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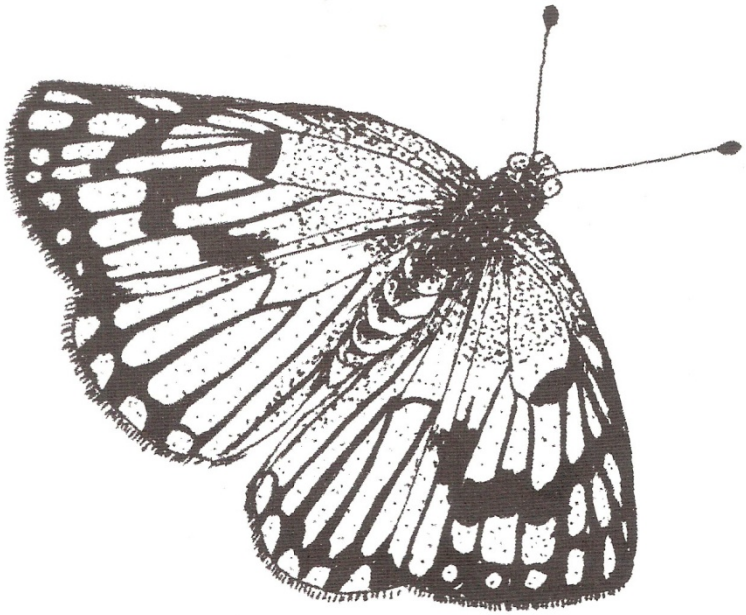

Colotius doubleday angolanus (Pieridae) male

(Forewing length 19 - 22 mm)

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

COMMENT BY THE PRESIDENT

Conservation has again occupied my attention for the past couple of months. My major concern has been vandalism at the Ruimsig Entomological Reserve. The high 'game' fencing that we had erected around the reserve ten years ago for a cost of some R11 000, has been cut and pulled down in several places. This allows free access to a variety of vagrants. They have built fires on the veranda of the Information Centre and smashed the windows. They could not get inside because of the heavy burglar bars we had installed.

The Enviro Club of Florida Park High School has again got involved in fixing up the mess. They have cleared up, repainted the centre and replaced the broken window panes. There is not much, however, that they can do to repair the fence which has been badly damaged in a number of places. Funds will have to be raised again to get the fence repaired professionally. This will have to be done as garden refuse is again being dumped in the reserve, presumably by the local residents who cannot be bothered to take it to official dumping sites. This will only increase the weed and litter problem at the reserve.

Fund raising for the Brenton Blue Project is still going as planned and articles and adverts have appeared in various newspapers and in the latest *African Wildlife* magazine.

Finally, like in the last issue, I must end on a sad note. Most of you will know by now of the death of Jan Kielland on the evening of 9th October 1995. He died instantly when the car in which he was travelling from Nairobi to Dar es Salaam ran into the back of an unlit lorry near Kibaha in Tanzania. Ivan Bampton, who was with him, survived with only cuts and bruises and a broken rib. The death of Jan Kielland is a great loss to the butterfly community as he was the foremost authority on Tanzanian butterflies. He was the author of many scientific papers and described numerous new species. He also wrote that magnificent book entitled "Butterflies of Tanzania". I met him for the first time over twenty years ago when he made a brief visit to South Africa and have corresponded with him fairly regularly since then. I am going to miss his amusing letters and the delightful articles he wrote on his collecting trips for *Metamorphosis*.

Stephen Henning

A DISCUSSION ON THE LARVAL FOOD OF THE SUBFAMILY LIPTENINAE (LEPIDOPTERA, LYCAENIDAE).

By I. Bampton
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Abstract: A report on observations, which indicate that the larval host plants of all the genera belonging to the subfamily Lipteninae, with the exception of the genus *Cooksonia*, are algae. These observations contradict the general belief that liptenine larvae feed on lichens.

In all the literature available on butterfly life histories, it has been suggested that genera of the Lipteninae feed on lichens. Personally I do not believe that this is correct. From my own observations I would state that apart from the genus *Cooksonia* all other genera in the sub family Lipteninae feed on algae.

Lichens are composite plants evolved from an algal-fungus partnership and although, as a layman, I do not fully understand this relationship it appears to me from a drawing of lichen anatomy that the algal cells are embedded in the fungal growth and therefore are not readily available to the liptenine larvae.

As far as I know the only members of the Lipteninae which have solved this problem are species of the genus *Cooksonia*. Species of this genus feed on foliose lichens. From limited observations I have made so far it would appear that they do not eat the whole plant, but merely scrape away the top layer, which suggests to me that the algal cells are contained in this part of the lichen plant. Before the larvae attack the lichen it is normally grey-green in colour and when they have removed the top layer the plant appears pink.

My first contact with algae-feeding Lycaenidae was in the early 1970's. A friend of mine returning to South Africa from Kenya obtained employment in the Natal Midlands. It was early January when I first walked up the steep, rocky hillside behind his house to see what was flying. I saw nothing until I got to the very top where I picked up a solitary *Durbania amakosa* sitting on a rock. Having been advised that the larvae feed on rock lichen I searched among the abundant small boulders in the vicinity and found both pupae and final instar larvae to be quite common. What I could not understand was that most of the rocks appeared to be absolutely clean with not a trace of any plant life at all. Most rocks showed no trace of any lichen but all showed traces of a black deposit adhering to the otherwise bare surface.

Taking a few of the smaller pieces of rock back with me I placed them in wire cages made for *Capys* larvae. When I put the *Durbania* larvae on these rocks I studied them under a magnifying glass and they appeared to me to be scraping this black deposit off the rocks. It did not seem to me that they were actually cutting at this deposit like a *Charaxes* larva does on a leaf but were merely scraping with a downward movement.

My son was at Pietermaritzburg University at the time so I persuaded him to take me along to see a professor of Botany, Dr Cathy Gordon-Gray. When I produced the rocks

and asked her if she could tell me what was on them she stated that the black deposit was in fact blue-green algae.

On my next safari I visited Russell Walter in Harare, where we discussed life histories. In our discussions I mentioned the algae-feeding *Durbania* and he informed me that he had been breeding *Alaena* and that "they did not feed on the lichen itself but fed on the black threads sticking up through the lichen." These were, of course, filaments of blue-green algae.

According to the botanical literature algae are considered to be the most primitive of plants. Most of them are only found in water, but whatever species are being used by the Lipteninae, these plants have the ability to remain dormant in dry conditions, but will immediately start to multiply whenever moisture becomes available.

Algae can be found everywhere, and are, without a doubt, one of the most abundant food sources available. According to Carcasson (1981) there are 42 genera and 507 species in the purely Afrotropical Lipteninae, each species, in my opinion, occupying its own particular niche in the food chain.

Up until 1992 I was under the impression that all *Alaena* species fed on rock algae but in April of that year we found a new *Alaena* species in Tanzania living in grassland among open *Brachystegia* woodland. When discussing the species with Colin Congdon, I stated that I could not understand where the larvae were feeding, as there were no rocks in the area where they were flying.

His reply was, after I had informed him that the *Alaena* were algae feeders, that he had examined the area and had found there were large bare patches among the grass which were covered with algae, to an even larger extent than seen on the rocks where the normal rock-breeding *Alaena* fly.

As I have already mentioned, algae are found everywhere, and on one occasion in Malawi I watched a *Pentila pauli* female fly into a friend's garden where she deposited eggs on every available surface. She started by using the bricks along the garden path, then she also oviposited on the walls of the house, on large rocks, on tree trunks and on grass stems.

If you examine the lower sheaths of large grass stems, or even old stems low down in small clumps of grass, especially in high rainfall areas, you will notice black streaks running down. This is algae and is used by some of the *Pentila*.

The first record of *Durbania* larvae is given by Trimen, who states that a Miss Bowker found them and that they were feeding on grass. Most of the *Durbania* larvae that I have found in the Natal Midlands were sitting on rocks behind a layer of grass growing up the face of the rocks. They have all been large larvae almost ready to pupate. I have yet to find early instar larvae sitting on the rocks.

In December and early January you will find *D. amakosa* larvae and pupae, in February in the same rocks you will find *D. limbata*, never the two together. Where are the early instar larvae? Perhaps they are feeding on the algae on the grass stems around the base of these rocks, hence Miss Bowker's impression that they were feeding on grass itself. They would certainly have more protection living among the grass stems than on the bare rocks.

Several years ago, on a rather damp morning, I was walking around Mike Bingham's garden in Lusaka when I came across a freshly emerged *Ornipholidotos peucetia* sitting

on the ground. I picked it up, and as I was debating where it could have come from I looked on the nearest tree, and sure enough there were two empty pupa cases attached to the main trunk. I took the specimen to Mike and asked him if he had noticed this butterfly in his garden before, and his reply was in the negative.

Next day it was back to sunny weather and as I was checking on a *Dichrostachys* bush for *Spalgis lemolea* pupa, the larvae were feeding on wooly scale infesting the twisted seed pods, Mike shouted to me that a female *Ornipholidotos* was ovipositing on a large *Piliostigma* tree (now *Bauhinia*). We watched her for several minutes as she flew among the branches depositing several eggs. His son John climbed up and actually found one of the eggs but we left it in situ.

Large trees of *Bauhinia thonningi* are very heavily fissured and therefore ideal breeding places for these insects. They generally hold a lot of algae but not much lichen. On the underside of one of the main branches Mike found a larva hanging up to pupate. It had longer hairs than *Durbania* larvae, being very similar to *Cooksonia* and *Mimacraea* larvae. After pupating the base of the pupa is enclosed by the cast skin as in *Durbania*.

The following year Mike moved to the opposite side of Lusaka where he had some large *Khaya nyassica* trees in the garden. Here again in January he found several similar larvae feeding low down on the main trunk of one of the *Khaya* trees. These trees have a very smooth trunk and are not very good lichen trees but the larvae were feeding on a large patch of algae.

With the exception of *Deloneura,* all of the southern African Lipteninae are ant-associated by choice. They will live under the protection of ants if these are already present, but the females do not deliberately seek out ant-infested trees before ovipositing. At Christon Bank in Zimbabwe Ian Mullin once found two empty pupa cases of *Cooksonia* behind the bark of a tree infested with *Crematogaster* ants.

In the wetter forests of West Africa where ants are abundant, a large proportion of the Lipteninae will only be found on trees where *Crematogaster* ants have placed their carton nests. Some species actually live in the ant nests, but most of them are to be found on the tree trunks, feeding under the protection of the ant colonies.

Several theories have been put forward as to what those species which live with ants feed on as they are not carnivorous. One suggestion is that they might feed on the fungus grown by the ants themselves. My own personal view, although I must admit that I have not yet had the opportunity to study these particular species, is that they are feeding on algae which is growing on the walks of the ant nests.

The first person to throw some light on the possible food of Lipteninae larvae was C.O. Farquharson when stationed in Nigeria. In a letter dated November 26th 1915 he writes on the larvae of *Iridopsis incredibilis*, "I am not yet certain what they feed on. I think it must be algae or dead bark."

Again, on February 26th 1916 he writes, "I am practically satisfied that the whole group with hairy larvae, *E. honorius, Hewitsonia, Iridopsis* (including almost certainly *Citrinophilia* and *Eresina*) feed on algae or lichen or the bark of the trees on which they occur."

On March 1st 1917 he writes of the possible larval food of *Teratoneura*, "I am on the whole inclined to believe that they are lichen feeders." Further on in the same letter he writes. "Yesterday I liberated two (immatures) of the hairy lycaenid larvae (*Teratoneura*) after starving them for 24 hours. I put them in the ant track on the bark of the tree. They appeared to start feeding at once and the ants simply walked round them. I then cut off a piece of the bark and enclosed the larvae in a perfectly clean tin. This morning I found fresh frass. The food material is about the most unpromising stuff I've ever seen."

Finally in a letter dated March 18th 1917 he states that he is still inclined to believe that they are lichen feeders but he cannot understand how they manage to feed off the only lichen present on the trees which is of the extremely thin crustaceous variety, so thin that they simply look like different coloured portions of the bark.

There are two observations by Farquharson (1921), which seem to me to confirm, in the light of my own observations with various other members of the Lipteninae, that algae is indicated as being the most probable food plant for the whole group.

The first is contained in his letter dated March 1st 1917 in which he talks of having examined some frass of *Teratoneura* larvae microscopically and mentions that, "It is a mixture of vegetable debris of a very odd kind, including numerous algal elements, not filaments but sporing or resting stages." Further on he writes, "I remember at the time I found the *E. honorius* larvae that some of their frass left in a jar, the walls of which were moist, formed centres for the growth, a vigorous growth, of filamentous algae."

Secondly in a letter dated March 11th 1917 in which he is describing the probable food of *Lachnocnema bibulus*, he includes the following remarks, "In connection with the food of the *Hewitsonia* (*Teratoneura*) type of bark-feeders I have been examining the frass of various larvae microscopically, and it is to me a great wonder what they take out of the ingested matter. There is no question that they feed on the 'cortex', by which I mean just the thinnest superficial layer (including epiphytic algae etc) for their bites are not visible to the naked eye, nor have I picked them up with a lens.

After Farquharson the only other person to do any work on the Lipteninae was T.H.E. Jackson and in his paper of 1937 he quotes a few early stages and indicates that they feed on lichens and mosses.

When describing *Hewitsonia kirbi intermedi* he qualifies this by stating that the larval food is, "Lichens on the trunks of trees, preferring apparently the smaller types, since it is found usually on clean smooth bark where its coloration is very effective."

For the past twenty years, I have been telling people that the South African Lipteninae are algae feeders, but no one took any notice and every book on African butterflies written in that time have merely followed one another and have written lichen feeders.

During the past year I have been working with Colin Congdon and Jan Kielland in N.W. Tanzania. One of our main objectives was to study the Lipteninae, especially the ant associated species. Colin and I would go into the forest at night and collect larvae off the ant trees. Sometimes they would be left in the collecting boxes all night, and next morning Colin would place them in boxes containing algae-covered bark. Immediately they were placed on the bark they would begin to `browse'. This is the term I have always used

when referring to the feeding habits of Lipteninae larvae, as their heads go back and forwards just like cattle.

When I first noticed this feeding habit with *Durbania,* and after looking at them under a hand lens, I suggested to one scientist at the time that he put the larvae under the microscope and examine their mouth parts, as I consider that they do not have cutting jaws like normal larvae, but jaws that have been adapted for scraping. My suggestion was not taken up, however, but I hope that one day someone will decide to solve the problem in a proper scientific manner.

