flying with *L.dukei*, a first for me, and they were both difficult to net once flushed. The secret was to creep about looking at blue flowers, hoping to spot the well- camouflaged undersides. This hunt took quite some time, and I suddenly remembered my primary objective - *adonis*! The spot where Cameron and I had taken a male and two females produced a rather worn male almost immediately, and then I made my mistake. I am an inveterate mountain climber and although common sense told me to lurk balefully in the same spot looking for more specimens, I had to climb those seductive slopes! Served me right - all got was one tatty male *P. uranus* and the usual swarms of *Thestor petra*, not one more *P. adonis* or any *Lepidochrysops quickelbergei*. It took so long to climb the peak and there were disappointingly few butterflies at the trig. beacon, which I reached at 1330 hrs, supposedly the best time. By the time I got back to the *adonis* spot the sun was well down the sky and I was time for Christmas dinner! I collected Jayne from the shade of a large protea tree under which she had been snoozing, and we walked back to the car. The *dukei* and the fresh females of *gydoae* more than compensated for the lack of *adonis*.

Boxing Day morning saw us footsore and stiff from the previous day's walk, and sandbagged by Shelagh's excellent Christmas Dinner and the booze that accompanied it, so the climbing of huge mountains was out of the question. We hied ourselves to Yzerfontein, but this turned out to be a huge disappointment, the famed hordes of lycaenids being totally absent. Perhaps this was due to a rather cold south-wester that had sprang up, bringing with it a slight sea mist. We settled instead for a lazy scenic drive back through Du Toits Kloof where the spot by the old road tunnel produced a few *Thestor holmesi*, *Aloeides pallida grandis* and a beautiful fresh pair of *Lepidochrysops australis*. Yet again I wondered where the fabled *Poecilmitis palmus* was to be found... but more of that later. The car's airconditioner blew a hose on the pass, which guaranteed, via Sod's Law, plenty of hot weather for the rest of the trip! We finished off by driving to the farm Vredehoek at the bottom of Waaihoek mountain to dream of newly described *Poecilmitis blencathrae*, for which Jonathan Ball had earlier told me we were a month too early. This is such a huge brute of a climb - 1450m of ascent in about 4.5km of walking - that the coward in me was quite glad that we had come at the wrong time of the year!

On the 27th we set off for Cape Town, with the clouds gathering on a coolish south-wester. We booked into our B&B house, Muisnes in Simons Town, run by John and Michelle Wiseman (who also had no objection to the keeping of bugs in the deep-freeze!), and set off up Red Hill. This was a bit of a let-down as there was a cold wind and intermittent cloud, and the only butterflies seen were *Thestor protumnus protunus*, *Lepidochrysops robertsoni* and *Aloeides pierus*, as well as the ubiquitous *Stygionympha vigilans*. We repaired to the Victoria and Albert Waterfront in Cape Town to drown our sorrows in Mitchells' ales and a fish dinner, after contacting Jan and Jerine Coetzee who were also staying in the Cape and arranging a Gydo trip followed by a visit to Jonathan Ball on the morrow.

As we picked the Coetzees up from Pinelands the weather was dull and cloudy, but as the weather forecast was correct and it cleared up on the northern side of Gydo Pass. But it was still blowing cold from the south-west, and we struggled to find any butterflies at the Driefontein spot that Jonathan directed us to. At least Jan got a *P. adonis* (only one!) and Jerine a nice *L. gydoae*, (accompanied by a loud scream of "I gotta *Lepidochrysops*!!!!) As Jonathan had warned us, the area had been ravaged by fire and the fynbos was only just recovering, so for the time being the spur further to the west that we climbed on Christmas Day appears to be the best spot. It is very green and appears not to have been burnt for years, as there are plenty of large, healthy queen proteas there and few burnt-out corpses of same.

We still had quite a bit of the day left, so we obtained the permission of the farmer at Welgemoed, on the eastern side of the massif, to drive up to the Waboomberg summit. There is a radio mast there, and at 1848m the peak is higher than that of Gydo which is only 1737m. We reached the top at about 1400hrs, to find only a cold wind and a stunning view! There were a few butterflies about, the inevitable *T.petra* (a first for Jan) a few interesting *Tarsocera* which still have to be identified. I got one *L. dukei* and missed, dammit, a nice *Thestor vansoni* that was snatched away by the howling wind. This spot definitely warrants a re-visit on a warmer day, as the entire summit ridge of the Gydo massif is an easy walk from this peak.

