FOREWORD

Peter Overton

It is ten years since the Biosearch Nyika project was first mooted and agreement with the Director of National Parks and Wildlife obtained for our exploration of the remoter parts of the Nyika National Park. Over this period the teams have focused mainly on the northern part of the park where patrolling has been very limited and our gathering of intelligence has been most helpful to the Nyika management.

In 2004 we undertook the most challenging expedition to date, launched from the extreme north of the park at Uledi, a four-hour drive from Thazima. The team's first challenge was to cross the unbridged North Rukuru River with all their supplies. They then had to climb up the western escarpment of the Mpanda ridge to a point on the Mpero River, where they set up a Base Camp, from which to launch out on their surveys. The greatest achievement was to climb both Mpanda and Kawozya and discover the remote Bleak House, now derelict but offering stunning views over Lake Malawi and far beyond. At this point they could certainly claim to be in remote country since this old site is much talked about but very rarely seen by visitors. We have yet to have clear information about who built it, when and why. Perhaps it was a holiday 'retreat' for Livingstonia or a staging post for missionaries who conducted business on the west of the Nyika National Park and into Zambia.

Figure 1 Bleak House obscured by trees and long grass.

In many ways this expedition was the pinnacle of logistical achievement. It was with some trepidation, after a comprehensive recce in 2003, that we decided to go for it. Manuel Gondwe, who was based at Uledi, deserves special mention for his contribution, making the adventurous 2004 expedition possible and showing exceptional responsibility and reliability both on the recce and the expedition itself. We are grateful that we were provided with so many support scouts this year. In the unlikely event of an emergency it would have stretched all our human resources to get someone out from such an isolated place as the Mpanda–Kawozya ridge. The team, with their popular and experienced leader Quincy, relished the challenge. They have contributed valuable information about the far north of the park, its plants and its animals and also the considerable extent of poaching in the area.

Every visit to Nyika has involved substantial fund-raising by our teams and each time we have been able to make some contribution to the equipment of the scouts in the park, to enable them to do their jobs more effectively. The long-running funding problems, which have left Nyika with a severe shortage of manpower, are beyond our reach. However, it is very encouraging to hear of co-operative developments with the Zambian authorities

Figure 2 Presenting one of a 12 pairs of binoculars to Gibson Mpepho of the Nyika National Park.

and other Malawian Parks, which may increase the number of patrolling scouts. We feel that our donation of excellent, sturdy and waterproof binoculars provided through a grant from the British High Commission in Lilongwe, were well-received and should be of great assistance in improving the effectiveness of the staff that are available.

Living in the wild on expedition is in stark contrast with our normal lives and this is one of the major attractions for our teams to visit Nyika. Apart from the excellent and necessary support and protection that the game scouts afford us in the bush, they give the team members some flavour of what it is like to live in these difficult conditions, day in and day out, and how it impacts on their families. The team also picks up bush skills of which they are very proud. The dry and largely wind-free climate, apart from the occasional exciting whirlwind generated by the heat of the day, is an added contrast to conditions more familiar to those based in the United Kingdom.

Figure 3 Whirlwind near South Luangwa

It seems that in the remotest areas one cannot escape football. Laura's description of the great Uledi cup final is a worthy contribution to the report. We would like to thank members of that community for assisting us with getting our supplies and equipment up the mountain but not for the thorough thrashing that they gave their visitors at the match!

At the end of the expedition the team enjoyed two nights at the lakeshore near Chinteche. Expeditioners relish this finale of luxury after an exhausting period in the bush on simple rations.

Figure 4 Makuzi Beach at dawn

The proximity of the Nyika National Park, despite its remoteness, to the wonderful resource of the lake means that there is an added advantage to visitors. The cleaner and healthier climate of the Nyika is also a huge attraction for those wishing to spend longer enjoying the considerable wildlife attractions of the park, even though large mammal populations are not high. Nyika remains a superb location for wildlife research and for wilderness trekking and can certainly accommodate many more visitors (on foot) without visible evidence of their presence.

We feel that our series of expeditions have been both unique and successful over the years. We have always received great support from the Parks staff and there has been a genuine feeling of mutual benefit at the end of each expedition. Thank you very much indeed to all our team members and our Malawian partners for their unfailing support who have made this wonderful opportunity a reality.

ACKNOWLEDGEMENTS

Biosearch Nyika would like to extend congratulations to all our partners in this project. Some individual acknowledgements are to be found separately in each section. However, we would like to particularly thank the following for their contributions to this work:

Department of National Parks and Wildlife in Malawi, the Director L. D. Sefu for continuing permissions to work in Malawi.

All the staff working in the Nyika National Park and particularly the Manager Chiza Manda and Scientific Officer Gibson Mphepo for on-going support of the project.

The National Herbarium and Botanic Gardens of Malawi in Zomba, for releasing Hassam Patel to the expedition, whose continuing contribution to botanical research in Malawi is outstanding.

The Royal Geographical Society for giving recognition.

Dr R. K. Brummitt of the Kew Herbarium for advice on plant collections and their nomenclature.

Professor Stephen Hall of the University of Lincoln.

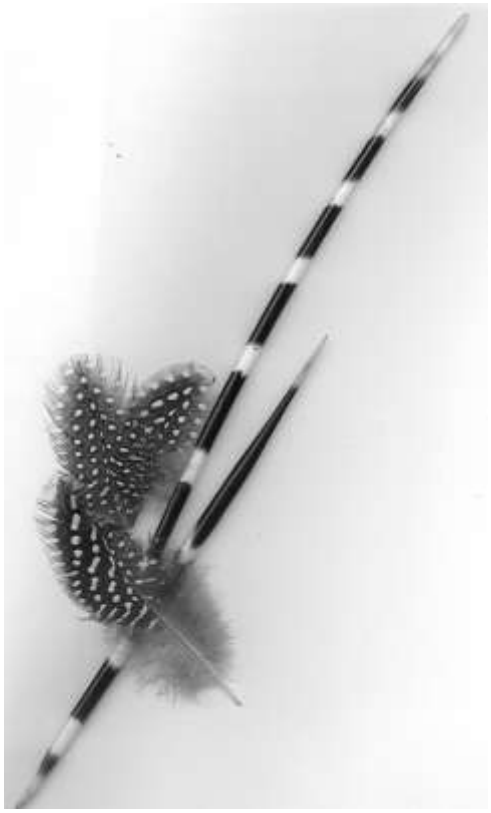
The British High Commission, Lilongwe, for medical support and advice.