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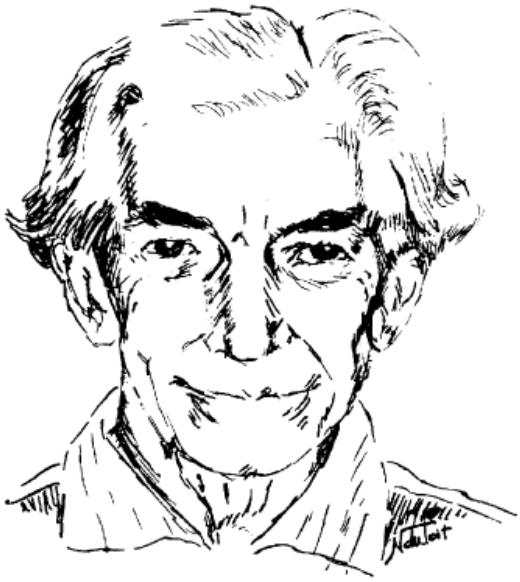

Ivan Bampton August 1995. Drawn by W. Du Toit

NOTES ON THE EARLY STAGES OF *ARGYROCUPHA MALAGRIDA MARYAE* (WALLENGREN)(LEPIDOPTERA, LYCAENIDAE)

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Abstract: The final instar larva and pupa of the Cape lycaenid *Argyrocupha malagrida maryae* Dickson and Henning are described and illustrated for the first time. Some form of symbiotic relationship is shown to exist between *A. malagrida*, the pugnacious ant, *Anoplolepis custodiens* (F. Smith, 1858), and certain aromatic buchu plants. Observations are made on the butterfly egg. Some conservation issues are discussed, such as the effect of veld fires.

Introduction

There are four described subspecies of *A. malagrida* (Wallengren, 1857). The nominate subspecies is currently known only from one tiny endangered population on the Cape Peninsula. *A. m. paarlensis* (Dickson) 1967, occurs in moderate numbers on the Perdeberg mountain, 16km NNW of Paarl; previously known and described from Paarl mountain but not recorded from there in recent years. *A. m. cedrusmontana* Dickson and Stephen 1975, is known to occur in good numbers on the Cedarberg mountains, the Skurweberg north of Ceres and the Waaihoekberge near Wolseley. *A. m. maryae* Dickson & W.H.Henning, 1980 is found in good numbers on limestone ridges near Witsand (Henning et al., 1994) but was originally described from Struisbaai, near Cape Agulhas, where alien vegetation has since infested the area.

Clark & Dickson (1971) described and illustrated the egg and first instar larva of the nominate subspecies in detail (as *Phasis malagrida*). They stated that eggs were laid on *Aspalathus* sp. and *Trichogyne laricifolia* Less.. They noted that the eggs took 30 days to hatch, but since the first instar larvae would not eat the plants on which eggs were laid, they concluded that the larvae were not phytophagous. M. Schlosz (pers. comm.) has also observed nominate *malagrida* ovipositing on *Aspalathus spinosa* L. The full life history of this insect has long been sought, partly because of the mystery surrounding its larval food, but also because the nominate subspecies is extremely localised, and in some years very scarce indeed. This paper extends our knowledge of this insect a little further.

Materials and Methods

On the 28th January 1995, we decided to search for the early stages of *A. malagrida maryae* on the farm belonging to Mr. V. du Toit, situated between Ouplaas and De Hoop Nature Reserve, near Bredasdorp, in the southern Cape. We had found the butterfly to be very common there between January and March in previous years, hence the probability of finding larvae or pupae was good.

fig. 1 Final instar larva, dorsal & lateral view

fig. 2 Typical seta from final instar larva

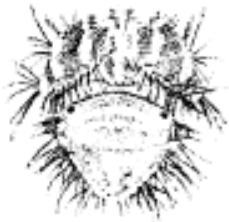

fig.3 Posterior of final instar larva

Early stages of *Argyrocupha malagrida maryae* Dickson & Henning

Drawn by A. Heath

fig. 4 Pupa, lateral & dorsal view

Several large rocks were dug out or turned in our efforts to find early stages of *A. m. maryae.* We followed various ant trails leading down through cracks in the bedrock; this was achieved with the aid of a pick-axe and other similar implements. A final instar larva, fatally damaged during our excavations was preserved in alcohol for the purpose of detailed examination. A live final instar larva was placed in a plastic box, 25 x 16 x 12cm, containing part of an ant nest, together with some soil. Initially, several fresh pieces of vegetation from the capture site were placed close to the larva, but after a week this was discontinued.

Searches for early stages were also carried out at Perdeberg for *A. m. paarlensis*, and at Cape Town for *A. m. malagrida*. A female of both *A. m. maryae* and *A. m. paarlensis* were captured and induced to oviposit, by each being placed in a small carton covered by netting and containing some pieces of buchu plant, together with three *Anoplolepis custodiens* (F. Smith, 1858) ants taken from their respective population site. After a period of six weeks had elapsed without the eggs hatching, they were exposed to direct sunlight for short periods in an attempt to induce hatching. This process was repeated for 3 or 4 days only. Since the eggs were kept in a dry indoors environment, they were also subjected to water mist spray every 2 months to allow for any moisture re-absorption which might need to take place.

Figures 1-4 were drawn from photographic slides taken of the larva and pupa.

Results

Initially, we paid considerable attention to two species of *Aspalathus* plant which were common in the vicinity, and at the base of which a few ants could be seen. Four of these plants were closely examined but no signs of *A. m. maryae* early stages were found, despite excavating beneath the roots. The first larva was discovered at about 5cm below bedrock-, a pupa was later found at a similar depth a few metres away. A male *A. m. maryae* butterfly hatched from this pupa ten days later. Several more excavations were made, and on the following day another final instar larva was found. All three of the *A. m. maryae* specimens were found about 5cm beneath bedrock, with no vegetation within a metre of where they were found. The larva pupated on the 12th February 1995 and a female *A. m. maryae* imago emerged on the 2nd March 1995. When found, both larvae and the pupa were attended by 3 or 4 of the pugnacious ant *A. custodiens*.

The larva took no interest in any of the plant species taken from near where it had been found, it moved about within a small space in one corner of the box in which it had been placed, sometimes tugging at some rootlets in the soil. It lay out of sight under a small clump of soil close to the side of the box and was attended by the smaller of the pugnacious ants. Attempts to study their interaction were thwarted by the ants and larva being alarmed by the movement of the soil and the light, however it was our impression that five or six of the smaller ants were gathered close to the head of the larva prior to them being disturbed. When the larva pupated, it was of a greenish colour but later changed to yellowish-brown.

The ants maintained their interest in the pupa until it was removed from the box.

After about two weeks, the pupal wing cases changed to a creamy colour. Two days later, the red and brown colouration of the wings could be seen. This condition lasted for three days. Having seen some distortion in the wings of the male which had hatched earlier, it was assumed that the humidity was incorrect, so a droplet of water was placed on some soil beside the pupa. A female imago of *A. m. maryae* emerged within an hour of this action.

A female of *A. m. maryae* and of *A. m. paarlensis* were each induced to oviposit in the presence of a piece of buchu plant and three ants. The twelve or so eggs from each female were laid singly or in pairs mainly on the stems; very few were laid on the foliage. These were camouflaged by brown, ribbon-like setae from the end of the female's abdomen, adhering to the egg. None of the eggs laid had hatched at the time of writing. After three months, a carefully opened egg revealed a live larva inside. This was repeated after a total of six, and again after eight months had elapsed, with the same results.

A search for early stages of *A. m. paarlensis*, and of nominate *A. malagrida* proved to be unsuccessful. The population numbers of *A. m. malagrida* were very low. We observed only two males at the end of January 1995, and one male on 25th February 1995. Despite several searches throughout February and March, we did not see any other *A. m. malagrida* imagines. This contrasted with as many as twenty imagines seen by us between early February and mid-March on previous years.

The Perdeberg population of *A. m. paarlensis* was reasonably strong with over twenty specimens being seen during a visit in early February 1995. However the specimens were on average 15% smaller in wingspan than those we have seen in previous years. It was learnt from Mr. Le Rauville, a local farmer, that a fire had devastated a large area of veldt on the Perdeberg during December 1994.

The *A. custodiens* ants which attended *A. m. maryae* at Ouplaas were also present at the spot where *A. m. paarlensis* flies on the Perdeberg. At Cape Town, it was noted that the small area where nominate *A. malagrida* normally flies, contained a buchu plant *Diosma hirsuta*, L. and where its limits were, so also was the extent of the butterfly's small territory. Buchu plants are members of the Rutaceae family; they are aromatic plants having oil-producing glands and consist mostly of the genera *Diosma, Agathosma*, and *Euchaetis*. All these buchu plants are known to depend upon the ant *A. custodiens* to disperse their seeds, taking them into their nests; the seeds germinate in the season immediately following a fire (Jan Vlok, pers. comm.). This knowledge prompted a search for buchu plants at the two other localities, mentioned above. On the Perdeberg a plant present at all the spots where *A. m. paarlensis* flies was also a buchu and believed to be either a *Diosma* sp. or *Agathosma* sp.; the flowers were not available and would be needed for proper identification (Jan Vlok, pers. comm.). Some of the plants present at Ouplaas, where *A. m. maryae* flies, were also buchu plants, *Diosma sabulosa* Williams and *Euchaetis longibracteata* Schltr.

Description of final instar larva of *A. malagrida maryae*

The larva was 18,4mm long, cylindrical in shape, with a slightly flattened posterior end

(fig. 1). Segments 2 to10 were well defined since each was very convex, especially when viewed dorsally. The larva was very similar to that of *Trimenia argyroplaga* (Dickson, 1967) as described by E. L. Pringle (Henning et al., 1994). This was later confirmed when we examined photographic slides of a *T. argyroplaga* larva, taken by E. L. Pringle.

The ground colour was pale duck-egg blue with darker pinkish-maroon markings. These 'reddish' markings took the form of uneven and disjointed longitudinal stripes. The surface was devoid of visible setae except as described in the detail below. Where setae did occur they were mostly sturdy and spine-like, two thirds blackish but with a whitish tip bearing several small and fine lateral spikes (fig. 2). No dorsal nectary organ could be detected on the larva.

A pair of narrow, disjointed reddish stripes extend along the dorsal surface, separated by an uninterrupted narrow strip of ground colour; this central strip appeared darker than the rest of the ground colour due presumably to the alimentary canal making it appear a darker blue. On either side of these dorsal stripes there was a broader, reddish stripe which was interrupted by yellow-orange mounds on segments 2 to 9. These mounds were positioned towards the posterior end of each segment. Each mound bore 3 to 5 spine-like setae emanating from a very small area and radiating in a 'splayed out' fashion. A further broad, reddish stripe lay on either side, lateral to those described above. The stripes ventro-laterally to these were less well defined, narrow and very disjointed.

Mounds similar to those described above, were also present ventro-laterally on each of segments 2 to 10. These mounds each bore 6 to 8 'splayed out', spine-like setae. A black spiracle was located just above and anterior to each of these mounds, except for segments 2 and 3 which had no spiracles. A larger, black spiracle was also present on segment 1. Smaller, orange mounds with 4 to 5 setae each occurred on each of segments 2, 3 and 10; they were positioned two thirds of the way up the segment when viewed laterally and were placed close to the anterior extremity of the segment. Some more, smaller mounds with similar setae occurred lower down on each segment.

The head was black and glabrous above whilst the lower third was equipped with 10 to 20 whitish, anteriorly projecting setae. The neck-shield on the first thoracic segment was bluish-grey and its anterior edge was yellowish and slightly raised to form a ridge on either side of the centre. The two ridges were each equipped with about 16 setae. Most of these setae pointed forwards but those close to the side of the segment pointed outwards at right angles to the body. A few, small, blackish markings were present near the centre of the neck-shield and a smallish teardrop shaped black mark was located on each side, just behind the yellow ridge of the shield. A pair of short club-shaped, specialised setae were positioned anteriorly on the dorsal surface of segment 2; these were black, with a whitish tip. Between segments 10 and 11, a raised, yellowish ridge was situated on either side of the central stripes and at an angle to them (fig.3). Each ridge was equipped with about 16 sturdy setae, curved towards the rear end of the larva. The pair of ridges and their setae resembled a pair of eyelids with eyelashes.

The anal-shield on the last two segments was fairly flat, shield-shaped and generally of a greyish-blue colour, with a few black indentations close to its posterior

margin. On either side of the shield there were two grey tubercles, each equipped with three, needle-like, black spines (fig. 3). It is possible that earlier in the instar more of these spines were present. Just in front of the tubercles and mediad to them, were situated a pair of prominent black spiracles set in a smooth, yellowish area, thereby making them conspicuous. The sides and posterior margins of the anal shield were equipped with many dense, sturdy setae, those on the posterior margin being slightly shorter.

Pupa of *A.malagrida maryae*

The length of the male pupa was 12mm and the female was 13,5 mm (fig. 4). The shape was similar to that of allied genera, such as *Poecilmitis* Butler and *Oxychaeta* Tite & Dickson but differing in the posterior end which was slightly shorter, being curved round on the dorsal surface, giving a more rounded appearance when viewed laterally. The colour was yellowish-brown, being browner on the abdomen. The male pupae was found lying loose in soil without any apparent attachment. The female pupa (in captivity) was also unattached in loose soil. It is assumed that the cremastral hooks are redundant, since very few were found and those which were present were very small.

Discussion

The taxa whose population numbers are generally small or moderate, such as *A. m. malagrida* at Cape Town and *A. m. paarlensis* at Perdeberg and previously Paarl Mountain, pose interesting questions concerning their survival. Their numbers do vary noticeably from year to year and like *Oxychaeta dicksoni* (Gabriel) 1946, the numbers periodically drop well below what would appear to be viable. It is conceivable that one or more years could be skipped in the larval or pupal state if conditions were unsuitable. The observation that larvae can remain alive within the egg for (at least) eight months, is interesting and poses the question whether this happens under natural conditions. This period is perhaps subject to favourable conditions existing for their hatching, however in view of the probability of frequent veld fires, it seems to be a poor survival mechanism. Further monitoring of the *A. m. maryae* and *A. m. paarlensis* eggs will continue.

From what has been learned to date, *A. m. malagrida* does not appear to depend for its survival upon any vegetation directly, although the observations made in this study do suggest a possible link between the butterfly and the buchu plants, through the activities of the ants. The butterfly seems to thrive only where the vegetation is fairly short and it would appear that not only do occasional veld fires benefit the buchu and the ants but they might also be beneficial to the survival of this butterfly. The smaller wingspan observed on the specimens from the Perdeberg in February 1995 may have been caused by the late fire which devastated the area only two months prior to their emergence.

Acknowledgements

We would like to thank E.L Pringle for providing the photographic slides of a *T. argyroplaga* larva for examination, also to acknowledge permission granted for access and research by the farmers, Mr. Le Rauville at Perdeberg, Mr. Du Toit at Ouplaas and the City Engineer and Director of Parks and Forests of the Municipality of Cape Town. We would like to thank Dr H. Robertson, S.A Museum and J. Vlok, Cape Nature Conservation, for identifying the ants and plants respectively. We also acknowledge the financial assistance provided by The Department of Zoology of the University of Cape Town, through the Charles Dickson Research Grant. Finally, we wish to thank the Chief Director, Nature and Environmental Conservation, for permission to pursue research in Provincial Nature Reserves.

