Newsletter of the Lepidopterists' Society of Southern Africa
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New Members

The following people and organizations have joined our Society since March 1985 and to all of them, on behalf of the committee and our members, we extend a warm welcome and hope that their association with the Society will be a rich and long one:

Frederik Botha – Nelspruit, Transvaal
Peter Bridgeford – Namib-Naukluft Park, SWA
Johannes & Margret Coetzee – Florida Hills, Transvaal
Denis Crocker – Modderfontein, Transvaal
Koos de Wet – Lydenburg, Transvaal
P.L.M. de Wet – Worcester, Cape
Piet de Wet (Jnr) – Worcester, Cape
André Erasmus – Botha's Hill, Natal
Ernest Forbes – Brits, Transvaal
Willem Fourie – Pretoria, Transvaal
Maarten Grabandt – Edenvale, Transvaal
Stephan Hattingh – Pietersburg, Transvaal
Suzette Madden – Honeydew, Transvaal
J.G. Peach – Bultfontein, OFS
S.W. Peach Bloemfontein, OFS
Joao Pereira – Cape Town, Cape
Vivienne Swain – Pretoria, Transvaal
Marius van der Merwe – Hwange, Zimbabwe
Roger White – Ormidhia, Cyprus
Wildlife Conservation Society of Zambia (Luanshya Branch)
Frederika Zanella – Honeydew, Transvaal
Transvaal Museum Library – Pretoria, Transvaal

Report on the second conference of the Lepidopterists' Society of southern Africa

Dave Edge and Graham Henning

The second conference of the Society took place over the weekend 10-11 Aug. 1985 at the Transvaal Museum in Pretoria. Forty one members registered for the conference and we had five visitors, some of whom will, hopefully, become members of the Society.

Once again we had members come from Zimbabwe (we thank Rob & Claire Paré and Ian Mullin for their support); two members came from the Cape – they are our first 'visitors' from that Province – and we were certainly pleased to see Ernest and Anne Pringle. Our two stalwarts from Natal again attended and we thank Deryck Whiteley and Ivor Migdoll for making the trip. There was an informal gathering for tea during the registration which took place between 09h00 and 10h00.

Douglas Kroon chaired the proceedings for the first day and introduced Mark Williams who gave his presidential address. Dr Williams summarised the events of the past year and the major activities of the Society. He expressed his pleasure at the attendance of Mr Koos de Wet and Miss Lindsay Beveridge from the Transvaal Nature Conservation Division. He apologised for the intermittent appearance of *Metamorphosis* during the year but pointed out how much he relied on members' contributions. The major achievements of the Society were summarised as:

1) Contact established with nature conservation authorities in the various Provinces (Dr Douglas Kroon & Mr Rudi Mijburgh).
2) Declaration of a butterfly reserve near Roodepoort (Stephen & Graham Henning).
3) Impending publication of a comprehensive checklist of Southern African Lepidoptera (Dr Douglas Kroon & Dr Lajos Vári).
4) A publication on rare and endangered species of butterflies in Southern Africa (Stephen Henning).

This was followed by Dr Lajos Vári who gave a very interesting talk on 'General aspects of Southern African Lepidoptera'. He showed slides of the various types of Lepidoptera to be found and we saw some very unusual specimens, including moth females without wings and a very primitive moth with mandibles and not sucking mouthparts. Also included were some very unusual cases of sexual dimorphism, talk of migratory instincts in butterflies, microlepidoptera (including leaf burrowing larval stages) and the considerable variation in size both in butterflies and moths. This talk certainly made us appreciate the problems faced by moth collectors. Dr Vári drew members' attention to the recent reclassification of certain genera in the family Papilionidae. As far as Southern African species are concerned, they now all fall under either *Princeps* or *Graphium*. Details will appear in the forthcoming checklist to be published by the Society.

Stephen Henning then presented a slide show of the Charaxinae butterflies of Africa. Mr Henning opened by describing his life-long fascination with this subfamily of butterflies, which have the following special characteristics:

- they do not feed on nectar
- their flight is extremely swift and vigorous, making them difficult to catch
- their liking for rotten fruit and animal droppings.

He explained that the Charaxinae are split into three tribes, namely the Charaxini, the Euxanthini and the Pallini. He went on to briefly review each tribe by reference to the species groups within each. He described how difficult groups had been sorted out by breeding experiments and that knowledge, for example, of the black *Charaxes* species had improved dramatically in recent years. Mr Henning referred members to his soon-to-be published 'Atlas of the Charaxinae butterflies of Africa' and illustrated his talk with examples of photographic material similar to that used in the book.