Finally we got back to Pinelands and Jonathan, whose hospitality and cold beers were most welcome to the weary travellers! Tales were told of the ones that got away, and Jan

looked ruefully at his boots, which had not taken kindly to the rigors of Gydo - both soles were "talking!" We also had a look at Jon's series of *P. blencathrae*, (well, *had a drool* would be more appropriate expression), and discussed plans for the reminder of the trip.

As the 29th dawned bright and sunny, I had another crack at Red Hill but except for *Phasis thero* failed to find anything new. After the experience of hunting for butterflies on the fire-damaged slopes of Gydo, I was sensitised to fire's effects. At Red Hill, the number of blackened remains of proteas and the lack of large living ones indicated to me that the area had suffered a catastrophic fire perhaps two or three seasons in the past. This could explain the dearth of butterflies in a place that I had been reliably informed to be a mecca some four years ago.

We spent the rest of the day going around the wineries, adding more weight to the burden the poor little Meteor was going to have to lug back to Joeys. Feeling a bit more energetic on the 30th, we went up Du Toits Kloof again, this time armed with Jonathan's advice to search the gullies for *P. palmus*. We were not disappointed - at one little dell there must have been several thousand of them feeding on brambles and yellow daisies. I've never seen a *Poecilmitis* in such numbers before, not even at Lamberts Bay. Another female *L.australis* put in an appearance at the same spot. This was a day I will remember forever, hot sunshine, lush vegetation, towering mountains, and a long sought-after butterfly swarming. Experiences like this make up for all the long, hot fruitless walks that lepidopterising in the Cape often produces. I climbed the Muizenberg peaks on New Year's Eve, and was struck by the large numbers of *Lepidochrysops oreas oreas* on the wing. The foodplant, *Selago*, was common, and it was a delight to see so many blues together with their more sombre relatives *methymna* and *robertsoni*. At last the long-sought after *L.trimeni* put in an appearance, a male and a female being seen. These were probably the beginning of the second brood, as they were very fresh. The fynbos here is in excellent condition, having apparently escaped the huge fires we saw almost daily on the Cape Peninsula. In fact on the very next day, as we drove over the Ou Kaapse Weg on our way to Hermanus for a scenic drive, a fire had started on the Silvermine plateau. When we returned later in the day, it had spread right up to the western side of the Muizenberg peaks, where the CPA firefighters seemed at last to have got it under control. That fire, started no doubt by some careless picknicker or a cigarette flicked out of a car window on the Ou Kaapse Weg, probably killed more butterflies in one day than I have in a lifetime of collecting. I remembered an article published by Ernest Pringle in *Metamorphosis* last year speculating that overcollecting had extirpated a colony of *Argyrocupha malagrida maryae*. Despite a comment to the contrary by the Editor, I believe this simply prolonged the life of the myth, seemingly accepted by the CPA Nature Conservation department but never proven scientifically, that collecting harms butterfly populations and should not be allowed. As far as I am concerned, the big threat is FIRE. Fire during the short flight periods of these myrmecophilous butterflies. I believe this does enormous damage to the fynbos butterfly populations, as these fires are VERY common. And before any readers say to themselves - "Ah, he's only a Vaalie, what does he know about the Cape?", they should please consider the following. During only eight days in the Cape fynbos area, we saw fires or evidence of fires as listed below:

24 /12/92: Fire in the Baviaanspoort mountains to the north-east of Ceres.
25/12/92: Huge fire in the Skurweberge and Witsenberge west of Ceres, spreading almost to

Gydo Pass.
28/12/92: Evidence of recent fire on central area of northern slopes of Gydo Mountain.
29/12/92: Signs of extensive fire on the area to the north of Red Hill Drive, behind the Pinehaven cottages, probably 2-3 years ago as the fynbos had partly recovered.
1/1/93: Large fire on the Muizenberg side of Silvermine plateau.
1/1/93: Widespread devastation seen in Riviersonderend mountains when returning from Hermanus.

From this small sample, the total number of fires in a single Cape summer must be large. With this threat as well as the depredations of the Argentine ant to cope with, I hardly think the few dozen specimens taken by a collector are a significant addition to the problems facing the Cape fynbos butterflies! Perhaps the CPA can do more to conserve these insects by taking really stringent measures to prevent fires. By this I mean:

NO braais allowed even in recognised picnic spots. We were horrified by the number of people braaiing alongside the Gordon's Bay road on New Year's Day.
Possession of matches or lighters when in the fynbos areas made a punishable offence, backed by random checks. Whilst climbing Muizenberg I saw several walkers smoking, but not one CPA ranger!
Regular patrols along busy roads to extinguish fires caused by cigarette ends before they get too big to control.