Mark Sprong of Land and Lake Safaris for safe and reliable transport.

To all the members of the team who worked hard to raise substantial funding to make these expeditions possible.

Department of National Parks and Wildlife Scouts

MANUEL GONDWE
LACKSON MUGHOGHO
KELVIN MUNTHALI
SOLISTER MUNTHALI
RICHARD NYIRENDA
KINGFREY SICHINGA
GRANDSON SIMKOKO



2004 TEAM MEMBERS

We were fortunate to have a good Anglo-Malawian team of 27 people, including scouts, scientists, young people for whom this was a career move and others on a first expedition experience. For some the priority was scientific success. Others were seeking challenge and adventure in this Central African wilderness, whilst making a useful contribution to the conservation of wildlife in the host country.

C. PETER OVERTON BSc (Hons)
Project Director of Biosearch. Peter was a member of the Wye College Nyika Expedition (1972) to the northern extension of the Park (as it now is). He was a member of Amazonas Expedition (1987). For the British Trust for Ornithology, Peter co-ordinates a regional team of voluntary researchers, contributing to national records. He has organised the eight previous Biosearch Nyika expeditions and has long experience in project organisation and management in the UK.

MARIANNE J. OVERTON BSC **(**Hons) PGCE CBiol MIBiol FRGS
Overall science co-ordinator. Marianne has led expedition teams to the Amazonas (1987), Kenya (1988), Arctic Norway (1989), Yukon (1990), Queensland (1995) and a series of expeditions to Malawi with Biosearch Nyika. Each expedition involved a wide range of ecological surveys. She has undertaken regional work for the Institute of Biology. She was raised in East and South Africa.

Field Team

QUINCY CONNELL FRGS EXPEDITION LEADER
Quincy led this expedition and the three previous ones for Biosearch. He joined Biosearch as a very experienced and well-qualified leader, having previously led expeditions to destinations including Iceland, Indonesia, India, Guyana, Thailand, Malaysia and Hondurus. He has had considerable input into the training and design of expeditions through the Duke of Edinburgh Award Scheme, the Young Explorers Trust and other youth organisations and he is a fellow of the Royal Geographical Society. Quincy spent twenty-one years as Scenes of Crime Officer with the Metropolitan Police, examining scenes for forensic evidence, preparing and presenting that evidence in courts of law.

I.HASSAM PATEL
Hassam is a Malawian botanist who has worked for many years at the National Herbarium of Malawi in Zomba. He has led the botany on all but one previous Biosearch expedition and was also a member of the 1972 team to the Nyika Northern Hills, alongside Dr Dick Brummitt from Kew Gardens and Peter Overton.

KEFA KAUNDA
Kefa is a botanical technician from the National Herbarium of Malawi in Zomba and joined us for the first time in 2004.

ROBERT SINGINI
Robert is a competent technical assistant to entomologist, Ray Murphy. Robert has been learning his skills since joining Ray in his work based from Mzuzu since 2000.

STACY BATT

Stacey (20) has BSc Hons in Animal Management and Welfare at University of Lincoln. Interested in Guide Dogs for the blind. “The whole experience has been a memorable one. I have been able to meet new people and learn a little about the tracking of large mammals. I found walking across the terrain in the park difficult at times but one look at the views from the hills that we climbed has made the experience worth it.”

NATALIE BENSON

Natalie (21) has BSc (Hons) in Animal Management and Welfare at the University of Lincoln. “I wish to work with exotic animals, particularly big cats. I have never been on an expedition before but really enjoyed it and would like to do more.”

ANDREW BOURNE
Andrew (23) is studying Biology, Environmental Science and Management at University of Derby. Has travelled widely to Australia, New Zealand, Japan, Hong Kong and much of Europe. “I love the outdoors, camping and walking – and chocolate!”

DONNA CLEAL
Donna (20) is studying Forensic Science and Criminology at University of Lincoln.

LAURA MILLER
Laura (23) is studying Environmental Biology at Nottingham Trent University. “Most of my spare time is taken up with horses, which I show-jump regularly. I follow bloodhounds in the winter, which is very fast and furious. I have had a fantastic time on the expedition and was one of the team members who climbed both Kawozya and Mpanda.”

ROXANNE MAGEE
Roxanne (21) lives in the Isle of Man. Roxanne has completed two years of a degree in Criminology at Nottingham Trent University. Completed her Duke of Edinburgh Awards whilst in the Air Cadets for five years. She travelled to many different countries undertaking outdoor activities although this was her first expedition.

REBECCA MOORE
Rebecca (23) is studying for BSc in Zoology at University of Derby. Plans to do a veterinary science degree afterwards. "The first time I have done anything like this; I found it very hard at times but it will be a rewarding experience I shall never forget.”

CHRIS NEAL
Chris (50) has been a gas engineer for many years. “My interests are local and national politics. I have also exhibited fifteen times at the Chelsea Flower Show in the window box and small courtyard sections. I am looking forward to the next chapter of my life and hope it is an easy one!”

KELLY OSBORNE
Kelly (20) has been studying BSc(Hons) at University of Derby and has now transferred to an Animal Science degree at Nottingham Trent University. “I gained some camping experience whilst in the army cadets. My greatest ambition in life is to live in Africa and help conserve wildlife. I found the expedition a great experience and achievement and would certainly consider doing it again.”

SIÂN PHILLIPS
Siân (20) is in her final year studying Animal Science at Nottingham Trent University. “I am going into my final year at university and like to spend my time socialising, horse riding and relaxing between studying and working. This was the first time I had done anything like this and it’s been a great opportunity for me to be able to come to Africa, something that I’ve always wanted to do. Some of the walking has been challenging but the views at the end always made it worthwhile.”

AIDAN PIERCY
Aidan (24) is in his final year studying Zoology at University of Derby. “I have been passionately interested in field biology for many years and am particularly interested in the interactions between the large and small mammals in the Nyika National Park.”

CATHERINE TABOR
Catherine (21) has BSc in Forensic Science at University of Lincoln. Was a member of the April 2003 Biosearch Nyika expedition. “I have now caught the travelling bug and plan to go round the world in the near future with friends. I plan to return to do a MSc in Forensic Anthropology and Archaeology.”

JOANNA WALKER
Joanna (20) is Studying Environmental Biology at Nottingham Trent University. Studied Botany on the expedition. She enjoys drawing and painting and has contributed some artwork to this report. “This expedition has been one of the hardest things I have ever undertaken but also the most rewarding.”