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THE QUEST FOR THE RAREST *THESTOR*

By E.L. Pringle
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Forty-five years have passed since Sutcliffe Strutt handpicked the first specimen of his beautiful *Thestor strutti* van Son, which has since acquired an enormous reputation as a rarity. Because of this, and because of its very inconsiderate time of emergence, I had for years procrastinated the search for this Thestor. But, having captured all the other Cape Thestors, the final showdown with *strutti* had become inevitable. I decided to see if we could find a small number of specimens, and then, having had a good look at its habitat, to make a determined effort to find another colony elsewhere. How else could we be sure of its long-term survival? This could take a couple of years: our search for other colonies of *Oxychaeta dicksoni* Gabriel had taken seven years: perhaps *strutti* would be the same? But the challenge is surely what makes the hunt interesting.

August 12th found us up at the famous Twin Peaks, ready for the kick-off. It was a clear day, but with a freezing south-easterly gale, and snow lying on all the surrounding peaks. It did not look good. We (myself, my wife and my six year-old) walked up to the right hand Twin searching all the sheltered depressions along the way without success. Because of the rough and sometimes precipitous terrain, I decided to leave my wife and six year-old there while I pushed on further along the ridges. I returned about an hour later with an empty bag: *strutti* was being true to form. I concluded that we were too early in the season for them, and started thinking about packing up this particular hunt. There was, however, no sign of the other two on the right hand Twin, and I concluded that the wind had driven them back to the car. So off I went back to the car, where there was no sign of them either. I had no alternative but to return to the Twin to find them; but again, there was no sign of them or their spoor, and hollering against the wind was also not working. I was now starting to become alarmed, as it was already nearly 1.30p.m., and there are many things that can go wrong with wives and six year-olds in the mountains. However, the only thing to do was to go back to the vehicle and wait there. Of course, as I approached the vehicle, I saw them sitting inside it. My consequent irritated outburst at both them and the butterfly was met, surprisingly, with giggles. The story then emerged that they, bored with waiting for me, had, for some reason best known to themselves, slowly picked their way down the steep and rough north-facing slope of the mountains. And there, low down on the slope, they had found three *strutti*! So, eating a lot of humble pie, I was led down the mountain to search for more. Obviously, *strutti* had (temporarily perhaps) shifted its normal breeding areas to lower down the mountain, bamboozling me completely. But it was some comfort to know that I was not the first collector that this had happened to.

While netting the occasional isolated specimen of *strutti* in this area, I started to think about other north-facing slopes I had seen nearby. The following day dawned bright, clear and windless, and soon we were struggling (as one does with six year

olds) up the main mountain massif near Bain's Kloof. It was a long shot, but who can be sure? Then suddenly, a small yellow *Thestor* came fluttering past and settled. Finally, forty five years after its discovery, we had succeeded in finding a new area for *strutti*! The war whoops this prompted would have caused some consternation, had there been others nearby to hear them. After this, another truly magical experience in my life as a naturalist began, for soon we were walking among dozens of *strutti*. As far as we walked, there were specimens fluttering around us; I have never in my experience as a collector come across a *Thestor* as numerous as this one was that day. At one spot we stood in awe and watched seven males engaging in a great territorial dispute around us - the mind boggles.

In conclusion, I would like to urge collectors, as I have so often done in the past, to expand the search for our rarities to beyond their known colonies. In this way, not only will our knowledge about these species be extended, but, with luck, you might find yourself walking into the real areas for the insect you are looking for. Remember *strutti*!

Thestor strutti male upperside

A NEW SUBSPECIES OF *CHARAXES XIPHARES* (CRAMER) (LEPIDOPTERA:NYMPHALIDAE) FROM THE WESTERN CAPE PROVINCE, SOUTH AFRICA.

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Abstract: A new subspecies of *Charaxes xiphares* (Cramer) is described from the Grootvadersbosch area of the southern Cape Province. This population represents a taxonomically and geographically distinct taxon. It was previously known as form *occidentalis* van Son, 1953, but since this name is infrasubspecific and thus both invalid and unavailable for nomenclatural purposes, the taxon is here formally described as a new subspecies.

Introduction

This insect was originally described as a colour form of *Charaxes xiphares xiphares* (Cramer) by van Son, 1953. For reasons given under discussion, it is felt that this diagnosis is incorrect, and that this insect should be accorded the status of a full subspecies. Since the original description is only that of a colour form, the taxon has no status in terms of the International Code of Zoological Nomenclature, and so is formally described here. However, van Son's name is retained and his type specimens are used in the type series of this new subspecies.

Until now, the view has been that the colour form *occidentalis* occurs west of Knysna, in the George and Swellendam districts, the nominate form occurring east of Knysna. Extensive collecting in this area has proved that this is not the case, and that the nominate race extends from George through to Van Staden's Pass, near Port Elizabeth. This should have been expected, as the forests in the Tsitsikamma region, from Storms River to George, are continuous, and there is therefore no potential gap in the species' distribution. There is, however, a large gap of approximately 120 kilometers, between the indigenous forests of George and the nearest forests of the Swellendam area. Without doubt this forms an effective ecological barrier, as it is the cut-off point in the distribution of a number of butterfly species. These include the following: *Charaxes karkloof trimeni* Rydon; *Antanartia hippomene hippomene* (Hübner); *Belenois zochalia zochalia* (Boisduval); *Papilio dardanus cenea* Stoll; *Eagris nottoana knysna* Evans. The chief reason for this seems to be the existence of a belt of drier vegetation, centred around the Gouritz River valley system, which does not contain the foodplants of any of these butterflies, inclusive of *C. xiphares*. Furthermore, close examination of populations of *C. xiphares* from the southern and eastern Cape seems to indicate that this is a very ancient ecological gap. Specimens from Grootvadersbosch show, on balance, greater differences when compared with those of the Tsitsikamma region, than do Tsitsikamma specimens in comparison with eastern Cape specimens of the subspecies *thyestes*. From this one could deduce that the George-Swellendam gap in the forests is probably an older one

than the gap which exists between the Tsitsikamma and eastern Cape forests. It is surprising that this has gone unnoticed for so long.

***Charaxes xiphares occidentalis* ssp. n**.
Charaxes xiphares xiphares f. occidentalis van Son, 1953: 219 (unavailable name)

Description

MALE: Forewing length: 43mm. Antenna/wing ratio: 0.48.
Wings, upperside: Ground colour black, with a strong blue suffusion. On forewing, a postdiscal series of eight spots from area 1b to area 7, the spot in 6 and 7 being white and the remainder Cadet Blue, the spots forming a sinuous band incurved in areas 3 and 7, a discal series of blue spots from areas 1a to 5, those in areas 1a and 2 elongated, along the margin, a row of yellow spots from areas 1b to 7.

On hindwing, a whitish spot in area 7 and a blue discal band from 1c to 6, this strongly indented along the distal margin by black along the veins, a row of small blue submarginal streaks and a marginal series of blue streaks from areas 1c to 5; anal lobe of a greyish colour.
Underside: Basal area of forewing light greyish-brown, with three transverse blue-black white-edged striae in the cell, and a fourth running parallel, just beyond the cell; two similar striae below cell, one above and the other below the first median nervule; median area of darker brown, bordered by blackish streaks which are outwardly edged with white; beyond this a whitish discal area running into a darker postdiscal area, which extends as far as the postdiscal series of spots, which are white in areas 6 and 7 and ochreous from 1a to 5, those in areas 1b, 2 and 3 strongly lunulate; the apical area paler, greyish-khaki, similar to the ground colour in the basal area, with 2 pronounced tornal spots in area 1b and a further submarginal spot in area 2.

On hindwing, a light olive-green basal area containing a series of dark white-edged streaks and bordered by a discal line which is outwardly edged with white; between this line and the ochraceous postdiscal lunules is a lighter whitish- khaki area; beyond the postdiscal lunules, which are edged with blackish markings, is a darker grey-green submarginal area; an ochreous series of marginal streaks bordered inwardly by faint white-edged violet submarginal lunules; tails fairly long, the upper 5mm and lower 3mm.

FEMALE: Forewing length: 50 - 52mm. Antenna/wing ratio: 0.41.
Wings, upperside. Ground colour black with a brownish sheen. On forewing postdiscal series of spots consisting of large white spot in area 6 and 7 and very faint yellow marking in 4 and 5, discal series consisting of broad white spots in areas 2 to 6, the largest in area 2, and small white spot in area 1b; a faint median ochreous marking in area 1a and a series of ochreous marginal dots becoming progressively fainter from areas 1b to 6. In hindwing, discal band consisting of a broad white spot in area 7 and a wide ochreous patch from 1c to 6; a row of small blue submarginal streaks and a marginal series of ochreous streaks which are broken only at the ends of the veins; anal fold greyish-blue in colour; tails long, the upper 8mm and the lower 4mm and curved outwards.

The underside very similar to that of the male, except that discal areas of both wings with much more pronounced and wider white markings, reflecting, in the forewing, the formation of the upperside discal spots; postmedian stria in area 1b much more lunulate than in male, leaving a comparatively narrow white marking between it and the tornal spot.

Type Material

Holotype: Grootvadersbosch, Swellendam 1-6 November, 1940 (Transvaal Museum).
Allotype: Same locality and date (T.M.)
Paratypes: 2 Same locality and date (T.M.); 2 No data (T.M.).
2 Grootvadersbosch 28 February, 1992 (E. L. Pringle)
7 3 Grootvadersbosch 22 January, 1993 (E. L. Pringle)
1 1 Grootvadersbosch 14 February, 1994 (D. A. Edge)
1 1 Grootvadersbosch 15 February, 1994 (D. A. Edge)

Discussion

There are numerous differences between this insect and nominate *xiphares* from the Tsitsikamma region. In both sexes, the underside ground colour is lighter than in the nominate race, being light greyish-khaki, as opposed to dark olive green. The black edging of the discal line of the hindwing underside is not as prominent, and the space between the discal line and postdiscal lunules is wider, particularly in the anal area. The whitish markings in this space show up less prominently than in the nominate race, because of the lighter surrounding ground-colour. The submarginal row of white-edged violet spots on the underside of the hindwing are lighter and less prominent. On the upperside of the hindwing, the discal patch is narrower than in the nominate race. In the male, the outer edge of this discal patch is strongly indented along the veins, giving it a very irregular outline; in the nominate race, the discal patch is not only wider, but is more solid, and has a comparatively regular outer edge. There is an important and consistent difference in the shape of the postmedian stria in area 1b of the forewing underside of the male: this is markedly straighter, or less lunulate, than in the nominate race, resulting in a correspondingly wider light area between it and the tornal spot. This is also evident, but to a much lesser extent, on the underside of the female. In the female the white discal spot in area 1b of the forewing upperside is always present, in the nominate race this is frequently absent or vestigial.

The species is not illustrated with this description, as it is illustrated in colour in most textbooks on Southern African butterflies; eg. (van Son, G., 1953., van Son, G., 1979., Henning et al, 1994)

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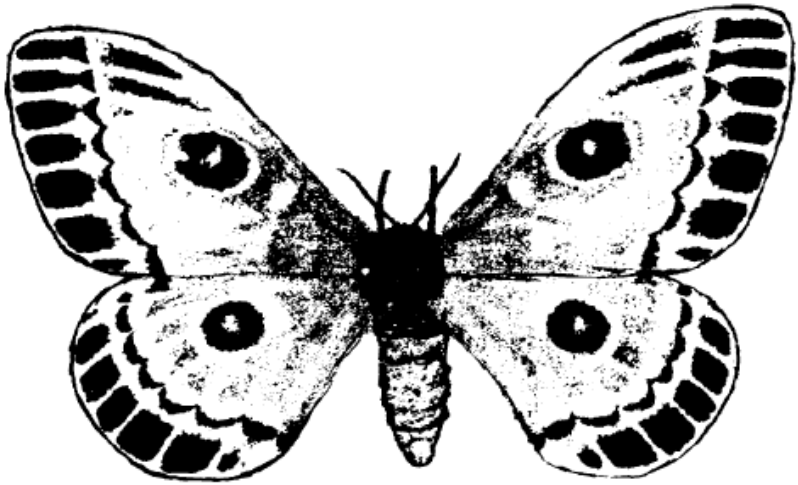

Bunaeopsis jacksoni (Saturniidae) male upperside

ZIMBABWE EASTERN HIGHLANDS IN JULY

By Peter Ward
43, Fourth Ave, Parkhurst, 2193, South Africa.

I have long harboured the desire to go butterfly hunting in that most appealing of areas, the Eastern Highlands of Zimbabwe. For various reasons, I have never had the opportunity before. But the July school holidays posed a problem - who was going to look after the kids? My wife had only recently started a job and could not get leave. It didn't take too long to arrive at the idea that this might be a golden opportunity - a **valid** non- lepidopterous excuse to explore the Eastern Highlands! Lepidopterist pursuits would of course be incidental!

So began the planning of the trip - the endless wrangles with the Department of home affairs to get our travel documents in order. By the time one has sorted out car Insurance, Third Party, visas and malaria prophylactics etc., I am convinced it is easier to go on a collecting trip to anywhere else in the world!

Bearing in mind that Matthew is aged 8 and Sarah only 4, I resisted the temptation to make this a major Woodhall-style collecting frenzy! Although this was not prime collecting season, I felt that my senses would more than likely be totally overwhelmed by Primary Experiences without even trying too hard. I also did not plan to make any arrangements to be shown around by any of the local fundi's as I needed to maintain flexibility for the kids' sake.

After setting off on Saturday 15 July and overnighting at Messina, we hit the border at a chilly 6.00am. The bunfight on the Zimbabwe side only took about an hour which was apparently getting off lightly! By 7.15am we were on our way to Mutare via Masvingo.

I had hoped to stop for a bit in the Birchenough Bridge area, but from the main road it all appeared very dusty and dry (I subsequently discovered that if one follows the Chipenge road from the bridge for a while, there are some promising-looking patches of riverine bush). We stopped a few times on the way to Mutare, but not much was in evidence except for a few *Colotis.* I was starting to think that I should have left my nets at home, but it began to look a bit better towards Mutare.

Our first 3 nights were planned to be in the Vumba at Trinafor guest cottage at the end of the Laurenceville road, overlooking the Mozambique border fence. As we headed into the Vumba, things definitely began to look more promising. The drought and the fact that it was winter left things somewhat dry and dusty, but there was still some green vegetation clinging to the lower slopes of the hills and to the river courses. We arrived at the cottage at 3.00pm which is way too late for collecting at this time of the year. Nonetheless my spirits were lifted by being able to hand-pick a perfect *Hyalites johnstoni* which was sheltering from the chilly breeze on the veranda of the cottage. My first specimen of the trip, my first Primary Experience and I didn't even use a net - I was convinced that this was a Good Omen!