After lunch Koos de Wet of the Transvaal Nature Conservation Division gave us a talk on the problems he faces in conserving the invertebrates of the Transvaal, a task which has been assigned to him. Some of the points raised in his talk are given below:

- The natural Heritage programme of the Department of Environmental Affairs aims to encourage land-owners, initially by appealing to their sense of pride and duty, but later hopefully by tax concessions, to conserve important natural sites, both large and small. Butterfly and moth localities, *inter alia*, can qualify for the programme. The first site has already been established near Heidelberg to conserve *Poecilmitis aureus*.
- He appealed to the Society to provide full information on habitats of rare or endangered localities (examples given were *Erikssonia acraeina* and *Lepidochrysops lotana*).
- There are plans to do research on butterflies existing in nature and game reserves, and permits will be issued to LSSA members to conduct this research, resulting in checklists.
- All provinces will hopefully be encouraged to follow this programme once its success has been demonstrated in the Transvaal. A single combined Nature Conservation Authority for the entire country of South Africa is envisaged.

A lively discussion followed and we all ended up more enlightened. We wish Koos every success in the future and with close co-operation from the LSSA perhaps some meaningful conservation will ensue.

The photographic competition followed at 14h30 with Stephen Henning showing the slides and giving the comments made by the various judges. The judges were Douglas Kroon and Rudi Mijburgh who represented the lepidopterists and William Morrison and Ian Crichmore-Thompson who represented the photographers. Both the latter gentlemen are experienced photographers and judges. We extend our thanks to all the judges. Thirty-three slides were shown and we thank all those members who participated. Rolf Oberprieler emerged the winner with his beautiful slides of emperor moths. He was formally handed the new floating-trophy, which was kindly donated by John Joannou.

After tea at 15h45 Ivor Migdoll from Durban entertained us with a selection of his slides for which he has become well known. This was a relaxing and entertaining way to close a very exciting day. Some highlights [of Ivor's talk] were:

- life history of *Euphaedra neophron*
- early stages and adults of *Durbania amakosa*
- larva and pupa of *Epamera diametra natalica*

During the free time during the day many members were taken on a guided tour of Dr Lajos Vári's Lepidoptera Department. We thank him for his hospitality. Some beautiful paintings of butterflies by Ernest Forbes were exhibited and some equipment and Japanese butterflies were shown by Mr J. Yano. Our thanks to these gentlemen for their participation.

Sunday's proceedings were chaired by Stephen Henning and began at 08h30 with the 2nd Annual General Meeting, the minutes of which will be supplied separately. Our congratulations to Rob Paré for winning the Logo Competition (see AGM minutes).

After tea, at 10h30 Graham Henning gave a talk on some concepts of speciation in butterflies. This began with some fossil records and definitions

of a species and subspecies: the former is defined as genetically isolated whereas the latter need only be geographically isolated. A discussion of how long it takes for a species to develop was illustrated by Sesse and Bugalla Island lycaenids in Lake Victoria. A discussion of how species develop was followed by diagrammatic representations of geographic barriers due to the rise and fall of montane forest. These fluctuations result from temperature changes and emphasis was placed on the changes since the last glaciation, which was about 20 000 years ago. The Madagascan influence on southern African butterflies was discussed and illustrated with maps and slides. Mr Henning concluded that a subspecies could be established in as little as 300 years, and a full species in around 1 000 years.

At about 11h30 Rolf Oberprieler presented a detailed analysis of defence mechanisms in Lepidoptera, with special reference to the emperor moths. These were classified as primary and secondary mechanisms and included defenses such as crypsis and some interesting offensive mechanisms. All of this was illustrated by his superb slides. He ended with some unexplained examples of very blatant colouration in certain species and posed some theories for these phenomena.

At 12h15 Dave Edge gave his closing address and thanked those people who contributed so much towards making this a successful conference. Special mention must be made of Mrs Leonora Mijburgh and her helpers who organised the catering. Our heartiest congratulations for a superb effort. We thank Dr C.K. Brain and Dr Lajos Vári for allowing us the use of the Museum, Rudi Mijburgh for his competent organisation of the event. Mrs Erasmus of the Museum staff for use of cutlery etc., and Marius du Plessis who controlled the sound, lighting and slide projector. To all those who came to the conference, thank you very much, and to all those who didn't – we hope to see you next year!

More on hill-topping

Stephen Henning

In my article on hill-topping (*Metamorphosis* **1** no. 8) I did not present arguments in favour of hill-topping being an important part of the mate-locating behaviour found in low density species because this was dealt with in detail by Shields (1967) and his conclusions have been accepted by researchers throughout the world. But as several people have expressed disbelief and a certain lack of understanding of the issues involved, I will endeavour to clarify the matter. The comments expressed by Ernest Pringle in *Metamorphosis* **1** no. 14 are typical of what I have received.