But this would require effort, money and inconvenience to tourists! Far simpler to refuse to consider collecting permits, sweeping the problem under the carpet whilst doing nothing whatever to conserve the butterflies of the fynbos, simply paying lip service to this goal.

Our jolly to Hermanus ended our stay in the peninsula, and on the next day we set off back to our overnight stop at Richmond via the Swaarweerberg. We forgot that January 2nd is a public holiday in the Cape, arriving in Sutherland with the petrol gauge on the red to find the only filling station closed. This didn't stop us from ascending the mountain again although it did cut our stay short and put a damper on the day's collecting. *Thestor pringlei* had almost finished flying and there were fewer *Poecilmitis* on the wing, but we were rewarded with two more pairs of *Phasis pringlei* and my first female *Aloeides vansoni*. We drove down to Matjiesfontein, where we knew petrol was available, with our hearts in our mouths as we freewheeled down every hill. The Meteor, bless her, made it, but not without a scare as the engine stuttered when cresting the last hill!

One kilometer from the guest farm, the car mysteriously developed a fuel blockage necessitating a tow in. Jayne was worried sick that this would strand us for a few days for repairs, but that evening as we drank red wine with braaied karoo mutton chops and the best boerewors I've ever tasted, my mind went back to the Transkei where a car breakdown produced a few extra days of collecting! Perhaps I would be able to explore Simon's farm after all! Alas, in the morning the Meteor started easily and the blockage disappeared as mysteriously as it came, and we travelled the 850km home uneventfully.

In Joburg that night I couldn't sleep. No soothing sea roar or karoo silence - too much traffic! What's the definition of a Vaalie? Answer - someone who can't find a job in the Cape!

HAZARDS OF BUTTERLY COLLECTING
- GIRAFFES AND SILK PANTIES -
Kenya, 1979

By Torben B. Larsen

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I think it was my visit to Samburu in 1979, notwithstanding the somewhat unpleasant events to be detailed later, which finally made me certain that I would one day write a book on the butterflies of Kenya (1991. *The Butterflies of Kenya and their Natural History.* OUP, Oxford). Samburu country is incredibly beautiful, with rounded hills and meandering rivers, emerald green during the wet season - the very epitome of East Africa. And the Samburu park teems with animals. The dry area north of Mount Kenya is more closely related to the Somali zone than to the savannahs further south, which are allied to the Zambesian zone, and this is very evident in both butterflies and the larger animals. The Zebras are the narrow striped Grevy's Zebra, the Giraffe of beautiful reticulated variety, Beisa Oryx abound. Many of the butterfly species do not extend far south of the equator and several are endemic to Somalia and northern Kenya.

On arriving at the tented camp we checked in, dumped the luggage, and went off in search of animals and butterflies. What was that long line of animals in the distance? "Elephants", I said. "Nonsense", said Kiki, 'they are too small, and anyhow elephants aren't red'. They were elephants, though, which had rolled in red laterite mud. They allowed us to drive to within touching distance, and to observe the myriads of Whites (*Belenois creona* and *B. aurota*) which settled on their steaming droppings. Giraffes abounded. They have the curious habit of 'hiding' behind even small bushes, so that by moving left and right one can provoke a spirited *pas-de-deux*, though always separated by the bush. Old termite mounds in such areas are often clad in a mixture of the various bushes of the caper family on which the tropical Pieridae feed, and it is not unusual to find more than a dozen Pierid species in same spot.

We ended the day amid a troop of baboons on a river bank watching two elephants in love as the sun set over the river, caressing, rubbing shoulders, squirting each other with water and dust. They finally waded across, trunk in trunk. It was a slight let-down that both were males.

Back at the lodge we went straight to dinner, followed by drinks and small talk. It was not till about ten thirty that we reached our tent. An excited babble of Italian was much in evidence: 'Have you also been robbed?'. 'I don't know .... I'll check'. We had been robbed. ' Tutti?' 'Tutti !' We had not realised that baggage could have been locked in the toilet which was a cement structure adjoining the tent, anyhow, we had been assured it was quite unnecessary.