DIARIES

Siân Phillips

AFRICA!

Arrival: Day 1
At 11.00am the members of the team who had arrived early travelled to the airport to meet the rest of the team. On arrival it was discovered that all their flights had been delayed. By 4pm the whole team was at last assembled, although some without luggage. The delays and lost luggage caused the team to stop over in Lilongwe for the night, rather than travel up to Chikangawa on the Viphya plateau as planned.

Lost luggage: Day 2
Two members of the team remained behind to track down the essential lost luggage at the airport. They were fortunately successful since it had arrived on the next flight. They were able to follow the team in the second vehicle and eventually catch up with the rest of the team at Thazima after dark. Without all the streetlights to which we were accustomed, we were able to clearly see the stars shining brighter than most of us have seen before.

Journey to first camp: Day 3
Whilst waiting for the scouts to arrive we began to get to know each other. We began to attract the attention of the local children. It started with just three and ended up with a large crowd watching us. The scouts arrived and we had brief introductions before settling on the bus and travelling to Uledi. The journey was dusty and we all got very orange tans (that washed off). We stopped for lunch near the edge of a hill with spectacular views of the African landscape. It seemed to go on forever. We could already see the evidence of poaching from burnt areas. Later in the afternoon we arrived in Uledi, where we met the final two scouts to join our team. Finally the whole team is together and we waded across the North Rukuru River and set up camp around a magnificent large tree.

Getting acclimatised: Day 4
After the previous day's travelling we were all in need of a break. We spent the day washing clothes and ourselves. We sat on large rocks across the river that seemed to be used by the locals as a washing point. At the bottom of the stream there was a beautiful view of the surrounding mountains; it was such a picturesque point.

Making a start: Day 5
This was the first day of surveying. Whilst out on our trek, we stopped to take our first breathtaking views from within the park. Standing at the top of a small hill we could see for miles ahead of us; the hills folding in to each other and covered in trees. With the keen eyes of the scouts, Grandson and Solister, we found 15 snares, used to trap birds. The scouts dismantled them all, probably to the annoyance of the poachers. We gained a better idea of how close you have to look for even the smallest signs of animals, which the scouts can spot so easily. The scouts brought us some *nsima* and relish for us to try. This is their staple diet. By the river there was a *'Baywatch'* moment whilst filling up the water drums. One of the drums slipped from grasp. Kelly, thinking quickly, threw off her shoes and ran heroically into the river, saving the drum before it was swept away!

Up to Base Camp: Day 7
This morning we found that only seven members of the group were well enough to travel up to Base Camp; sickness had struck the camp suddenly and was put down to contaminated food. The walk up the hill to our Base Camp began well. We all walked happily after the scouts. However, soon the heat and the heaviness of our rucksacks began to show. With the help of porters the team eventually made it in a tired and aching state. It was a challenging walk for everyone - except the scouts! We settled into Base Camp and relaxed for what was left of the day.The first sign of the arrival of the others was when some porters arrived with pots and extra food from the Uledi camp. Later in the afternoon the remainder of the team arrived, exhausted from their journey. They did seem to have made some recovery from the previous day.

My birthday: Day 10
A smaller team than usual, we set off after another breakfast of porridge. During our journey we had a slow walk up the steep side of a large hill. As we reached the top we were greeted by a beautiful view, nicely framed by the overhanging trees that surrounded us. There was a steep drop before us but ahead we could see a long stretch of virtually flat land surrounded by mountains. We have all discovered that although the walking can sometimes be very difficult, you are always rewarded by the amazing views. The Overtons

arrived at camp, in time to celebrate my birthday. I received a card signed by all of the team, including the scouts. We had a much more eventful night than usual, with a bush birthday cake. It was such a lovely birthday that will always be remembered.

Hyaena call: Day 13
When we were ready to leave for our day's survey plots we found that our two scouts, Grandson and Solister, were nowhere to be seen. They had left without us! The two small groups joined together to make one large group. Grandson and Solister returned to Base Camp, having had a very successful day and finding a baboon skull and lots of poaching traps.

That evening we sat round for a meeting with Marianne. As the meeting was coming to a close we heard the eerie sound of a Hyaena's call coming from behind us all. Then a rustling approached us. Suddenly we all turned round wondering what would appear. Kelvin, one of the scouts, approached from the darkness!

Kawozya Camp: Day 15
We left Base Camp for our next camp near Kawozya. It was a long walk and all our backs were sore from carrying our large rucksacks. During our journey the scouts showed us a poachers' hut, which they had found previously. We pulled the hut apart and burnt it. We walked down a steep hillside and through bushes to the area, which was to be our camp. We all stood looking at very thick vegetation wondering how we would all fit in, within minutes the scouts had cleared the area. Running alongside the camp is a lovely stream with a fallen tree over it, proving an ideal area for sitting and for drying clothes.

Poachers! Day 16
Whilst walking to the square we stopped when Hassam and Solister spotted four people walking in the distance. We all crouched down so as not to be seen by the poachers. We hurried along as quietly as possible until we reached the stream where the scouts left us. Hassam Patel took us to an old poacher camp to wait for the return of the scouts. We sat anxiously awaiting their return. After what seemed like hours we heard what sounded like gunfire. Then from nowhere the scouts appeared, laughing. The 'poachers' turned out to be Quincy, Laura, Roxanne and Laxton. Somewhat disappointed we continued on our way.

Bushbuck: Day 17
The squares were in very long and dense grass, making the plots hard to complete. As we sat resting, the scouts pointed out a female bushbuck running in the distance, disturbed by our movements. Getting down the hill to camp again proved 'interesting', with many falls. Becky managed a particularly dramatic one, ending up with her legs in the air! Later in the day we played cards with the scouts, something which they enjoy doing. It was nice to spend the time getting to know them. We packed up and left our camp, walking at a faster pace than usual. When we felt it was time for a break Grandson asked "why", with our destination being so close. Sure enough we turned a corner to see the tissue rolls in the tree. It had taken us only two hours to return to the camp on the North Rukuru River. We are now clearly feeling a lot fitter.