The main point in our present disagreement appears to be due to the fact that Ernest does not know the difference between a low density species and a high density species. Therefore before answering the points raised by him I had better describe what is meant by these and other terms.

Hill-topping is defined as a behaviour pattern of certain insects in which males fly to the summits of hills and when there, remain on the summit and show perching (territorial) or patrolling behaviour, resulting in an unexpected abundance of males on hill-tops (Scott, 1968). Hill-topping low density species have many behavioural traits in common. They do not congregate about the foodplant but instead tend to be large, strong-flying,

solitary species with more widely-scattered foodplants than other species. When a specimen of these low density species emerges from the pupa it will be unlikely to find a member of the opposite sex in the near vicinity. If unable to find a mate it will ascend to the highest topographic point where it will find other members of the species who will also have ascended to the peaks to mate. The males that will mate more than once tend to congregate around these high points waiting for females. A high proportion of females only mate once or twice in their lives, therefore many will only ascend to the summit shortly after emerging and once mated will never return. This is why females are seldom observed on the summits as they are only there long enough to mate. Courtship usually only lasts 2-3 minutes and once in copula they are usually out of sight in the grass or in a tree, often downhill from the summit. So chances are very slight that you will see a female. This gives rise to the impression that only the males are hill-topping. *Charaxes jasius saturnus* is a good example of a low density species that shows hill-topping behaviour. It is an extremely common butterfly in the bushveld but is regarded as a low density species as its foodplants are scattered throughout the bush and females range widely laying their eggs wherever they find a suitable tree.

Hill-topping confers little or no advantage to species with high numerical density and a newly emerged individual is likely to encounter a mate long before it attempts to fly to the summit of a hill. These species, especially the weak fliers, spend their entire lives, except for brief forays in search of mud or flowers for nourishment, around stands of the foodplant, and therefore have a built-in mechanism for bringing the sexes together. Often both sexes are limited both to foodplant and certain areas of environment such as a marsh around a dam. Or possibly the butterfly will be confined to the foodplants in a particular area because it is only here that the host ant occurs. This will include all of the myrmecophilous species such as the *Lepidochrysops*. In these species, when an individual emerges from the pupa it is very likely to encounter a member of the opposite sex since they will also emerge from the plants or ant nests nearby. Therefore in these species you will generally find that most mating will occur in the vicinity of the foodplants. These species will benefit from hill-topping only when their populations fall to low levels. Hill-topping may be selected for at low population levels, and remaining near the foodplant may be selected for at high levels, so that the advantage of hill-topping for a particular species depends on its average density and the fluctuations from this average. In swarm years, which often occur in some species such as *Lepidochrysops robertsoni*, excess males, displaced from territories around the foodplants and ant nests may ascend to nearby hills in the hope of the appearance of a mate, but the vast majority of mating will occur near the foodplants.

Ernest Pringle states that in all his years of collecting he has hardly ever seen females coming to a hill-top and has only once observed courtship. This is not a very impressive record of observation. Soon after reading the article by Shields (1967) about hill-topping I undertook several trips observing and recording the behaviour of butterflies on numerous hill-tops in the Transvaal. On one day alone in a period of about 5 hours my wife and I observed 3 instances of courtship which led to copulation. These species were *Charaxes vansoni*, *Axiocerses amanga* and *Acraea terpsichore neobule*.

Shields (1967) found that an abnormally high percentage of females captured on the summits of hills were virgin when compared to those captured elsewhere. This fact was determined by the absence of a

spermatophore in the female's bursa copulatrix. He also noted that the apparent scarcity of females was due to the inconspicuousness of *in copula* pairs and due to the fact that virgins stayed only long enough to mate and non-virgins rarely approached the summit.

My observations in the Transvaal and those of Shields, Scott and other researchers have shown that males feed during the early part of the day and ascend to the hill-tops from about 11h00 to start hill-topping or mating behaviour. In high density colonial species, which are not hill-topping, this also appears to apply as the males also only start courtship and territorial behaviour from 11h00 onwards. This is possibly due to the fact that butterflies are poikilothermic and derive their energy from the sun, so they only indulge in sexual behaviour when their energy is at its peak (opposite to what Ernest suggests).

Ernest quotes the example of *Harpendyreus notobia* to back up his arguments that males return to the breeding areas to mate. I have a different explanation. *H. notobia* is a high density species in which the males patrol the area around the foodplant for mates, this is why he observed tham *in copula* or engaged in courtship in the breeding areas. The males on the hill-tops are excess displaced males who were unable to establish themselves around the breeding area.