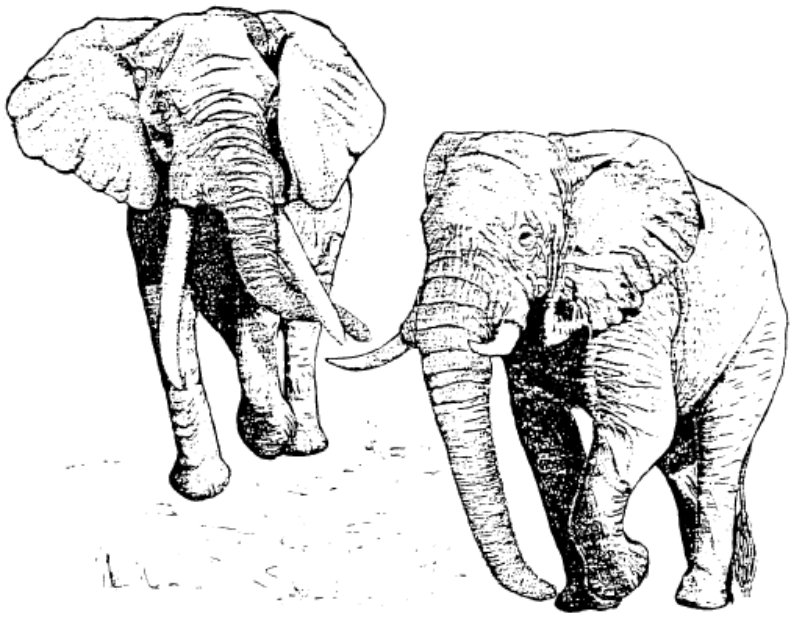
The only other victim was a tall, rather striking Italian woman. She was in a state of near hysteria, despite a Valium. We decided that the best therapy was to do something active, like making a list of lost effects. I had no idea it was possible to travel with so much underwear, nor that silk underwear could be that expensive, a fact which was underscored by the prices being quoted in Lira. 20,000 *anything* for a pair of panties?

Constable Plod, or whatever the Swahili equivalent is, arrived from Archer's Post at two in

the morning, rolled his eyes, proclaimed the matter to be way beyond his jurisdiction, and went off to his girlfriend among the hotel staff - presumably the real reason why he had bothered to come at all, since boyfriends were not allowed in camp

Early next morning the heavy artillery from Nanyuki rolled in, two whole Land Rovers full. The staff were duly rounded up and terrorised, the grounds were combed, we were interviewed, and the Land Rovers raced about, scaring the gentle giraffes senseless. Just after breakfast the inspector in charge bore down on us and saluted smartly: It had been two men; they had cut the perimeter fence of the camp; they had loaded the loot in two sacks; they had gone due east; they would doubtless be caught since it was a hike of 30 km.; he would report back at regular intervals. We announced our intention of going game watching. He assured us we would be found if there were interesting developments.

While we were watching two small dik-dik antelopes perform the most amazing ritual fight, a Land Rover rolled up with an item of silk underwear: 'Sorry, Italian lady', and off they roared in a cloud of dust. There had been a hole in one of the sacks and the thieves left a trail of almost a million Lira worth of Italian underwear. We got back a bit of our bric-a-brac, but no valuables, and none of the 20 exposed films. Still, we do have the pleasure of wondering what the elephants, zebras, giraffes, lions, and oryx made of it all.



They were elephants, though, which had rolled in red laterite mud.

GETTING TO KNOW MOTHS
- CLOTHES MOTHS, HORN MOTHS –

By Stephen Henning

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The clothes and horn moths belong to the family Tineidae (Superfamily Tineoidea). This family of small moths usually have narrow wings bordered with long hairy fringes. They may often be yellow or white, speckled with dots, or mottled orange, brown or other shades. The head has rough scales or bristles and the antennae have a whorl of erect scales on each segment. Ocelli are absent and the labial palpi are bristly.

The eggs are oval. The larvae are scavengers feeding on dried animal and vegetable matter or fungi. Many species fed on the debris of abandoned bird or rat nests. A few species are economically important as they damage fabrics and grain. Only a few species of Tinea or Tineola are really clothes moths in that the larvae eat holes in carpets and clothes, rolling themselves into the fabric as they progress. They pupate in the larval shelter or cocoon. The pupae have abdominal spines and segments 4-8 are movable in the male, 4-7 in the females.