Bleak House: Day 21
We set off to our camp near Bleak House to complete are final four plots. We would not be returning to Base Camp but would head straight back to Uledi afterwards. The walk was very long, passing through Camp Overton; we headed up a hill. It seemed to go on forever. At every stop our brave and fearless leader told us we were half way there but by the third time he told us this we began to doubt him! Eventually, after a long and tiring walk we reached Bleak House, where we all collapsed for a while. Eventually a good supply of water was found and we set off, coming across the most amazing view; stretching for miles we could see the boarder to Tanzania. We arrived at Camp Andy. The next two days we completed our final four plots. On the final day of surveying our brave and fearless leader was confined to camp, against his will, due to illness. Our final day was a rest day and the weather took an unexpected turn and it rained slightly, but only briefly. We explored down the river, clambering over rocks and trees. On the way we came across a poacher's spoon, which we had not noticed the day before; needless to say we hurried on back to camp. The scouts explained that the spoon would be used to make *nsima* for eight to ten poachers.

Wild honey: Day 28
We left Camp Andy and began our journey back to Uledi. We walked through the long grass that rose above our heads. We took a second break, where the scouts kindly brought us honey from a hive we had passed. When the team was revitalised by the fresh honey we carried on, reaching Camp Overton, where we stopped for the night. The following day we

took our final walk, reaching Uledi by early afternoon.

Sunset on the Nyika: Day 29
We eventually left Uledi and travelled to Thazima along the dusty roads. The journey was long but we saw an amazing sunset, the red stretching across the sky. In the dark we arrived at Thazima, where some of us pitched tents and others prepared to sleep in the garage compound. The next morning we packed up camp for the final time and after handing out the few remaining gifts, which had not already been distributed to the scouts, we visited their families at Thazima. After saying goodbye, which was harder than we had imagined, we set off towards Makuzi Beach on Lake Malawi via Mzuzu. There the team enjoyed the best meal since leaving home and absorbed the beauty of the Lake in comfortable surroundings for two days.

The beach: Day 32
Reluctantly we left Makuzi beach, after watching a beautiful sunrise over the lake and filling ourselves with another amazing breakfast - with no porridge in sight. We travelled back to Lilongwe. From there we travelled on to South Luangwa for three days to see some game close-up, this time from a vehicle.

Heading home: Day 36
For the final time the team travelled together to Lilongwe International airport, arriving in plenty of time for our flights. Finding a shop we finished off any remaining money on chocolate, a luxury we had all missed. Saying our farewells the team slowly dispersed to their different flights, ready to head home after an amazing time in Malawi, with memories to last a lifetime.

Marianne Jane Overton

FOUR DAYS OF EXPLORATION – VISITING THE TEAM

Up to Base Camp: 20 July
We were up before dawn and had left by 7am on our tough walk with full pack, led by Manuel Gondwe. The climb was less arduous than we expected. I think our training walk in late May in the Scottish Borders did us a lot of good and Gondwe stopped for 10 minutes every hour, so that we were in the Base Camp in just three hours and fifteen minutes. We found Quincy and two team members in camp, Catherine Tabor and Aidan Piercy, the latter being unwell with a bad case of diahorrea. We had a good chat with Quincy and other team members. The four porters who had accompanied us carrying food, returned almost immediately, without rest. The first team arrived back in camp soon after 2pm, the second shortly afterwards. Laura Miller had stayed out with Hassam Patel and Mr Kaunda, doing the botany project. They arrived back at 4.30pm, which I thought was a suitable return time. The team had had a difficult start with widespread stomach problems and was lacking in enthusiasm, which was hardly surprising. Quincy had prepared most of the meals in Base Camp whilst the surveys were going on.

Birthday party
It was Siân's birthday so a party was in order. Michael and I made a fruit cake with orange sauce. It was excellent. Quincy also made one in an oven, which had been designed over the little river Mpero on which the camp was based. It is one of the very few streams in the far north of the park that continues to run throughout the dry season. Chris Neal made a vase of reeds bound together, somebody else wove her a basket and Michael made her a crown to help her balance it. The scouts made a small axe and Cat and friend made a banner of paper and cotton. So inventive! We had a good singsong and photos, then Laura produced a brilliant performance with whirling fire strings in true circus mode. She is very talented. Andrew then treated us to a brilliant bedtime story from a Maori tradition. We then had further songs, including Ilkely Moor from Peter and Quincy and a traditional war dance from Manuel Gondwe. I had some good recordings for our radio diary for BBC Radio Lincolnshire.

Surveys: 21 July
We went out with Andrew's team to do the surveys. We started off well at 7.15am but had some navigational problems and took a steep climb upwards, which initiated a mutiny. "Too tired, headache, short of water, too steep". With some persuasion one plot was completed, then lunch, then someone said they needed to go back to camp. Sigh! We should be doing five plots per day. We persuaded the group to do one more on the way back and then we shot home at top speed like hungry ponies. Hassam managed some botanical plots along the way. Arriving at camp at half past two left plenty of time to wash clothes and help Quincy prepare the meal again.

Bleak House: 22 July
Our reconnaissance team left at the same time as the survey teams and got to the last known water point some two hours later. The Upper Mpero River was a series of pools and small waterfalls. Quite recently, poachers had used the camp, which subsequently became known as Camp Overton. We set up camp and then walked well with light packs, reaching the ridge path for lunch and a much needed hour's rest in the shade of a *Brachystegia* tree while admiring a splendid view of Mpanda to the North and Kawozya to the south.

Next we walked along the grassy ridge, with the Nyika National Park laid out below us to the west and eventually views to Lake Malawi to the east. After about half an hour we came to the ruins of Bleak House. It was believed to be the retreat of the missionary Robert Laws, who set up Livingstonia in the 1880's. They moved away from the ravages of malaria at Cape Maclear and Bandawa on the lakeshore. The bricks were well made and the walls stood stubbornly against the onslaught of vegetation. Trees a foot thick dominated the lounge but this showed that it had been used much more recently than we had previously thought. We had often talked over previous years of visiting this site but it always seemed too far from our camps in the Mondwe and Chipome valleys and the long-running Base Camp at Nganda. Now we had at last found the site and there was a feeling of great discovery, knowing how rarely anyone comes this far, as indicated by the lush vegetation inside the building. Kingfrey found a small watercourse in the evergreen forest just below, so our mission to find a campsite was accomplished. We set off hot foot back to our camp below, to arrive before dark. I apologised for the over-spiced rice and the beans weren't ready until bedtime - so we had supper largely for breakfast. Flexibility is the art of an expeditioner! Kingfrey slept under the tarpaulin near a rock but the rest of us had tents.