We were up early the next morning, and after hanging two traps on the Laurenceville road we headed for the forest and marsh at Cloudlands. It was still too chilly at 8.00 am

so we went on to Leopards Rock Hotel to do the tourist-thing and also to cash some travelers' cheques. On the way back we stopped at Cloudlands again and immediately spotted some *Mylothris*. In our haste to get to them, we forgot that marshes are wet places! Wet and muddy feet are a small price to pay and we were soon beaming happily as we examined our first *Mylothris sagala umtaliana.* These and some *Precis oenone* were about the only things on the wing, so we headed for Burma Valley, the name alone conjuring up images of all sorts of Lepidoptera.

It took us longer to find a suitable collecting spot than I had imagined (with two children one needs to be able to collect away from the main road), so by the time we eventually found a place at the bottom of the escarpment at 11.30 I was somewhat frustrated. What happened next must have resembled something from "Funny People". Each time I picked up a trap to hang it, something exciting (or so I imagined) would whiz past, causing me to abandon my traps and grab for my net, by which time of course the butterfly was gone.

After some 15 minutes I was still empty-handed so I put my mental blinkers on until the traps were hung. I guess I'll never know if I missed anything of interest. I did however end up with a good handful of Primary Experiences. When Matthew gabbled frantically that he had just sighted "a giant *Iolaus* - as big as a *demodocus*!" I thought he had also been infected with "Burma Fever". But shortly afterwards, when I found my first *Charaxes bohemani* (a perfect female) in a trap, recognition of the "giant *Iolaus*" dawned and I was the one doing something akin to a triumphant war dance.

Seasoned Zimbabwean collectors will probably scoff, but *C. bohemani* has been on my want-list since I first laid eyes on it in Pinhey's book in 1970. As you can imagine, the kids thought I had finally lost my mind towards the end of the day when a routine inspection of my traps revealed a perfect female *Sallya rosa.* Next time I attempt a new collecting spot I will sell tickets to the show!

On a trip back to the car for refreshments around 2.30pm, I noticed for the first time a white car tucked into the bushes on the other side of the road. I was just about to investigate when out of the bushes emerged another Lepidopterist - Bertrand Gerschel from Harare. He had arrived about an hour before us and had gone in the other direction to the one I chose. After comparing notes he kindly donated another *C. bohemani* to our collection as well as a *C. macclounii* - many thanks Bertrand, these are valued additions . He had trapped and released a worn *C. protoclea azota* earlier, which is another of my definite "wants", but I'll just have to wait for another trip!

Other catches of interest for the day included a female *C. guderiana, C. baumani, C. pollux gazanus , Acraea egina areca, Teniorhinus horona ruso.* Our traps yielded a male *C. guderiana* and some *C. varanes* and *C. candiope.*

The following morning we headed for Nyanga planning to take in the Honde valley on the way as we had been warned that Nyanga was a bit cold at this time of the year. What I did not realise was how long it would take to get down into the Honde valley - the road is steep and very tortuous, but the scenery is terrific. What was depressing was the bleakness of the valley itself until the Pungwe river - the deforestation of the area is frightening, with only the odd huge tree to remind one of what the area must once have looked like.

As it turned out we had lunch at the Pungwe river bridge, which looks like a tremendous spot for a summer visit, but yielded nothing at this time of the year. On our way back up to Nyanga, we took the scenic road and I was fortunate to catch *A. pseudatolmis* at one of the view sites. We did not go further than Nyanga as it was now far too late for collecting, so we headed for the cottage. The traps we had left on the Laurenceville road yielded nothing of interest and a nasty cold wind had started to make itself felt.

The next day we left the Vumba heading for Buffelsdrift guest cottage on the Tanganda river in the Chipenge area. The weather was overcast and cool, and although we stopped hopefully every time the sun came out, the chilly temperature put paid to any chance of finding anything interesting. We put on our tourist role in desperation and went to see the sights around Chimanimani, sometimes in a light drizzle. A really beautiful part of the country - I'd like to see it in sunshine! The guest cottage at Buffelsdrift is magnificently situated in the riverine bush and we were hopeful that it would yield some interesting catches. The weather was not kind to us and after a spot of drizzle during the night, the following day was overcast and cool, clearing only in the evening.

Our last day was planned to be in the Mt. Selinda area and fortunately the weather was good. The forest areas were magnificent. Not much sun penetrates the canopy at this time of the year and there was nothing on the wing inside the forest. There is also a sign up which specifically states that written permission is required to collect butterflies, so we retired a safe distance from the forest and concentrated on the surrounding bushveld areas.

Dry season males of *Charaxes zoolina* were plentiful and we took a couple of worn *C. cithaeron* as well as a lovely *Mylothris yulei* and *Acraea oncaea.* Surprisingly few Lycaenids were in evidence - in fact this was a feature of the trip. The only Lycaenid of any note which we took in the Mt. Selinda area was a *Lepidochrysops* which I am still trying to identify - maybe we were too busy looking for bigger game! Disappointingly the traps which we had left at the guest cottage yielded only a few worn *Satyrids* and *Biblias*.

The next day we headed for South Africa via Chiredzi, stopping in the Triangle area at a bridge where I noticed a lot of activity at the Bougainvillaea and at some flowering shrubs on the river bank. Many *Colotis* and *Acraeas* were in evidence and we spent a lovely hour supplementing our collection with *A. aglaonice, A. acara , C. celimene* and a fair cross-section of others. The border on the return trip was a pleasure and we were through both sides in under half an hour.

We overnighted in the Louis Trichardt area, planning to spend a while at Wyllies Poort the next morning as I had not visited that spot for over 15 years. The weather again decided our fate and we awoke to drizzle, so we headed for home, arriving at lunch time. Despite not being peak collecting season, we had a relaxing and productive trip - it was a tonic to be swinging a net in July while the rest of Gauteng was deep in the grips of winter! The next trip to the area will definitely be in summer - I think my nerves can probably manage it now.

AN INVESTIGATION INTO THE *PSEUDONYMPHA VARII* SPECIES COMPLEX (NYMPHALIDAE: SATYRINAE) IN SOUTH AFRICA

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Abstract: The *Pseudonympha varii* species complex appears to be a group of isolated populations with distinctive characteristics which may be in the process of speciating. The colonies in Mpumalanga and the Northern Province appear to be extremely localised in isolated colonies and do not move far from their natural habitat. Thus the possibility exists that there are more taxa than the two named species – *Pseudonympha varii* Van Son, 1955 and *Pseudonympha swanepoeli* van Son, 1955.The conservation status of the colonies is discussed with specific reference to colonies under threat.

Introduction

Along the eastern mountainous regions of South Africa there are a number of apparently allopatric populations, of closely related taxa belonging to the *Pseudonympha varii* species complex. Only two taxa belonging to this group have been described as distinct species (*Pseudonympha varii* van Son, 1955 and *Pseudonympha swanepoeli* van Son, 1955). The other taxa have yet to be accorded any taxonomic status.

During the 1994/1995 summer season the authors spent many days investigating a number of colonies in Mpumalanga. The interest was originally sparked in January 1993 when Neville Curle caught a specimen of the group on the mountain above Dirkiesdorp. This was well to the South of the other Northern Province and Mpumalanga colonies as well as to the North of the Free State and KwaZulu-Natal colonies. Extensive collecting in Mpumalanga meant that sufficient material was assembled to start investigating the group taxonomically. Mr Clive Quickelberge of the Durban Natural Science Museum was already working on the specimens from the Long Tom Pass so the specimens caught by the authors were placed at his disposal.

This article in no way detracts from the work being done by Mr Clive Quickelberge but serves to disseminate the current information and to record the observations made by the authors on the various colonies studied by them, in order to highlight the distinct nature of these colonies. This is only considered to be a first step in what is a huge task.

Further interest was stimulated by a unique specimen collected in 1971 by Izak Coetzer and deposited in the Transvaal Museum.

The authors also studied specimens from the KwaZulu-Natal, Free State and

Eastern Cape colonies. Not many specimens were available to them and yet some features of difference were noted between the various populations.
The complex may be defined in terms of geographical location and is summarised as follows:

Group I - Mpumalanga.
Ia Long Tom Pass to Mount Sheba.
Ib Mountains above Dirkiesdorp.

Group II - Northern Province.
Pseudonympha swanepoeli - Wolkberg.

Group III
A unique specimen from God's Window.

Group IV
IVa Dullstroom area.
IVb *Pseudonympha varii* - KwaZulu-Natal midlands.
IVc Lesotho, Free State and upper Drakensberg.
IVd Eastern Cape.

Results
Group I - Long Tom Pass to Mount Sheba and Dirkiesdorp.
These two populations have been grouped as they contain notably smaller specimens than the other populations.

The essential differences between these two populations are :
1. Long Tom Pass specimens have less red on the forewing underside than the Dirkiesdorp specimens.
2. Long Tom Pass specimens have less markings on the underside hindwings than those from Dirkiesdorp. They also hardly show a border except for the dark cilia hairs whereas the Dirkiesdorp specimens often show a darker border.
3. Long Tom Pass specimens have a brighter yellow ring inside the ocelli than those from Dirkiesdorp. The yellow rings are wider in Long Tom Pass specimens with less of a dark outer ring than the bolder ring in the Dirkiesdorp specimens.

Group Ia - Long Tom Pass to Mt Sheba (fig. 1 A-C; fig. 2 D-F; fig. 3 A-C; fig. 5 D-F)
The Long Tom Pass is in the Mt Sheba/ Mt Anderson range of mountains. Here it occurs in the marshes of Whiskyspruit and Whisky Creek and other similar marshy areas.

Group 1b - Dirkiesdorp (fig. 1 G-I;fig. 2 J-L; fig. 3 G-I; fig. 5 J-L)
Far to the south, after crossing the Komati, Usutu, Vaal, Ngwempisi and Assegai Rivers, and having descended to approximately 1400 metres the mountains once again rise

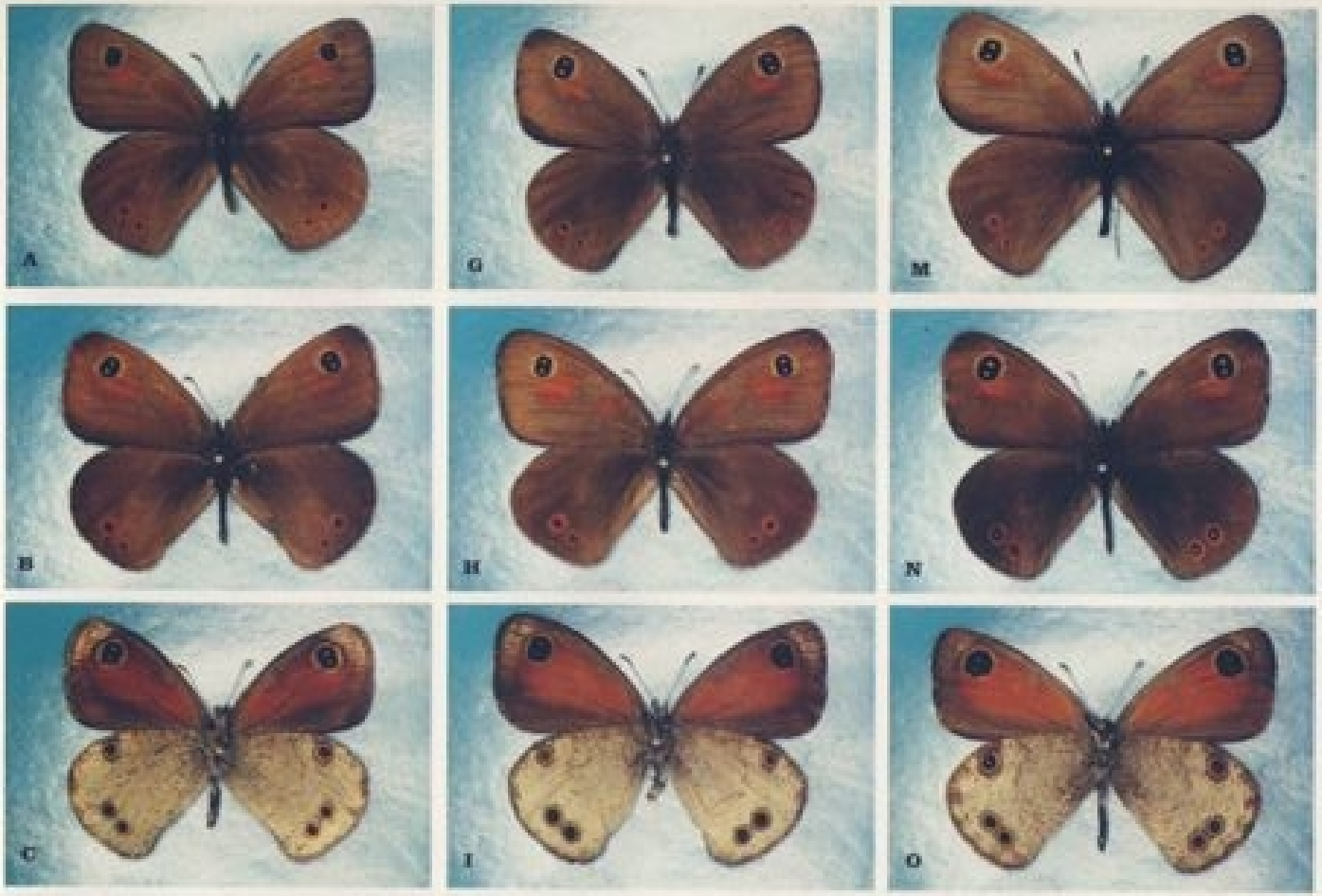

Figure1
Pseudonympha varii Complex - Males

A-B	Whiskyspruit	Uppersides	Group 1a	G-H	Dirkiesdorp	Uppersides	Group 1b	M-N	Dullstroom	Uppersides	Group 4a
C	Whiskyspruit	Underside	Group 1a	I	Dirkiesdorp	Underside	Group 1b	O	Dullstroom	Underside	Group 4a

Figure 2
Pseudonympha varii Complex - Male undersides
D-F Whiskysprult Group 1a J-L Dirkiesdorp Group 1b P-R Dullstroom Group 4a