Insects are by no means a very primitive life form as suggested by Ernest, they are actually a very highly specialized and successful group of animals. A primitive life form is an amoeba or a bacterium. The major function of an adult butterfly is reproduction or continuance of the species and no butterfly will show wasteful frivolous behaviour as suggested by Ernest. This is best exemplified by the emperor moths in which the adults live only a week, have reduced mouth parts and never feed. They are only winged reproductive organs as they just mate and lay eggs. As you all know the main feeding period of a lepidopteran species is the larval stage. You could almost call a lepidopteran species a caterpillar that has a winged stage for reproduction and dispersion.

Ernest's suggestion that males fly to the top of a hill to take maximum advantage of the sun is unacceptible – to what end would such behaviour lead? Why don't females do it? Why do males of these species show similar perching and patrolling on the hill-tops as the males of the species found around the breeding areas? If Ernest's hypothesis is correct how, for example, can a male and female *Charaxes jasius saturnus* locate each other when they wish to mate as there are no specific breeding areas for the species? The females fly at random through the bush and lay their eggs on any suitable tree. When the adult butterfly emerges it will be extremely unlikely that he will find another individual in the same area. Will he in turn then fly at random through the bush until by chance he comes upon an individual of the opposite sex? Does it not seem more logical then that these butterflies emerging at widely scattered places in the bush have a place to meet. The most prominent features are high points (hills) and they are the logical places for these species to find mates. As males mate several times they will remain around the high points while the females who usually only mate once depart immediately after mating. Females found on hill-tops are nearly always fresh perfect specimens and are virgin. I rest my case on these comments.

I would appreciate it if members could send me descriptions of courtship and copulatory behaviour of butterflies which they have observed. I would like to know where the male was located i.e. on a hill-top, around the foodplants and so on. Was he showing perching or patrolling behaviour and what time of the day was he showing this behaviour? Description of the courtship – what did the male do when the female arrived; did he chase her? And so on. In an unsuccessful courtship did the female show a rejection posture? If copulation occurred how long were they joined together and was there a postnuptial flight? All these points are very important to establish if we wish to understand and interpret the behaviour of butterflies.

REFERENCES

SCOTT, J.A. 1968. Hill-topping as a mating mechanism to aid the survival of low density species. *Journal of Research on the Lepidoptera* **7** (4): 191-204.

SHIELDS, O. 1967. Hill-topping. An ecological study of summit congregation behavior of butterflies on a southern California hill. *Journal of Research on the Lepidoptera* **6** (2): 69-178.

Hill-topping in butterflies: a sexual phenomenon??

Rudi Mijburgh

I found the articles by Stephen Henning and Ernest Pringle in *Metamorphosis* **1**, numbers 8 and 14 respectively very interesting. In Ernest's article he writes, and I quote: "All I would like to do is to stimulate some thought among field-workers in order that they themselves might observe this phenomenon more closely, and (hopefully) come to their own conclusions."

Ernest does not accept that hill-topping is a sexual function and he states that on only one occasion has he ever seen courtship between a male and a female take place on a hill-top. He suggests that mating takes place at established breeding areas, which are usually located lower down and that females stay in the vicinity of these areas. According to his observations this is definitely the case with the *Lepidochrysops* of the Cape. He is of the opinion that "this type of mating behaviour makes far more sense than the method suggested by Stephen."

I, however, would suggest that hill-topping is an important part of the mate-locating behaviour of some of the low density species and especially the fast-flighted species.

I had a great desire to catch a female specimen of *Lepidochrysops wykehami*. At 1 pm at the end of September I stood on a hill-top at Wolfhok in Namaqualand watching the behaviour of males of this species while I had a sandwich for lunch. I had enough males in my collection and there was no sense in catching more of them, but the beautiful brown female puzzled me. While I was pondering, a mint female specimen came out of the blue and perched on a shrub about two metres from me. She had hardly come to rest when a male dived in her direction and they both took to the air at a terrific speed. In two seconds they were out of sight. Needless to say I felt downhearted but I got the message. In all probability the female was a virgin and for survival of the race and before a predator could get hold of

her, nature demanded that she should get her eggs fertilised and, just as the weaver-bird has inborn knowledge to build a nest, she knew the rendezvous of the males. They start their honeymoon within seconds and at a terrific speed. I have no idea where copulation takes place but I think it is reasonable to assume that this happens at their feeding/breeding areas as suggested by Ernest. If this is the case then both Stephen and Ernest could be right.