The party consisted of Peter, Marianne and Michael Overton, Manuel Gondwe and Kingfrey Sichinga, Hassam Patel and Robert Singini and the two girls who had become firm friends, Laura Miller and Roxanne Magee. Aidan Piercy was still sick at Base Camp with severe diahorrea but more worrying was Chris Neal's pain from a kidney stone. Fortunately he coped well and recovered fully in two days.

Climbing Mpanda: 23 July
It took us around three hours to scale the first of Mpanda's twin peaks from our camp. We wisely set off in good time but still did not take proper account of the burning late morning sun as we were all exposed at the top of the mountain for well over two hours. Peter had begun to feel unwell and refused the precipitous route we had embarked on, at a particularly nasty spot, turning the group round. We did find a safer route, fortunately. One slip on the northern rocky face of Mpanda would be fatal, since rescue would be dangerous and probably futile, with the near vertical drop of perhaps 100 feet. Kingfrey, Robert and Hassam had taken the best route and were already on the next peak, which was at 6619' according to the map. It was only when Hassam returned that we felt able to make it to the very top with him. The group was elated with their achievement and returned safely, despite the uncomfortable moments. We did some large mammal plots on the way back down from Mpanda, which represented varied habitats.

Rest day: 24 July
We arrived back in Base Camp around 9am to find everyone else in camp and fried eggs and toast underway. Cake, buns, pizzas and even toffee apple followed later in the day. I got blisters chopping up vegetables but there was not enough so had to start over again. Finally everyone was fed with his or her many and various requirements. All food is so readily available in the UK that people become very particular. What a huge contrast to the monotonous diet of the scouts on nsima and kapenta (the small dried fish) - and glad of it too! To cater for different tastes, we had to keep all items cooking in separate pots, each at the right speed in different parts of the fire. This is complicated, especially in semi darkness with a number of hungry people clambering about! There were ten pots and two baking trays in use at one time.

We next held a meeting to refocus our aims. Chris Neal gave a brilliant talk at the start of the meeting, saying how much he was enjoying the expedition experience, meeting new people and discovering Africa. We focused back on the project work, which Catherine Tabor and I went through in detail. Hassam gave a really good talk, introducing himself as one of the two botanists on the expedition and explaining the importance of the work. I was not sure that everyone would have understood his strong accent, but a star speech nevertheless. Richard Nyirenda gave a good talk explaining that these were areas they could not patrol without the help of the expedition and thanking everyone for their

support. Poor Peter had retired to bed unwell but said that he and Michael had heard most of the proceedings from within the tent. Right on cue, near the end of the meeting when I introduced the 'large mammal project', was a series of Hyaena calls causing great excitement. We slept with our leather boots inside the tents that night, so Hyaenas wouldn't get them. That night as soon as everyone had gone to bed, a Leopard came right through the camp, close to our tent and a little later, a Jackal called close by. In the morning, we found fresh Hyaena prints on the sandy path skirting round close to our camp. Whilst the camp was quietly guarded by Quincy and a scout during the day before, a troop of about forty Baboons had visited, coming right into the camp and close enough for some good photos.

Laura Miller

A Difficult Day
We were out walking for ten hours today. I have been doing botany quadrats with Hassam Patel. The rest of my group returned to camp after completing the large mammal surveys. Hassam asked if I wanted to continue and I agreed. I'm sure Roxanne would have stayed with me but she was not feeling her best.

We had to drop 2000ft into a valley. The descent was completed in the style of Indiana Jones. The ground was unstable underfoot and at one point I fell and must have slipped 20m on my bottom. After the second quadrat it was discovered that Hassam had dropped his glasses. Mr Kaunda and myself searched and eventually found them. We still had a long way down to go.

Hassam was like a mountain goat and had no problem with the slope. I ended up clambering about on all fours on baboon tracks. I had a scary moment when traversing the hillside with a sheer drop below me. My feet slipped. I managed to prevent myself falling by clinging on with my fingertips. I froze, unable to move, with my heart in my mouth. I had lost sight of Hassam and Kaunda so couldn't even get a hand. It took me a lot to continue but I had no choice.

We entered a valley that had not seen visitors for over 30 years, there were no poachers' paths or anything but we saw a fresh Hyaena print. One problem with dropping into the valley is the climb back out of it. The climb was a nightmare. I had to move from one tree to another to remain upright.

On the way back I was getting short of water so was a little concerned. Today's adventure was the hardest thing I have ever done and certainly the most physically exhausting. I didn't realise just how tired I was until I returned to camp, my legs turned to jelly and I just had to sit down.

The Water Fight
After a dull and uneventful morning Roxanne and I were sitting on rocks in the river, just chilling out. A little boy saw us and I could only guess he went to get his friends, because soon we were surrounded by 10-15 children, ranging in age from about eighteen down to five. It was very strange. I suppose we felt like gorillas in a zoo. We were just being stared at!

To say that we struggled to communicate is a bit of an understatement; apart from a few names, we got nowhere. The only thing we knew was the *choo choo* song. The children obviously knew it and started to sing. We all joined in and even had a go at dancing, which gave the children a good laugh. At some point I fell off my rock and was soaked.

There was only one thing for it; a water fight! I started by splashing the older children first, as I was unsure as to what response I would get. They returned fire with vigour. Soon everyone joined in. Shrieks and squeals of laughter drowned out everything else. When we could get no wetter we set the children on the rest of the group who were just sitting in the river. About ten children and ourselves surrounded and drenched them, splashing more violently as they tried to retreat to the safety of the shore. They were not so impressed, which actually made things more fun!