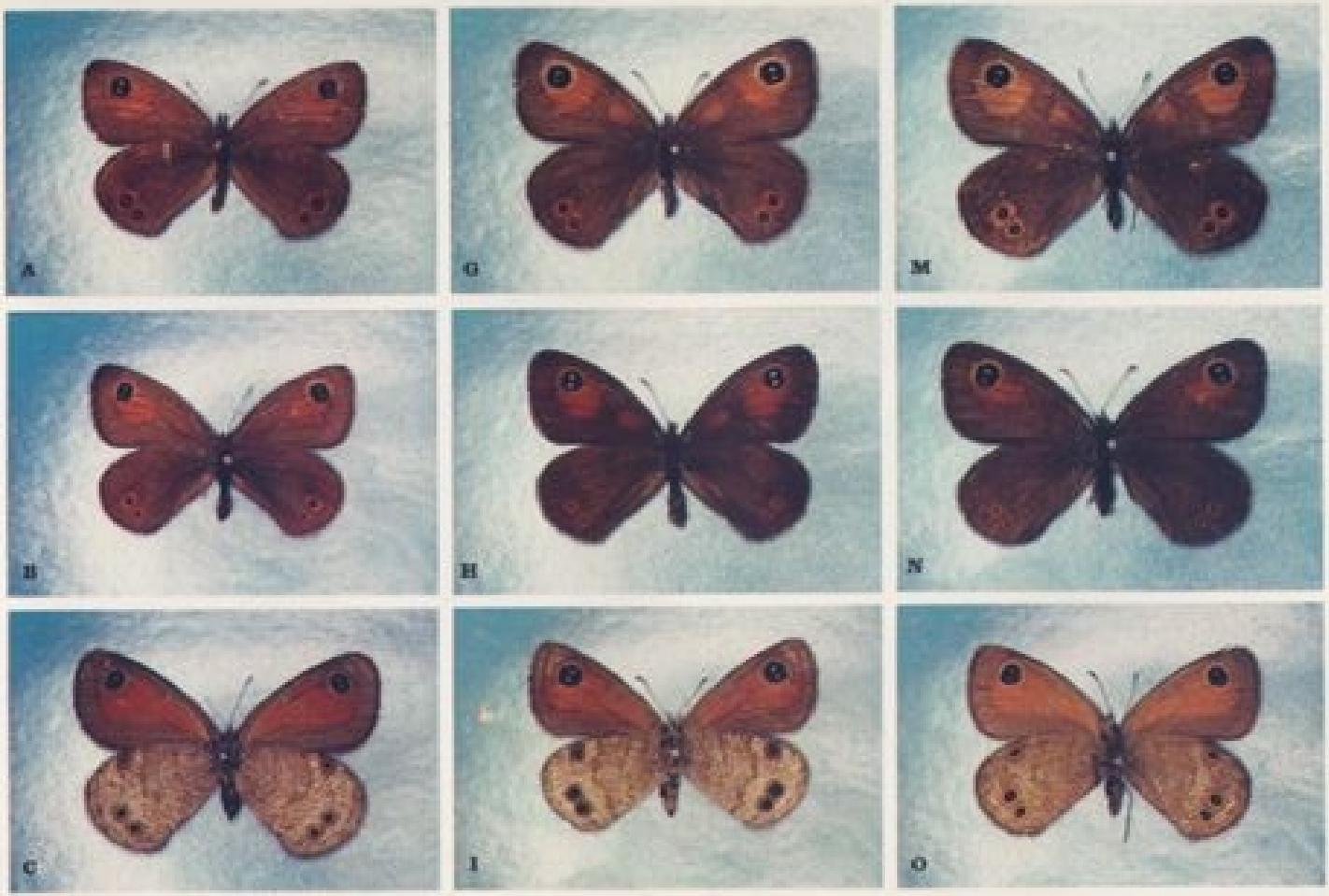

Figure 3
Pseudonympha varii Complex - Females

A-B	Whiskyspruit	Uppersides	Group 3a	G-H	Dirkiesdorp	Uppersides	Group 1b	M-N	Dullstroom	Uppersides	Group 4a
C	Whiskyspruit	Underside	Group 1a	I	Dirkiesdorp	Underside	Group 1b	O	Dullstroom	Underside	Group 4a

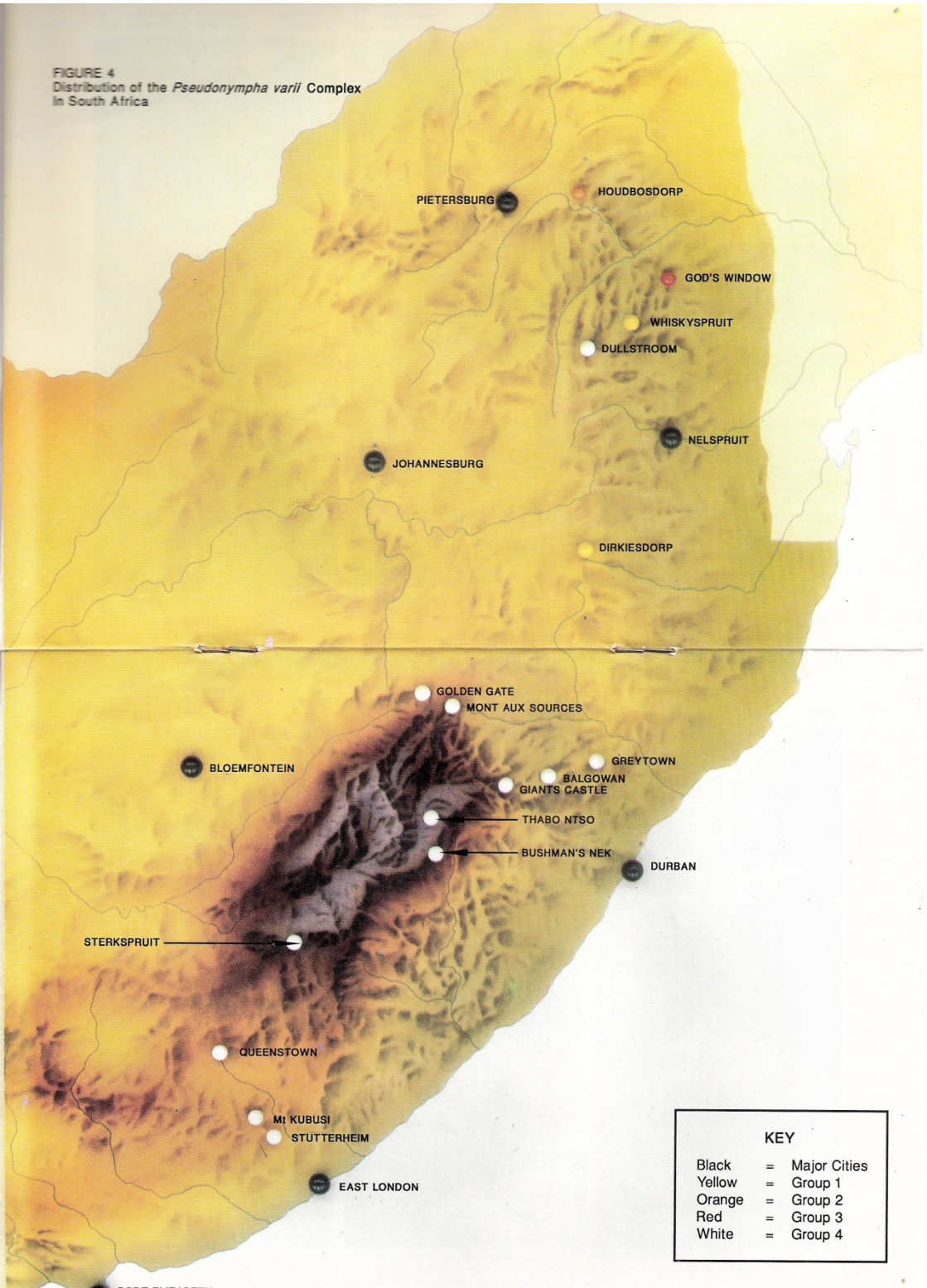

FIGURE 4
Distribution of the *Pseudonympha varii* Complex
In South Africa

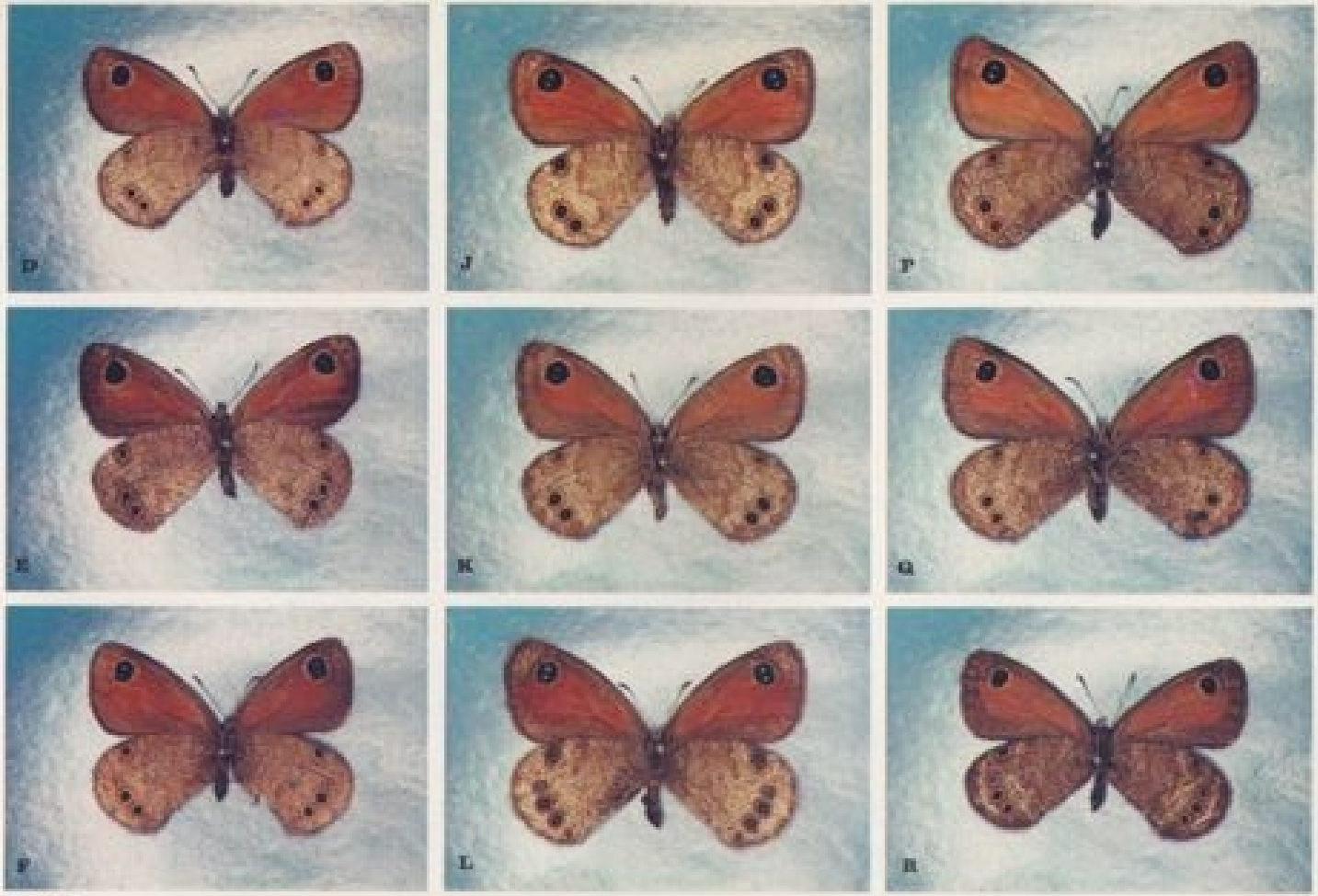

Figure 5
Pseudonympha varii Complex - Female undersides
D-F Whiskyspruit Group 1a J-L Dirkiesdorp Group 1b P-R Dullstroom Group 4a

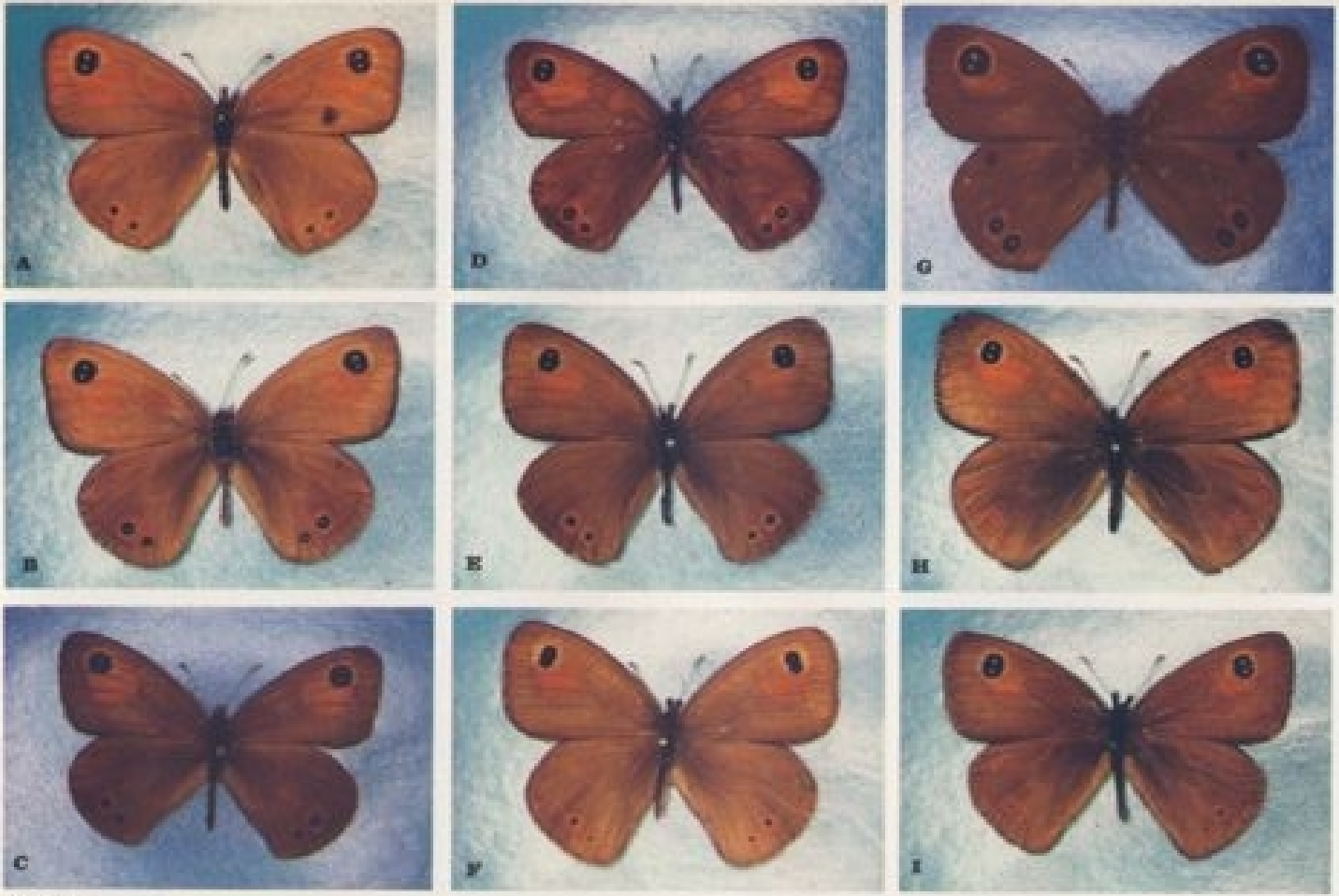

Figure 6
Pseudonympha varii Complex- Males upperside

A	Winterberg	Eastern Cape	Group 4d
B	Stutterheim	Eastern Cape	Group 4d
C	Greytown	KwaZulu Natal	Group 4b
D	Balgowan	KwaZulu Natal	Group 4b
E	Bushman's Nek	KwaZulu Natal	Group 4c
F	Golden Gate	Free State	Group 4c
G	God's Window	Mpumalanga	Group 3
H	Dullstroom	Mpumalanga	Group 4a
I	Houtbosdorp	Northern Province	Group 2