At midday the next day I was on the hill-top. I decided to eliminate all the males the moment they arrived at the hill-top. I had nine males in envelopes when a perfect female specimen arrived; it was so easy to take her. I was the happiest person in Namaqualand. I had to wait patiently for seventy minutes before 'Miss Wykehami' arrived. When I had her in the envelope, I released the nine males and departed. I followed precisely the same procedure with *Lepidochrysops titei*, *L. ortygia* and *L. swartbergensis* AND IT WORKED. Of these butterflies I have only two or three females each, but they are all perfect specimens.

Thus it seems reasonable to assume that, at least in some species, males do congregate on hill-tops to make it easier for the virgin females to find them.

Further observations on hill-topping

Mike Bingham

Hill-topping in male butterflies (Stephen Henning, *Metamorphosis* **1** (8); Ernest Pringle *Metamorphosis* **1** (14)) is surely the lepidopteran equivalent of the male swarms which have been recorded in other insect orders.

The most spectacular, in my experience, are those of the termite *Pseudacanthotermes militaris*, which is abundant over much of the miombo woodlands of the south-central African subregion. Alate swarming in this termite takes place during afternoons following morning or midday showers, mostly in February and March. Male swarms gather on the upwind side of tall, pointed structures, notably trees, and can number thousands of individuals, forming great swirling clouds. The function of these swarms, it is generally agreed, is to distract predatory birds from the pairing alates. Pairing takes place in flight, the male attaching itself to the female, and immediately shedding its wings. Once paired in this way the insects are naturally particularly susceptible to predation. The large numbers of egrets, swallows, and other insectivorous birds attracted to the male swarms give the clue.

I have observed male swarms in other termites, such as *Microtermes*. The swarms are never as large as those of *P. militaris*, and disperse after a few minutes. Objects favoured are about head-height, and I have frequently been bombarded in this way while observing alate flights.

Males of certain mosquitoes are known to swarm, and at Makerere University a tower was built to investigate the phenomenon. Small staphylinid beetles will swarm around a person, intermittently settling and running about in circles, but I must confess I have made no effort to sex them!

I would guess that the function of hill-topping behaviour in male butterflies is the protection of the females. The fact that it occurs at the time of day when the females are most active would seem to support this hypothesis.

A sexual phenomenon? In a sense.

Roodepoort gives land to butterflies

Fiona Higginson
(from *The Star* newspaper, dated December 28, 1985)

"'Endangered species' has become a catch-phrase in conservation but who would have thought a town council would give valuable residential land to a bunch of little orange butterflies? This is exactly what has happened in a recently proclaimed, up-market residential township called Ruimsig in Roodepoort. A 12 ha butterfly reserve will be fenced around by July 1986 for the protection of the myrmecophilous (ant associated) lycaenid butterflies, *Aloeides dentatis*.

The man who has made this possible is entomologist Mr Stephen Henning of Florida North, assisted by his brother Graham. It was back in 1963 that the two boys discovered the spot during a butterfly-hunting trip with their father. During his 20 years as a keen lepidopterist, Mr Henning has found no richer source of butterflies than this patch of flat ground where he has listed 90 species. He studied these butterflies towards his Master in Science degree and came up with many new findings.

When Mr Henning heard the area was about to be developed by the Roodepoort Municipality, which owns the land, he quickly brought this butterfly haven to its attention through the newly-formed Lepidopterists' Society of Southern Africa, of which he is secretary. After much back-and-forth communication, in 1984 the Roodepoort Municipality made history by creating possibly the first butterfly reserve in the world. For this purpose it gave over 12 ha of land, smack in the centre of its prestigious new township, opposite the new golf course on the Hendrik Potgieter Road. This land will be fenced at the expense of the municipality and it will remain the reserve of the butterflies until such time as they might no longer live there. This was confirmed by Mr Willie de Bruyn, chief of Roodepoort's parks department.

What is the point of preserving these obscure insects if only a few fanatical lepidopterists take an interest? The Hennings say the point is that every species has the right to survive, be it an elephant, a butterfly or an ant. They explain that the lycaenid butterflies spend part or all of their immature stages within an ants' nest. In some species, the larvae (caterpillars) shelter in the ants' nest during the day, and venture forth at night to feed on their host plants, while the larvae of other species never leave the nest of the host ants and are carnivorous, feeding on the brood. Localities providing the right combination of host plant, host ant, and suitable climatic conditions, are few and far between. This means the butterflies are confined to limited areas and are particularly vulnerable to any disturbance of the preferred habitat.

For further information contact the Lepidopterists' Society at (011) 672-3161 or write to 6 Verne Road, Florida North 1710.