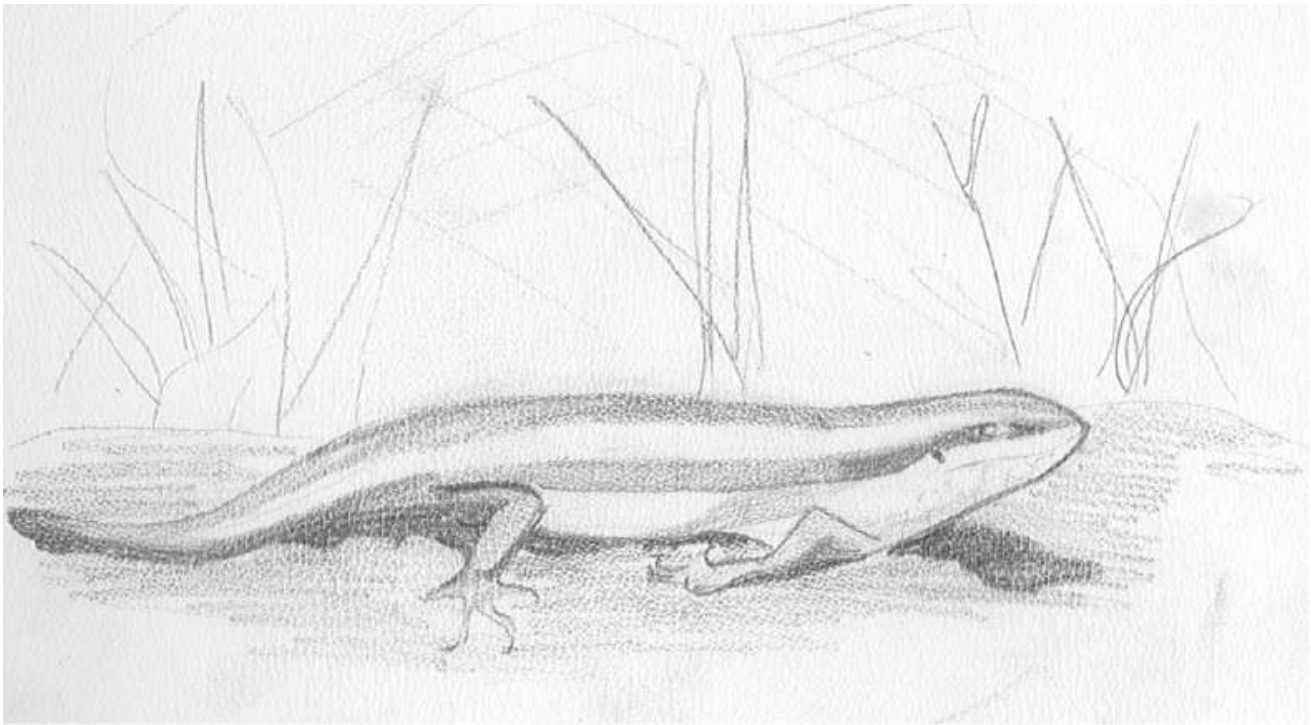
The day we played football
The scouts were invited to play football against the Uledi village team. Roxanne, Chris and myself thought it would be excellent to join in, although everyone would have been welcome to participate.

The pitch varied in condition, from quite level and sandy to rough and stony with potholes. We were the only ones wearing shoes! The whole of the village turned out to watch and support the team. Our supporters were, however, sadly lacking. Only Robert, Mr Kaunda and Luxam, who played in the second half, acted as our cheerleaders.

Chris was placed in goal; it was thought that his age and stature more suited this position. He did exceptionally well and put his heart and soul into this new role. Roxanne thought it best to wait until the second half to play so she could check out the teams. When she did come on she made her presence felt and executed a blinding header to save a penalty. Kingfrey and Manuel played up front along with two extras from the village. Richard, Grandson, Solister and myself played mid field, with Kelvin and a guy in a yellow shirt in defence.

At the beginning it was a little intimidating since I had never played in a football match before. However, I knew which way we were supposed to be shooting and my co-ordination is adequate, so I was able to kick the ball. I had no idea what I was doing and had to rely on instructions from Richard and Kelvin. The game started as it continued; very fast. The opposition was like whippets coursing a hare. They were so quick and so agile they made the scouts seem slow. Our team was not going to admit defeat and fought valiantly. Everyone played as if their lives depended on it. Richard and Manuel were exceptional and could comfortably match the speed of the opposition. Kelvin, being the biggest on the pitch proved a formidable opponent causing a few of the smaller players to be intimidated and to back off.

Unfortunately we lost 2-0. The match was played cleanly with and against true sportsmen and in the end the better team won. We were not too downhearted. We had not disgraced the scouts or ourselves. We had done all that we could and fought to the final whistle. The game may have been lost but we had won the hearts of the villagers. Roxanne and I had become local celebrities; all the women and children shook hands with us and followed us back to the river singing the *choo choo* song. It was a day that I will not forget in a hurry and it was a rare opportunity not to be missed. We had been accepted into a culture completely different to our own. After today and the water fight it seems that the universal languages of fun, sport and music can transcend any culture even when language makes a barrier.



Skink, one of nine species recorded for the Park. *by Joanne Walker*

KELLY'S CODE OF CONDUCT AROUND CAMP

Kelly Osborne

Living closely under canvas together with people in times of challenge, tiredness and stress gave us the opportunity to learn a lot about how to get on with people in all sorts of circumstances! When asked what advice I would give new expeditioners, I came up with this "Code of Conduct around camp", which I hope will be useful.

Behaviour is one of the most important aspects to consider around camp. An individual's behaviour develops due to a change in the environment. Thus an individual may act in a particular way, which in return causes a response by another individual. "If you smile the world smiles with you" is one of the best quotes to remember when thinking about behaviour.

Below are a few bullet points for successful expeditioners.

LOOKING AFTER YOURSELF, SO AS NOT TO BE A BURDEN!

- Be hygienic, keep clean at all times even though your clothes may be dirty. Your health depends on it!
- Keep all your kit close to you and if possible, in your tent.
- Dress accordingly. Do not wander around the camp half dressed and without boots on.
- Do not wander off into the bush without a scout, it could be dangerous.

LOOKING AFTER OTHERS

- Be aware of others in close proximity and their sensitivity. "Treat others how you wish to be treated in return."
- Do not borrow other people's kit without asking first and always replace it where you found it, in a clean condition.
- Make sure everybody knows where the toilet is, where to wash and where to get drinking water.
- Engage brain before speaking. "If you have nothing nice to say, say nothing at all."
- Always clean the cooking facilities after every meal to avoid contamination.
- Do not pry into others personal life, only ask sensible question about family and friends.
- Respect the scientists and scouts, they are your teachers.
- Work as a team, everyone is your family while on the expedition.

LOOKING AFTER THE ENVIRONMENT

- Do not cut more firewood than necessary, you are there to conserve.
- Don't contaminate the water with food scraps or non-biodegradable soap.
- Always clean camp before leaving to make it look as if you where never there.
- Most of all remember it is the bush and you are there to learn.

Now you have had a crash course in how to behave around camp, have fun and enjoy yourself. This will be a great experience for you.