This is a large family of about 200 species belonging to 12 subfamilies in Southern Africa. The subfamilies are Tinaeinae (21 genera, 65 species), Nemapogoninae (1 genus, 2 species), Phthoropoeinae (1 genus, 1 species), Meessiinae (14 genera, 16 species), Siloscinae (2 genera, 2 species), Setomorphinae (1 genus, 2 species), Tinissinae (5 genera, 5 species), Perissomasticinae (7 genera, 44 species), Myrmecozelinae (13 genera, 37 species), Scardiinae (4 genera, 5 species), Hapsiferinae (7 genera, 19 species), Erechtiinae (1 genus, 2 species).

For more information see Gozmany & Vari (1973), Henning (1985), Pinhey, 1975 and Vari & Kroon (1986).

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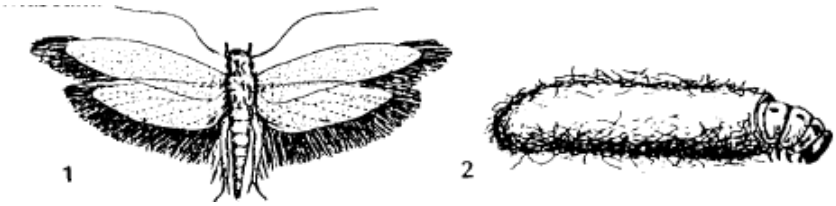

Common clothes moth, *Tineola bisselliella* (Tineidae) - 1. Male upper-side. 2. Larva in case (after E. Holm, 1985).

SCIENTIFIC NOTES

Swarming of *Vanessa cardui* in Namaqualand

Large numbers of the painted lady, *Vanessa cardui* were found on the main highway (N7) between Garies and Kamieskroon on the 14th August 1993. Although this species is known to migrate in large numbers in other parts of the world this has not been reported in Southern Africa. The swarm extended over some 50 kilometres in an area where spring flowers were in full bloom. The warm strong cross winds carried the butterflies across the road. Unfortunately no attempts were made to quantify numbers but the car in which we were travelling destroyed so many individuals we had to stop several limes in that short distance to clean the nyw, screen in order to travel on.

(Shirley Hanrahan, Zoology Department, University of the Witwatersrand, P.O. WITS 2050)

Large numbers of *Vanessa cardui* in Natal

Large numbers of *Vanessa cardui* were found washed up on the tide line along the beach from the Mtamvuma River Mouth to Port Alfred on the 2nd September 1993. This would appear to indicate that a large swarm of this butterfly must have flown or been blown out to sea somewhere along the east coast. The conditions in the area were quite stormy with strong winds during the previous week. Only small numbers of *V. cardui* were actually observed on the wing in the area.

(Stephen Henning, 5 Alexandra Street, Florida 1709, South Africa)

Vanessa cardui male upperside

The geranium bronze, *Cacyreus marshalli*, introduced into Europe

Cacyreus marshalli has been accidently introduced into the Mediterranean region on geraniums imported from South Africa. Over the past two years it has colonized all the Balearic Islands (Majorca, Minorca, Ibiza) in the western Mediterranean and has now been found on the Spanish mainland. If it does gain a foothold on the mainland it could cause havoc with Spain's geranium industry worth R80 million a year. In the Balearic Islands ninety per cent of the geraniums are affected and it is reported to be the commonest butterfly you see. The climate on these islands is similar to that here in South Africa but since there are no natural predators and parasites the population has exploded. The larvae of *C. marshalli* have also been identified on imports of geraniums to other European countries as far north as Belgium and Britain, but the butterflies do not survive in these colder climates.

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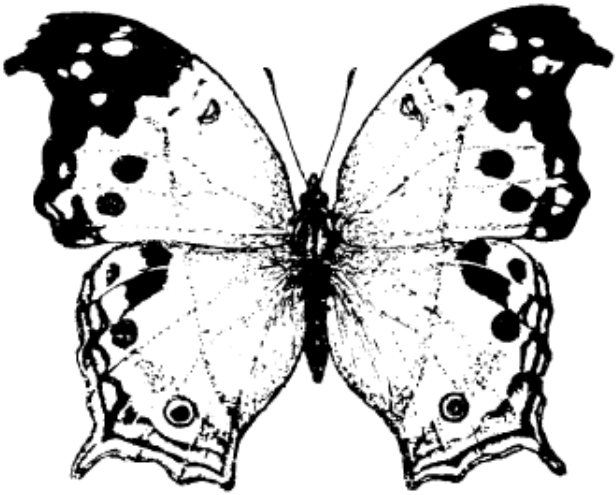
(Stephen Henning, 5 Alexandra Street, Florida 1709, South Africa)



Protogoniomorpha anacardii nebulosa male upper-side

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METAMORPHOSIS

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