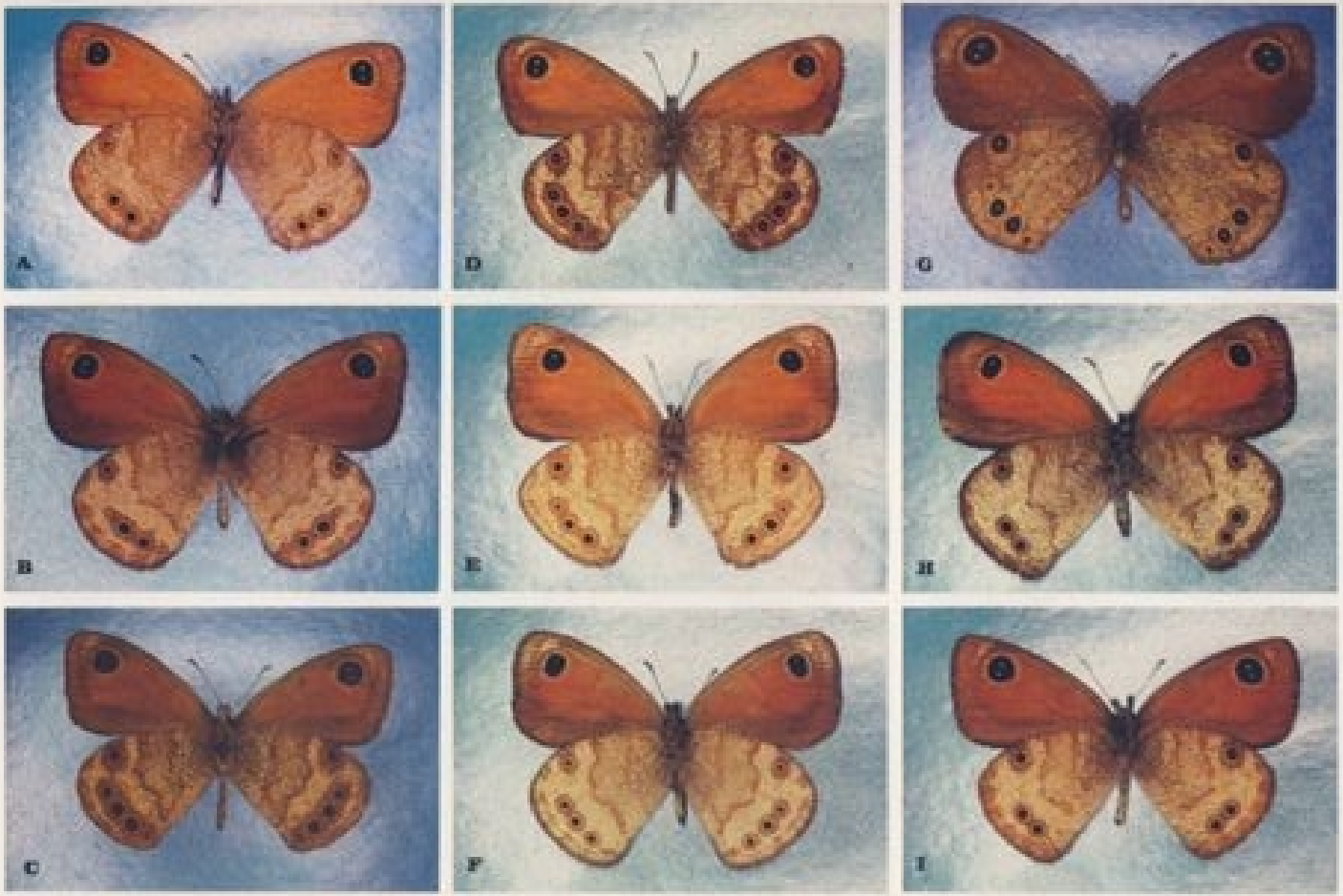

Figure 7
Pseudonympha varii Complex - Males underside

A	Winterberg	Eastern Cape	Group 4d	D	Balgowan	KwaZulu Natal	Group 4b	G	God's Window	Mpumalanga	Group 3
B	Stutterheim	Eastern Cape	Group 4d	E	Bushman's Nek	KwaZulu Natal	Group 4c	H	Dullstroom	Mpumalanga	Group 4a
C	Greytown	KwaZulu Natal	Group 4b	F	Golden Gate	Free State	Group 4c	I	Houtbosdorp	Northern Province	Group 2

sharply reaching 2000 metres on the mountain above Dirkiesdorp. This population is found in certain of the high altitude marshes while being absent from other apparently suitable marshes in the same area. A possible explanation for this is detailed later.

Group II (fig. 6 I; fig. 7 I)
Pseudonympha swanepoeli van Son, 1955 (Type Locality: Woodbush Village, Northern Province)
In the Northern Province at a latitude of approximately 24 degrees south we find the Houtbosdorp population. The Northern Province population is separated from the Mpumalanga populations by the Groot Letaba and Olifants River valleys. The altitude drops from 2000 metres in the Houtbosdorp/ Magoebaskloof area to 1000 metres at the Olifants river. From there it rises again to the Mt Sheba / Mt Anderson range of mountains at 2000 metres.

Group III God's Window (fig. 6 G; fig. 7 G)
It is a larger specimen than those found in the other populations. The ocelli are elongated rather than round. The underside hindwing is very plain. Clearly a most interesting specimen and more examples will have to be found.

Only one specimen of this butterfly is known and it is considered an extremely important find. It flies at approximately 1800 m which is higher than the Houtbosdorp population of *P. swanepoeli* and lower than the populations from Whiskyspruit and Dirkiesdorp.

Group IV
Group IVa - Dullstroom (fig. 1 M-0; fig. 2 P-R; fig. 3 M-O; fig. 5 P-R; fig.6 H; fig. 7 H)
This population has specimens approximately the same size as the *P. swanepoeli* from Houtbosdorp.

The differences between the Dullstroom population and *P. swanepoeli* can be summarised as follows:

1. Dullstroom specimens are a lighter brown on the upperside than those from Houtbosdorp.
2. Dullstroom specimens often show red in the cell of the forewing upperside while the Houtbosdorp specimens do not. *P. varii* from further south also has red in the cell.
3. Dullstroom specimens show a broken yet constant border on the underside hindwing of the males. The Houtbosdorp specimens have a solid border only broken by veins.
4. Females of the Dullstroom population show an extremely mottled, dark hindwing underside. This feature is very constant. The few female specimens of the Houtbosdorp population seen by the authors are also darkly marked on the hindwing underside but show the two irregular lines more clearly.

Group IVb - *P. varii* (Type Locality: Greytown, KwaZulu-Natal). (Fig. 6 C&D; fig. 7 C&D)

P. varii from the KwaZulu-Natal midlands are extremely beautiful with dark brown, chocolate, markings

Group IVc - Lesotho, Free State and upper Drakensberg (fig. 6 E&F; fig. 7 E&F)
The high altitude specimens show the underside markings reduced in comparison with *P. varii*, and the ground colour a darker brown with the impression of a much daintier butterfly.

Group IVd - Eastern Cape(fig.6 A&B; fig. 7 A&B)
The Eastern Cape specimens are beautifully marked with the underside hindwings patterned in orange-brown markings.

From the eastern Mpumalanga Drakensberg, where Group Ia is found, to the south-west the altitude drops down to the Alexanderspruit and Crocodile river valleys. The two river valleys meet at the Braam Raubenheimer dam where the altitude is approximately 1100 metres. From here, it rises again to 1920 metres at Verlorenvalei near Dullstroom. Further south the other three populations in this group cover a fairly extensive area of KwaZulu-Natal, Free State, Lesotho and Eastern Cape. But these are separated from the Dullstroom population by a distance of more than 200 kilometres of apparently uninhabited ground at a lower elevation with the Dirkiesdorp population on an isolated area of suitable higher ground(Group Ib) in between.

Notes, observations and conservation

Group I
Group Ia -Long Tom pass to Mt. Sheba
Specimens in the Transvaal museum caught by Ken Pennington during February 1968 are listed as being caught at Mt Sheba. Mt Sheba, Mt Anderson south to the Long Tom Pass, and including Whisky Spruit and Whisky Creek, are all part of the same mountain range, and efforts are currently under way to include this area, together with the Ohrigstad Nature Reserve, into one huge conservancy. Large numbers were caught and submitted to C. Quickelberge for purposes of comparison.

Group Ib - Dirkiesdorp
In January 1993 Neville Curle caught specimens answering to the *P. varii* species complex in the mountains above Dirkiesdorp in Mpumalanga. Following an intensive investigation by the Curle families over some 10 hectares during December 1994 and January 1995 Alfred Curle located the main Dirkiesdorp colony in an area of approximately 100 metres by 50 metres. A further four much smaller colonies were found within a one kilometre radius at a height of approximately 2000 metres. A conservancy has been formed in the region which includes the mountain on which the colonies were found.

Group II - Houtbosdorp
Pseudonympha swanepoeli, originally caught by van Son in 1925 and again by Swanepoel in 1943, was found at Houtbosdorp/Woodbush. In comparison to specimens

of *P. varii*, specimens from the Houtbosdorp colony normally have one less ocelli on the underside of the hindwing. Since 1955 *P. swanepoeli* has been caught at Houtbosdorp in limited numbers (Henning et al, 1994). One female specimen was caught in March 1995 during a trip undertaken by Chris Ficq and Alf Curle. The species is officially listed as rare (Henning & Henning, 1989). It is quite clear that the colony is under considerable threat from afforestation and exotic species of plant encouraged by the Department of Forestry. The problem that has arisen is that the indigenous forests are well preserved by the foresters amongst the pine forests but no "lungs" of grasslands or marshlands have been left to divide the forests in a natural formation. Consequently pine trees, species of oak and black wattle, apart from other smaller exotic plants, threaten all the natural marshes in the area. Unless dramatic and immediate efforts are made to address the problem, this colony is doomed to possible extinction during the next few years. Efforts will be made during the 1995/1996 season to further assess the problem.

Group III - God's Window

Because the authors did not have any specimens of the Houtbosdorp population for their own comparison, Nolan Owen-Johnston and Alf Curle undertook an investigation of the specimens housed in the Transvaal Museum with the kind assistance of Martin Krüger. Whilst there, they took photos of the various specimens (including the holotype of *P. varii*) as well as one specimen taken at God's Window by Isak Coetzer.

This specimen has a rather plain light reddish-brown underside hindwing which does not agree with the type specimens of *P. varii* nor with the specimens with the bright silvery undersides from Dullstroom. Furthermore, on the upperside hindwing, it has an additional ocellus close to the costa which is fairly well developed. Such ocelli are known from the Eastern Cape and Lesotho specimens of *P. varii.* This is therefore a most interesting and important find. Efforts made during the early months of 1995 by Nolan Owen-Johnston and Alf Curle to locate further specimens proved fruitless. Nevertheless further efforts will be made during the course of 1995/1996 to find additional specimens from this area. Again afforestation could present a major problem.

Group IV

Group IVa - Dullstroom

A colony of the *P. varii* Group was discovered by Richard Warren during the late eighties in the Verlorenvalei Reserve near Dullstroom. Records indicate that numerous collectors have now taken specimens from this colony. This population has a very bright silvery underside hindwing. This appears to be a very strong, yet isolated, colony. The area is part of a Reserve surrounded by a large conservancy. The conservancy, originally created to protect Cranes will no doubt add to the conservation of a number of rare butterflies, not to mention numerous plant species.

Group IVb - The midlands of KwaZulu-Natal

The specimens from Greytown and Balgowan (1000 m to 1400 m) fly at a different altitude

to those in Lesotho/Drakensberg. The authors are not aware of the existence of any conservation measures to protect these populations.

Group IVc - Lesotho, Free State and Upper Drakensberg
Specimens taken at Bushman's Nek in the South have been caught at 1700m although they may have been caught in a year of abundance. Specimens are normally only taken at higher altitudes and have been found at Golden Gate and the Sentinel near Witsieshoek. It is likely that the species is widespread in Lesotho. The species is protected at the Royal Natal National Park and in the Golden Gate Highlands National Park.

Group IVd - Eastern Cape
There would appear to be an unusually large gap between the Lesotho/Drakensberg colonies and those in the Eastern Cape. Information to hand is that the Eastern Cape colonies fly at an altitude of about 1500 metres. This information is still to be confirmed. No conservation details are known to the authors.

Discussion

There is no doubt that the group came from one ancestral stock. The question which arises is "has speciation taken place or is it still in this process?" More detailed study is clearly required before an answer can be given to this question.
The following points come to mind.

1. Under periglacial conditions, as little as 12000 years ago, the frost maintained grassy vegetation types centred in Lesotho in a much wider area than known today (C. K. Brain,1985). The *P. varii* group appears to have concentrated in the area of streams and marshes. Further, the three "new" Transvaal locations appear to have certain factors in common. They all appear to have a similar marsh grass, easily identifiable, from which they never stray very far. (At this point there is no proof that this is the food plant and further studies will be required to determine this fact.) The grass grows in marshes, areas of mountain streams or areas of seeping water on rocky shelves. It appears that the best conditions are where the water is moving, albeit under the surface of the ground. This common factor is present in most of the colonies visited by the authors.
2. The colonies seem to be geographically isolated through elevation. Certainly, the three "new" localities are at approximately 2000 m with much warmer and lower areas in between them. It is extremely doubtful if specimens from one locality could ever visit another. The colonies showed an appreciation of changes to wind speed and sun. The slightest sign of unfavourable weather and the butterflies would simply "fall" into the grass below them. It is noted that research in the Andes amongst a group of satyrines (Pronophilini) that many new populations were discovered at altitudes between 1800 m and 4200 m. There was a vertical stratification and the low altitude species from the different mountain ranges resembled each other to a much greater extent than the ones living at high altitudes (Sbordoni, V. & Forestiero, S., 1985).