FOOD MANAGEMENT

Roxanne Magee

LOGISTICS

Starting to feed the masses

Quincy, the team leader, was in charge of buying all the food before the team arrived. A list was used from previous years to give an idea of what was necessary and some alterations were made. The food was transported from Lilongwe to Uledi on the back of a truck. A tarpaulin was used to cover and secure the food, as it was a very long, dusty and bumpy ride. Because we arrived after dark at Thazima we experienced difficulties finding the food that we needed. The members of the team who had managed to set their tents up first made the dinner. The easiest thing to make on an open fire, which would satisfy everyone, was soup. The soup filled a hole but unfortunately the carrots and peas were crunchy. After that we soon learned the skills of cooking in the open.

On our arrival at Uledi camp, all the food was unloaded into an unused scout house. The fact that our camp was on the other side of the river meant that by the time camp was set up it was already dark. We had learnt the night before the importance of food being prepared before dark.

Up to Base Camp

A stock check was taken before the food was transported to Base Camp up the mountain. Porters were paid to transport the food to our Base Camp further into the park. The arrival of the groups was staggered due to illness within the team, so the few members in the advance team crammed the food into a spare tent and the fresh vegetables started to sweat. Quincy and Kingfey organised a shelving unit to be made, known as Quincy's Bazaar. This meant all the fresh food could be put in the open and was kept off the floor away from insects. Quincy had also provided us with white polystyrene containers with foil on the inside. These acted as our cool boxes for the cheese and butter. All the dry food was sorted into piles and kept in the tent.

In the field

The food eaten at Base Camp was freely used and only when the groups separated into two, was the food rationed, limited by the ability to carry it. Each group had to provide themselves with enough food to last them the days they were to be out in the field and that it suited the various dietary requirements of those individuals. On trips further afield the food was split between members who carried it in their rucksacks. The stronger walkers tended to take more food or equipment to balance out the walking speed of all members of the group so they could keep together.

Back at Uledi Camp

When both groups met up again at Uledi Camp, there was still plenty of food left, though mainly rice and dried soup packets. There was an over supply of onions, so we had a few splendid batches of onion soup made by Aidan. However it did not stop our tummies from rumbling. Some essentials, such as milk powder and sugar, had run out, which proved testing for some of the members who needed their sugar and caffeine fix. Quincy had arranged with the scouts for fresh milk to be provided every morning, which was a real treat. Another unexpected pleasure for the meat eaters was the chicken casserole, which was, surprisingly, prepared by the vegetarians. A handsome cockerel was purchased from Manuel, who lives at Uledi. He very kindly prepared it for us, so it was offered to the group as if it had been bought from the supermarket. The first group back to Uledi at the end of the expedition was able to visit the local market. The delights were endless; fresh bread baked by the local women was purchased, with local grown bananas too.

Thanks

Considering we were informed that the main ingredient in every meal was going to be rice and that our own spices were to add to the flavour. I can happily say we ate like kings and some of the meals produced were excellent. A big thank you goes to the chefs of the 2004 team for their outstanding effort.

RECOMMENDATIONS

The main difficulty with food management is trying to cater for everyone's needs. Being a vegetarian is not a problem as long as the substitutes are acceptable. Generally those substitutes are fish, soya and most importantly, vegetables. Unfortunately some of these weren't enjoyed by all. When a main meal was prepared, there was always an option of vegetarian or meat. If an individual will eat neither it can be very difficult to accommodate them with the limited hours of daylight remaining after returning from the field. One solution is to keep the rice and pastas separate but you really can't be fussy when you're out in the field, because you need a substantial meal for energy. I therefore recommend a general meal plan should be drawn up and stuck to. This will enable everyone to share his or her opinions and ideas in advance. The plan will also give members an indication of the amounts of foods they can use for each meal and ultimately ration the food so all the preferred food is not eaten straight away.

The standard menu

Breakfast	*Lunch*	*Dinner*
Porridge	crackers	varied option
Cornflakes	rusks	meat/vegetarian
Eggs/beans/corned beef	cheese/tuna/sardines/ Peanut butter/jam	rice/pasta/ soup/stew

Successful meals that everyone enjoyed were:

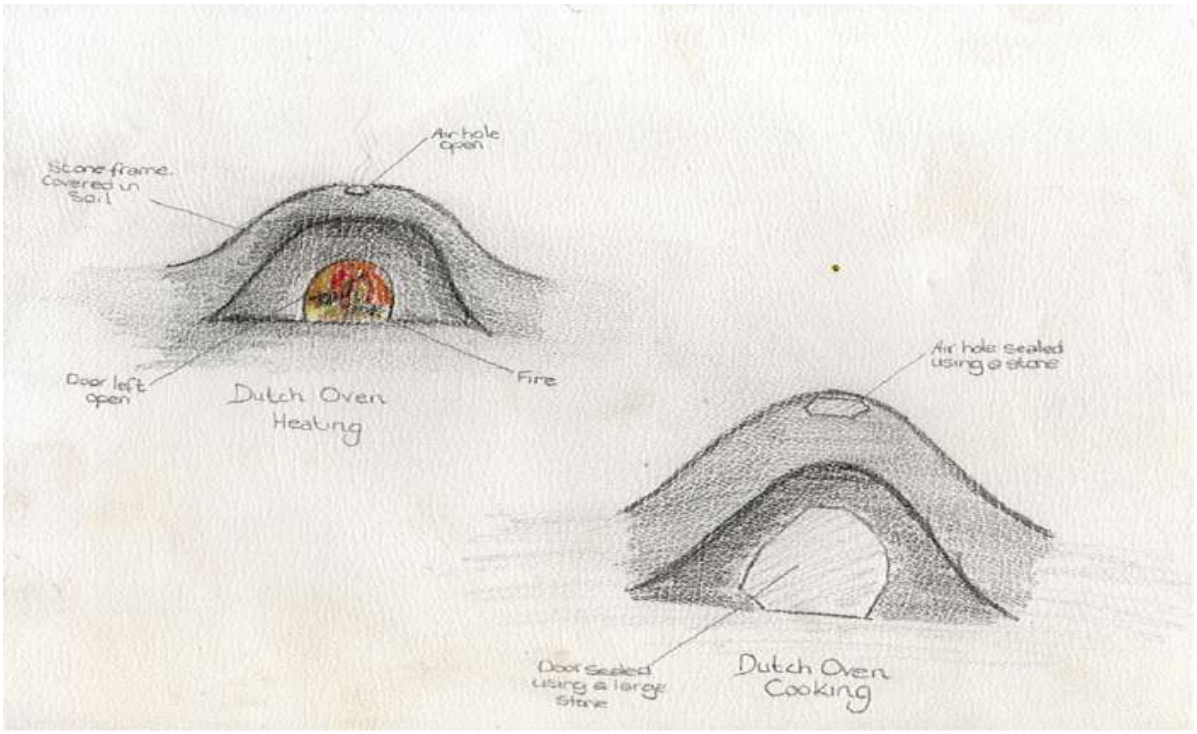
Corned beef hash	Potato patties
Vegetable curry	Pizza and chips
Spaghetti bolognaise	Pasta bake with cheese sauce
Chilli con carne	Tuna pasta bake
Gravy, smash and tinned meatballs	Stuffed peppers, rice and guacamole