3. There may also be other mechanisms of reproductive isolation at work within the group. Temporal isolation appears to play a part i.e. adult *P. varii* is known from November to March with some populations appearing in between these dates. The Houtbosdorp population *(P. swanepoeli)* flies in February and March. The Dullstroom specimens *(P. varii)* start in mid January and fly to mid February. These dates have been noted over the past three years although in some years the dates differ probably reflecting changes in the climatic conditions for the specific year. (Dates of the KwaZulu - Natal/Free Sate/Eastern Cape colonies are required for further analysis). The Whiskyspruit and Dirkiesdorp populations fly from late December to late January. Again, these dates have been constant over the past two years but may change slightly under different annual climatic conditions.
4. The constant distinctive features of the Northern Province and Mpumalanga populations indicate that similar differences may be found in the more southerly populations.
5. The females appear to be very important taxonomically in the group. This was noticed during comparisons in the group II populations during recent photographic sessions.
6. The authors have not analysed the populations for number of ocelli – i.e. two, three, or more. Evidence is that most populations have a varying number of ocelli on the underside hindwing. The authors do not, at this point, attach much weight to this particular feature, understanding that probably one ancestral stock was involved.
7. It appears that there are no intermediate populations. It also appears that the known isolated populations have constant features. The authors would like to see specimens from colonies that link known localities much closer than at present and that such colonies could produce specimens with intermediate markings. A cline probably did exist in wetter times but is in the process of breaking up. This is proven by the naming of *P. swanepoeli* as a good species. The strange specimen from God's Window also tends to confirm this idea that speciation has already taken place in certain areas.

The question is to what extent the remainder of the group has speciated? The authors believe that a species group could be involved. However, whatever the final answer, more work remains to be done. This includes food plant identification, breeding, more collecting - especially females from the various localities and genitalia studies with specific attention being paid to the females.

Future investigations

The authors have set out to study the group in more detail. Numerous questions remain unanswered and much work needs to be done:

1. The larval food plants have not been identified although the females are constantly found near one type of marsh grass which we believe to be its food plant. Experiments will be undertaken during the 1995/1996 season to determine if the food plants can be identified.
2. The life histories of each of the groups need to be documented.
3. More specimens of the Houtbosdorp, God's Window, Lesotho, KwaZulu-Natal (Low and High altitudes), and Eastern Cape colonies need to be studied.
4. Genitalia studies, specifically female, of each group need to be thoroughly investigated.

Acknowledgements

We would like to thank Hermann Staude and Graham Henning for information; Martin Krüger for giving us access to view and photograph the valuable specimens in the Transvaal Museum; Chris Ficq and Nolan Owen-Johnston who supplied specimens and accompanied us on several collecting trips; Clive Quickelberge for encouraging us to continue our research and our sons Martin, Simon and Michael who assisted us with collecting during many arduous mountain hikes.

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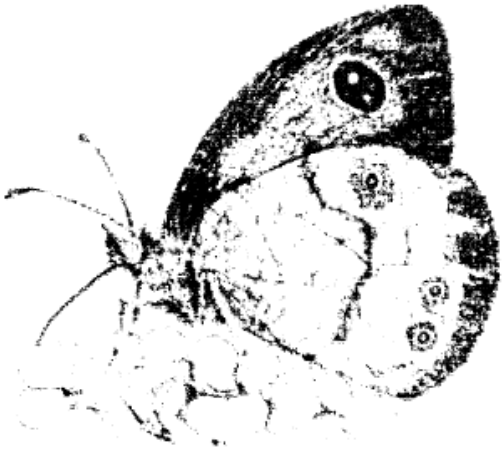

Pseudonympha swanepoeli male underside

REGIONAL ROUNDUP

The season so far has been good in some areas but poor in others. Trips to the Dullstroom area of Mpumalanga have shown that *Orachrysops lacrimosa* was out in early October. The high altitude race of *Dingana dingana* was out at various spots around Dullstroom. Stoffberg was devoid of butterflies and still seems to be suffering from the drought. The only butterflies of interest along that range were *Lepidochrysops ignota* and *Aloeides molomo*. Earlier in October the eastern escarpment of Mpumalanga had *L. ignota* and *L. irvingi* at the Bonnet and Hendriksdal but little else. Kowyns pass had nothing of interest flying. On the road from Hendriksdal to Nelspruit a few *A. molomo* were found.

Thanks to Ernest Pringle for his comments on the RED DATA BOOK species in the article which appeared in the September *Metamorphosis*. His thoughts are interesting and a further article on the subject will be forthcoming in due course. One species which I would like comments on is *Stygionympha dicksoni* which Ernest feels should be raised from RARE to VULNERABLE. I know little about this species and would welcome information from the members of the Western Cape Branch.

It was with great pleasure that I heard from Simon Joubert on the activities in Natal. He gives good news on the status of *Orachrysops ariadne*, another colony having been found by Kyle O Donahue at Wahroonga. The locality at "The Start", which had been burned, had the *Indigofera* well out and *ariadne* was not uncommon. *O. subravus* was very common in the Merrivale area during early September. In late September they were emerging higher at Mt. Gilboa. Also out in late September were *Lepidochrysops tantalus*, *L. asteris* and *L. ignota*.

Simon further listed some of his records from his easter Zimbabwe trip: *Mylothris carcassoni* at Banti; *Hyalites vumbui* at Cloudlands; *Acraea egina* and *H. johnstoni* at Pungwe; also some of the skippers which are so difficult to find in South Africa, *Andronymus caesar philander*, *A. neander* and *Fresna nyassae*.

A number of trips have been made to the Lootsberg Pass and other Karroo localities by Alf Curle, Steve Woodhall, Nolan Owen-Johnston and Pieter Roos. *Pseudonympha trimenii ruthae* was out everywhere, *Aloeides depicta* was found on the Lootsberg and *A. mbuluensis* was found on the Witteberg. The specimens of note were a few enormous *A. caledoni*, the biggest male *Aloeides* I have ever seen! Pieter Roos also travelled down to Namaqualand for the weekend! He visited a farm near Kamieskroon which is run by the WWF and did some ground work on behalf of the Lepidopterists' Society. We thank Pieter for his stout efforts. He recorded *Poecilmitis lysander*, *Alenia namaqua*, some *Tarsocera*, which he will identify from the genitalia, and a number of other species.

On the 21st October the first female *Orachrysops niobe* was seen at Brenton-on-Sea. Martin Krüger is there to try and unravel the mystery of its life history and distribution for the BRENTON BLUE PROJECT, we hope he is successful.

The rains seem to have come to Gauteng and Mpumalanga at last. Now the lament will not be that the drought has kept the butterflies away but that the bad weather over the weekends has kept the Lepidopterists away!

Graham Henning

GEGENES PUMILIO (HOFFMANSEGG, 1804) - AN APPEAL FOR HELP

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Introduction

It is now exactly a quarter of a century ago that I dissected a series of *Gegenes pumilio* (Hoffmansegg) in my flat near Beirut in Lebanon, to find that their haploid chromosome number was n=41. This was the same number as a specimen from southern Turkey studied by de Lesse and listed by him only as *Gegenes* sp., since he had already established the chromosome number of *G. pumilio* from Nice and Algiers as n=24.

I later saw de Lesse's specimen in the museum in Paris; it was definitely the same as my Beirut species and not the similar *G. nostrodamus* (Fabricius, 1793). Fortunately, I was shortly able to bring back some live *G. nostrodamus* from Cairo to Beirut. The counts were not fully satisfactory, but indicated n=15-16, a figure which was later verified by Dr. Saitoh in Japan as n=15 on the basis of Dead Sea specimens sent to me by Ichiro Nakamura from Israel (via Helsinki - in those days direct contact between Lebanon and Israel was not possible).

In 1979, I found *G. pumilio* in Yemen, and again Dr. Saitoh established a chromosome count of n=41 as in Lebanon and Turkey. This makes it fairly certain that the African *G. pumilio gambica* (Mabille, 1878) is the same, but we cannot be sure.

There was now sufficient data to write a paper (Larsen, 1982) establishing that two distinct species were hiding under the name *G. pumilio*. However, which name applies to which grouping must await chromosome counts from peninsular Italy and Sicily (the type locality of *G. pumilio* is Napoli, and there are several junior synonyms from Sicily).

Appeal for help

Given the above history, I believe it is time to get to the bottom of this problem, and I am therefore trying to get material of *G. pumilio* from peninsular Italy, Sicily, and Africa. Material from Greece and the Adriatic coast would also be useful. This is where I ask for the reader's help.

What is needed is about five testicles of *G. pumilio*, pickled in a small bottle containing Bouin's fluid. The procedure is as follows:

1) In the field, box or paper live males;
2) Kill the specimen by pinching - many chemicals, including cyanide, spoil the readability of the chromosomes;
3) Make an incision in the central part of the abdomen;
4) With a fine forceps or with a couple of pins extract the testicle;
5) Pickle immediately in Bouin's fluid. The testicle is spherical, of a deep maroon colour, and by far the biggest identifiable object inside the abdomen.

6) Bouin's Fluid consists of the following:

Picric Acid (Saturated Aqueous Solution)	75 ml.
Formalin	25 ml.
Glacial Acetic Acid	5 ml.

This fluid can probably be made up by your local chemist.

Training on a large butterfly, like a *Papilio*, might be a good idea. However, for the faint-hearted, and those without a binocular microscope, it is actually sufficient to detach the abdomen, make an incision, and pickle the entire abdomen.

Expectations

I expect that Italian and African data will prove that *G. pumilio* is a West Mediterranean species, confined to North Africa, Spain, France, and Italy. The species with n=41 will then take the specific name of *G. gambica*, ranging throughout Africa and Arabia, to northwestern India, and Turkey. The Greek and Adriatic populations may fall in either category. However, till the chromosome numbers have been determined, nothing is certain.

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Tuxentius melaena griqua male underside

INTERESTING DISTRIBUTION RECORDS OF BUTTERFLIES FROM NORTHERN TANZANIA

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Abstract: An annotated list of 34 butterfly species from Tanzania is documented in this note. These species have been highlighted due to their new distribution and altitude records, most of which come from the Kilimanjaro Region.

Although there is an abundance of literature on butterflies from much of East Africa, many areas within this region remain to be fully or even partially investigated from a biological standpoint. In Tanzania, a multitude of sites were visited by J. Kielland culminating in his exhaustingly detailed and monumental contribution to the distribution and ecology of butterflies in Tanzania (Kielland 1990).

Since 1981, I have been studying the butterflies of Tanzania. Most of my research efforts have been concentrated in the Kilimanjaro Region, with a few excursions elsewhere (e.g. Cordeiro 1992). During this period I have accumulated several new range extensions, some of which were included in Kielland's (1990) work. Several records, however, represent new information on the distributions of various taxa which I have chosen to document in this paper. These include a few records of Rev. B. Baker (Rev. B. Baker in litt.). Although the bulk of these records come from the vicinity of Mount Kilimanjaro for which a checklist is being compiled (Cordeiro in prep.), a few others are from the Mt Meru area, Mt Kwaraha and the North Pare Mountains. All sites mentioned in the text are listed by their coordinates in Table 1. I have followed the arrangement in Kielland (1990) to facilitate easy reference.

Table 1. Alphabetical gazetteer of sites

Sites	Co-ordinates
Kahe Forest Reserve, south of Moshi	3º30'S, 37º27'E
Kamwala Forest, North Pare Mts	3º42'S, 37º38'E
Karamu, Mt Meru	3º22'S, 36º53'E
Kindoroko Forest Reserve, North Pare Mts	3º45'S, 37º38'E
Machame, Mt Kilimanjaro	3º15'S, 37º13'E
Moshi, south of Mt Kilimanjaro	3º20'S, 37º20'E
Mount Kwaraha, Babati	4º13'S, 35º49'E
Pangani, Tanga Region	5º26''S, 38º58'E
Rau Groundwater Forest Reserve, Moshi	3º22'S, 37º22'E
Same, foothills of the South Pares	4º04'S, 37º42'E
Tarangire National Park, Arusha Region	4º00'S, 36º00'E

Notes on selected species:

Danaidae

Amauris tartarea damoclides Staudinger. The subspecies *damoclides* was believed to be restricted to eastern Tanzania (Kielland 1990); however, it is a common forest *amauris* in both the Rau and Kahe Forest Reserves.

Pieridae

Colotis protomedia Klug. Kielland (1990) notes this species to be very local in Tanzania, known only from the Chalinze area near Dar es Salaam. Two males were obtained in dry woodland near Same on 27 December, 1982.

Dixeia charina Boisduval. Thought only to occur in coastal areas of Kenya and Tanzania (D' Abrera 1980, Kielland 1990) and represented by the subspecies *liliana* and *dagera* respectively, this pierid is now known from Rau Groundwater Forest Reserve and Karanga River. The subspecies *liliana* occurs at these two sites.

Dixeia spilleri Spiller. In Tanzania, this pierid Is mainly dlstibruted along the coast(Kielland 1990). There are dated specimens from the BMNH collected in Moshi (pers. obs.). It is reasonably common in Kahe I & II Forest Reserves south of Moshi.

Appias epaphia contracta Butler. The closest locality record to Kilimanjaro is from the North Pares (Kielland 1990). Only one specimen was obtained from 1500m in the forested southern slopes of Mt Kilimanjaro in June 1988. It may be rare on this mountain.

Nymphalidae

Euxanthe tiberius Grose-Smith. There is only a single dated record of this butterfly from Moshi (Smiles 1985). I have not come across it in the Kilimanjaro Region and it is presumably very rare in this area.

Charaxes lasti Grose-Smith. Kielland (1990) mentions a single record from Moshi, referring to my specimens collected from Rau Groundwater Forest Reserve. It was first collected in this forest by Rev. Baker (Kielland 1984). It is a rather scarce species here.

Charaxes protoclea azota Hewitson. This *Charaxes* is only documented to occur inland as far west as the North Pares (Kielland 1990). It flies on the southern foothills of the mountain especially near rivers such as the Karanga R. It is especially abundant in the Rau Groundwater Forest Reserve and is reasonably common in Kahe Forest Reserve.

Euphaedra neophron violacea Butler. Believed to occur at high-altitudes from 1400-2000 m in the North Pares, Mt Meru and Mt Kilimanjaro (Kielland 1990), this race extends much further down in some localities. In the North Pares it flies above 1000 m whereas it is extremely abundant in the Rau Groundwater Forest Reserve at 750 m and Kahe Forest Reserve at 660 m.

Junonia sophia infracta Butler. Kielland (1990) has no records of this nymphalid from the 'Northern Highlands' although it is present on Mt Meru and Mt Kilimanjaro.

Apaturopsis cleochares Hewitson. Not a common species, this taxon is known from a handful of areas in Tanzania. To this list I add an observation of one feeding on the sap of an avocado tree in the Rau Groundwater Forest Reserve in August 1986.

Acraeinae

Hyalites baxteri subsquamia Thurau. Kielland (1990) states the possibility of this taxon occurring on Mt Kilimanjaro. Previous records from this locality include those of Eltringham (1912) and Carcasson (1961). I have only taken this butterfly on the western slope of the mountain but it most likely occurs throughout.

Hyalites igola Trimen. The closest reported locality to Mt Kilimanjaro is the Usambaras (Kielland 1990). A single specimen was apparently taken on Mt Kilimanjaro by Rev. Baker in February 1984 where, if it really does occur, it is presumably quite rare.

Hyalites perenna thesprio Oberthür. This species is only listed from a handful of areas in Kielland (1990) and from as far west as the Pare Mts. *A. perenna* is quite common along the Karanga River, south slope of Kilimanjaro, where it has been taken from 800-1100 m. It also flies in woodland and gardens in Moshi.

Acraea braesia Godman. Apart from the localities listed in Kielland (1990), this butterfly is also known from the foot of Mt Meru at Karamu, Tarangire National Park and Moshi. In addition Rev. Baker collected a specimen from Machame, on the southern slope of Mt Kilimanjaro, in August 1983.

Acraea chilo Godman. Listed from the Arusha Region in Kielland (1990). This species was taken by Rev. Baker at Same at the foot of the South Pares, in March and April, 1983.

Acraea zonata Hewitson. *A. zonata* flies along the Kenyan-Tanzanian coast and inland to Malawi (Kielland 1990). In July 1993, this butterfly was found to be common at 1600-1700 m along the forest edge of Kindoroko F.R. in the North Pares. An individual was also taken at the summit (2100 m).

Lycaenidae

Teriomima subpunctata Kirby. Kielland (1990) does not record this species from the Kilimanjaro area; however, it is reasonably common in the Rau Groundwater Forest Reserve where it flies in the mid-stratum to canopy levels of the forest.

Baliochilia pseudofragilis Kielland. This species was strangely excluded from Mt Kilimanjaro by Kielland (1990) despite his earlier documentation of it there (Kielland in litt.). It is infrequent in the coffee and banana plantations from about 900-1500 m where it has only been recorded from the southern and eastern slopes.

Spindasis ella Hewitson. This widespread but uncommon species was not listed by Kielland (1990), recorded from Pangani, Tanga. A male was taken in coastal scrub in April 1988.

Argiolaus silas Druce. Not listed from Mt Kilimanjaro by Kielland (1990). Two females were collected by Rev. Baker on the southern slopes at about 1500 m in January 1982 and February 1984.

Virachola vansomereni Stempffer. This taxon has only been recorded in forest from 1000-1800 m in the Usambaras and south-east Kenya. Two females from Kindoroko F.R. represent not only a range extension but also a high-altitude record at 2100 m.

Pilodeudorix caerula Druce. Although not recorded by Kielland (1990) from the Northern Highlands, this species was quite common in Moshi.

Lycaena abbotti Holland. This butterfly was previously not known from the North Pares. It was seen flying in July 1994 at 1750 m in an ericaceous zone in Kamwala Forest.

Anthene crawshayi Butler. Although Kielland (1990) considers this species to be common in western Tanzania with the only eastern record coming from Ulanga District, it is important to note three records from Moshi: two in August 1982 and a third in July 1986 from the Rau Groundwater Forest Reserve.

Anthene hobleyi Neave. Kielland (1990) records this species from montane forest of both volcanic and crystalline mountains, making no mention of records from Mt Kwaraha and the North Pares. A male was taken at damp sand at 2300 m on Mt Kwaraha in June 1988, and another male was collected at 2100 m on the summit at Kindoroko Forest Reserve, North Pares, in July 1993. The taxonomy of *A. hobleyi* is in need of revision as several races remain to be described (Kielland in litt.).

Anthene lasti Grose-Smith & Kirby. Although Kielland (1990) lists this lycaenid from Mt Kilimanjaro based on my specimens, it must be noted here that in this region it has so far only been recorded from Rau Groundwater Forest Reserve where it was quite common in 1986-1987.

Anthene lemnos Hewitson. This species may fly in forest throughout the year. Specimens have been recorded from Rau Groundwater Forest Reserve at 750 m and at 2000 m on the northern slope of Mt Kilimanjaro.

Anthene liodes Hewitson. A female of this taxon was taken in the Rau Groundwater Forest Reserve near Moshi in August 1986.

Pseudonacaduba sichela Wallengren. Believed to be scarce in the Northern Highlands by Kielland (1990), this lycaenid is quite common in the Rau Groundwater Forest Reserve.

Actizera stellata Trimen. This wide-ranging species of montane grasslands was noted from the Londrossi/Simba area at 1900-2200 m on West Kilimanjaro in February 1987.

Eicochrysops hippocrates Fabricius. This taxon was not mentioned from the 'Northern Highlands' by Kielland (1990). It is common in Moshi, especially near wet areas.

Chilades kedonga Grose-Smith. There were only two records of this species in Tanzania, one at Ruaha National Park and the other from Tabora (Kielland 1990). It has since been found in dry *Acacia* woodland on the north slope of Mt Kilimanjaro at 1600 m. There is little doubt that it extends into Kenya near Amboseli.

Hesperiidae

Spialia zebra bifida Higgins. Not mentioned from the Kilimanjaro area in Kielland (1990). This taxon is reasonably common at Moshi.

Acknowledgements

Many thanks are extended to M.I.L. Katigula, the previous manager of the Kilimanjaro Catchment Forest Project, for allowing me to conduct my research in the Kilimanjaro Region. Jonas Timothy accompanied me in various forests and much gratitude goes to him too. Rev. B. Baker provided a few records of interest and I thank him for this. I am indebted to Jan Kielland who not only identified some of the difficult species but also kindly commented on a draft of this note. Many of these records were collected opportunistically whilst I conducted research on forest birds with supporting grants from the Wildlife Conservation Society of Tanzania and the Royal Society for the Protection of Birds - the Birdlife International Partner in the UK.

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Letters to the Editor

Following the work done by Heath & Brinkman on *Oxychaetea dicksoni* Gabriel and their paper published in *Metamorphosis* **6**: 117-127.

The 1995 season was another poor year with only one male being seen by Tony Brinkman, my son David Heath and myself on September 10th. This was despite many visits before and since then. Ernest Pringle (pers. Comm.) Was not able to visit the Vermaaklikheid site and so no information is available on that population.

Regarding the pupae found at the site and mentioned in the above paper, one was parasitised, one was deformed due to damage caused during its discovery and a male and female *O. dicksoni* emerged on the 17th September. This pair was kept in a 15x15x15cm cage for two days but no mating was observed; they were then released at the Cape Town population site on 20th September. It was a dull day and they showed no sign of activity when released

Alan Heath.

DNA Project for Lycaenidae

I have agreed to collaborate on a project with Naomi Pierce, Professor of Biology at the Museum of Comparative Zoology, Harvard University USA. Professor Pierce is engaged in reconstructing the phylogeny of the *Lycaenidae* using molecular characters.

For my part I will *inter alia* be collecting material from the *Chrysoritis, Oxychaeta, Poecilmitis, Bowkeria* group of genera. Simon Joubert and Graham Henning have agreed to help in obtaining relevant material for this DNA analysis. The specimens need to be dehydrated in alcohol very quickly, ie. Cut up into pieces and placed in alcohol immediately, their wings stored separately for reference purposes.

One very key species in this endeavour is *Bowkeria phosphor* but I realise that few collectors would be willing to part with such a prize. However, if someone is both lucky enough and at the same time willing to part with it, then please try to keep it alive and let Graham, Simon or myself know. Failing that, cut the wings off and plunge the body pieces into alcohol as soon as possible (wings in an envelope).

Professor Pierce also would like to know if anyone is willing to collect South African Lycaenids (other than western Cape) for her and in particular the *Lipteninae*. If so please let me know. My home telephone number is (021) 531-6840.

It is hoped that the taxonomic status of this group will eventually be established through their life histories and the DNA analysis.

Alan Heath

BOOK REVIEW

Carcasson's African Butterflies: an annotated catalogue of the Papilionoidea and Hesperioidea of the Afrotropical region. editors, P. R. Ackery, C. R. Smith & R. I. Vane-Wright. CSIRO Australia 1995, CSIRO Publications, PO Box 89, East Melbourne, Victoria 3002, Australia.803pp. Price: US$140.00 (Hard-cover). ISBN 0 643 05561 4.

Every now and again a publication sees the light that becomes the standard reference work in its field. This, long awaited, monumental work promises to become just that in the field of Afrotropical butterflies. Steve Collins (Nairobi, Kenya) told me that he will be using it daily.

Carcasson's African Butterflies consists of four distinct sections: A gazetteer and list of regional works, biogeography, the catalogue and bibliography.

The introduction includes a useful brief summary of what has been published on the biology of Afrotropical butterflies (up to the end of 1993) together with some interesting comments.

The gazetteer and list of regional works lists the countries and islands of the region alphabetically indicating their status and location. Modern countries and some islands carry references to local or regional works and are indicated in bold print. This section should prove to be particularly useful in finding the appropriate literature when planning a trip to any given country.

The Biogeography section is based directly on Bob Carcasson's publication, *A preliminary survey of the zoogeography of African butterflies,* which was originally published in 1964. In this section Carcasson classifies the Afrotropical region by dividing it into sub-regions, the sub-regions into divisions and the divisions into zones, all based on habitat. He then describes the physical geography (general vegetation, climate, topography, isolating mechanisms) of each sub-region, division and zone. He also describes the butterfly fauna of each grouping, mentioning the butterflies endemic to each grouping. Throughout the section he discusses his own ideas on a number of relevant topics, and here the editors added useful notes and references on information published subsequently. In particular he describes his ideas on speciation based on his knowledge of African butterflies. It is amazing that his ideas, published at a time when phyletic gradualism was the accepted model for speciation, are more in line with modern evolutionary thinking of Vrba, Paterson, Eldrige and others that only emerged in the seventies and early eighties.

The catalogue section, which covers the main body of the work (626pp.), is an attempt at a systematic account of all the described butterfly taxa (genus level and below), including all synonymies and infra-subspecific names, applicable to the Afrotropical region that have been published before January 1 1990. This virtually impossible goal has been largely achieved by the editors for which they need to be congratulated. Some immediately apparent omissions are *Hypolycaena tearei* Henning G. A., 1981 and *Argyrocupha malagrida maryae* Dickson & Henning W. H., 1980. The catalogue is arranged systematically at the generic level and above but alphabetically and

chronologically at the species level and below. Entries in the catalogue include author, date, page reference, type designation, type locality, distribution and known larval host plants. The editors explain this arrangement fully in the introductory part of the catalogue. A representative species of each genus is illustrated by good quality black & white photographs under each genus name. The illustrated species chosen is often, but not always, for reasons not immediately apparent, the type species for the genus. The pleasing and easy to use layout is achieved by the liberal use of indentation and space. Glancing through the catalogue one cannot help but notice the numerous unfortunate misspelling and misrepresentation of geographic names that one is familiar with. Although one cannot expect the editors, who are probably not familiar with a lot of these places, to have picked up these mistakes themselves, they could perhaps have made use of local experts for proof-reading who would most certainly have helped eliminate most of these irritations.

The bibliography section is exhaustive and includes an addendum, which lists relevant works published after the cut-off date up until the beginning of 1994.

The genus and species index is restricted to genus, subgenus, species and subspecies names and lists starting page locations only. This restrictive arrangement keeps the index simple and makes for fast and easy usage.

Now that more and more South Africans are realising that there is life north of the Zambesi river and expeditions to the north are more frequently undertaken, *Carcasson's African Butterflies* is an absolute must for anyone with more than a casual interest in Afrotropical Lepidoptera. Unfortunately the price is a prohibitive factor for a lot of lepidopterists, but considering that it took twenty years to complete and the amount of pertinent information contained in it, it is in my mind worth every penny. In future I would like to see a CD-ROM edition that could be updated more frequently, this would be easier to use and would be environmentally friendly.

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

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

Lettering on illustrations must be clear and legible and allow for a reduction of plates to A5 size. Figure legends must be typed on a separate page, and each plate must have its own legend, which must be concise but completely explanatory of the figure without the need to refer to the text.

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Manuscripts must be arranged in the standard format of scientific papers: title, name(s) and address(es) of author(s), abstract, introduction, material and methods, results, discussion, conclusion, acknowledgements, literature references. In cases where these exact headings are not appropriate (e.g. taxonomic papers, short observations), the paper should be structured in a similar, logical fashion and divided into suitable sections with or without headings.

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

The abstract should be concise (not exceeding 250 words), but complete and intelligible without reference to the text. It should cover the main results of the study, including (in taxonomic papers), all nomenclatorial changes, or proposals of new taxa.

The introduction should include the aim and objectives of the study, and a concise summary of the relevant previous work on the subject (unless this follows under a separate heading).

The material and methods should fully explain all abbreviations, except the standard taxonomic ones, and those of measurements, for which the International System of Units (Sl) must be used. In experimental and purely descriptive work, the deposition of voucher specimens must be stated.

The acknowledgements should be concise and simple.

The literature references must be in alphabetical order and adhere to the following format, with multiple authors linked by an ampersand (&) and the journal names in full and unabbreviated:
i.e.

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

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

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

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

Taxonomic Papers

Papers should constitute a comprehensive treatment of a group delimited by taxonomic, geographic, ecological or other biologically meaningful criteria. Papers

dealing with miscellaneous species having no such natural association or simply describing a single new species will only be accepted under special circumstances.

The names of new taxa should not appear in the title, but all nomenclatorial changes must be listed in the abstract. Authors must fully comply with the 3rd edition of the International Code of Zoological Nomenclature (ICZN) and its recommendations, and with the published opinions of the International Commission.

Headings of taxonomic categories above the species group should be centred and preceded by the name of the category (e.g. genus, family). When used as taxonomic headings and with their first citation in the text, all genus and species group names should be cited with their author in unabbreviated form. Nomenclatorial changes should be indicated by the standardised abbreviations gen.n., sp.n., stat.n., comb.n., nom.n. as recommended by the ICZN; all other abbreviations should be avoided, or, if really necessary, explained in the section 'Material and Methods'. Under each taxon heading at least the most important references to the taxon must be stated, i.e. its original description, revisions, keys synonymies; such references must be included in the bibliography at the end of the manuscript. With genera, the type-species with its author and date must be listed after the synonymy.

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

All nomenclatorial and taxonomic changes (synonymies, type designations, generic transfers, changes in status, replacement of names, etc.) must be briefly justified, and nomenclatorial ambiguities and interpretations must be fully explained. lf a type cannot be traced, an account should be given of the steps taken to ascertain its whereabouts.

Type designations must be done in accordance with the ICZN, and types not recognised by the ICZN (homotype, metallotype, etc.) are not acceptable. The designation of allotypes should be avoided. Primary types (holotypes, lectotypes, neotypes) must be deposited in recognised public taxonomic institutions (not private collections) and, if at all possible, in the country of origin of the species.

All specimens examined should be included in a section 'Material examined', citing all specimens and their depositories. The data on the specimen labels should be cited *verbatim* in the case of types but standardised for all other specimens examined, arranging the localities in alphabetical order within countries or provinces. Obscure localities should be identified by means of map co-ordinates.

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