Food cooking recommendations

- Make sure the fire is always kept going.
- If you're the first group back to Base Camp from being out in the field, keep the hot water boiling for when the other group return for drinks.
- When cooking around a fire, ensure that everyone helping has a job to prevent people from getting under others feet.
- Have a set menu from the beginning to prevent arguments and to ensure that all palates are satisfied.
- Make sure there is always a vegetarian option.
- Keep the cooking area as clean as possible.
- Wash up all cooking utensils straight after use.
- Make sure all food packets that are open, are well covered to prevent attracting unwanted animals or insects.
- All fresh food must be cooked thoroughly.
- When cooking, wear protective gloves at all times, since burns are the commonest injury.
- Anyone who is not involved in the cooking of food should stay away from the fire to prevent accidents.

THE DUTCH OVEN

Members of the group designed a very successful oven, which produced pizza, cakes, fruit loaf, rolls and bread. The oven was made against a rock face. Large flat stones were gathered from the river. The two big stones made walls. The biggest was placed on top to balance the sides and make the roof. Any gaps were filled in with soil and leaves. A hole was left at the back by the rock face to act as a chimney. The outside surface was then covered with wet mud. A fire was built inside. Once the fire was roaring it was left for some time to heat the rocks. When it was ready the door was opened and all the embers were scraped out. The food was placed inside and left to cook.



TRADITIONAL AFRICAN MEALS

The scouts were very generous and often let us try the food that they eat. The main food that is eaten at every mealtime is nsima. This is maize flour, which is boiled with water until it thickens. Nsima is normally eaten with a relish; this could be anything from boiled vegetables to *kapenta*, a dried fish. Although these foods were interesting to try, they generally didn't tickle the group's taste buds. The scouts occasionally would eat cassava for breakfast. This was boiled and can be best likened to sweet potato. This was definitely a favourite of the group and was sometimes preferred to porridge, when the groups were split and were in separate areas of the park. The cooking was shared on the fire between group members and the scouts. Rice, cooked the Malawi way, with salt added to taste, was enjoyed. With the smoked flavour coming from cooking on an open fire it was a very enjoyable breakfast.

During the evenings when the groups are sat around the fire, the scouts would usually roast nuts. The nuts were heated and then a small amount of water and salt was added. This was also a very tasty snack. The Malawi way of cooking mentioned earlier is a basic procedure of which every future group should be aware. Firstly the fire should be built up and left to burn. Food cooked out in the bush should always be cooked for a long time. This is to ensure it is cooked but also that all the germs are killed off. When boiling food, there should only be enough water added to cover the contents. Water should be continuously topped up when needed. This is because generally most foods are dried and they need along time to re-hydrate.

FINAL SHOPPING LIST

This list provided for 14 British members and three Malawian scientists over 28 days out in the field. Peter, Marianne and Michael and the six scouts brought their own rations.

Table 1 Food supplies

Item	Quantity	Item	Quantity
Oranges	2 sacks	Gravy powder	4 packets
Apples	5 bags	Crisps	1 bag
Pineapples	6	Marshmallows	3 bags
Paw paw	2	Biscuits	
Potatoes	3 sacks	Custard creams	2 packets
Onions	5 sacks	Oil	3 bottles
Peas	8 bags	Tomato sauce	2 bottles
Aubergine	3	Soya meat (plain)	10
Peppers	4 bags	Salt n' pepper	2
Avocados	19	Herb mix	1
Cucumbers	8	Soup packets	
Tomatoes	1 sack	Orange cordial	1litre
Cabbages	7	Coconut + apple cordial	4 bottles
Lettuce	5	Toilet rolls	2 x 24
Carrots	7	Mentholated spirit	1 bottle
Lentils	7 bags	Washing powder	2 boxes
Pasta	18 bags	Washing up liquid	4 bottles
Bread	3 loaves	Mosquito coils	1
Rusks	6 boxes	Matches	2 x10
Spaghetti	10-pack	Fire lighters	2 boxes
Macaroni	6 packs	Clingfilm	2 rolls
Crisp bread	4 boxes	Foil	2 rolls
Nsima	4 bags	Baked beans	36 tins
Fruit cocktail	48 tins	Rice	7 bags
Cornflakes	3 boxes	Meatballs	36 tins
Tomato puree	3 tins	Tuna	40 tins
Porridge oats	8 boxes	Sardines	20 tins
Powdered Milk	2 large tins	Corned beef	30tins
Chopped tomatoes	10 tins	Sugar	20 bags
Butter	4 packets	Custard powder	11 tubs
Cheese slices	2 packets	Cake flour	1 packet
Cheese	10 blocks	White bread flour	6 packets
Margarine	4 tubs	Baking powder	1 pot
Eggs	6 trays (x30)	Milk powder	4 tubs
Peanut butter	24 x 250g	Soya meat (tom and onion)	10 packets
Jam	8 tins		

Table 2 Other Items

Two polystyrene coldboxes
Matches, dettol, large plastic basins, plastic scoop
Pots, frying pans, baking trays, large kettle
Oven gloves
Cleaning materials, powders and liquids
Tough Camp Cooking utensils from UK
Chopping board
Metal mesh for the grill
Two machetes

REFERENCES

Lack, Tony and Gifford, Nigel 1992 *Equipment and catering for expeditions.* Expeditionary Advisory Centre of the Royal Geographical Society, 1 Kensington Gore, London SW7 2AR
Previous Biosearch Expeditions, listed earlier.

ECOLOGICAL IMPACT

Catherine Tabor and Peter Overton

As with any expedition, we aimed to leave the environment as close as possible to its original state. To leave absolutely no trace is very difficult, since pitching tents and living in them for some weeks will always leave its mark but we did do the best we could.

Since expedition teams had not visited the area before, any traces that we left would be even more prominent to subsequent visitors, possibly for several years. We therefore aimed to stick to established paths where possible. There is one path where locals are permitted to pass through the edge of the Park en route to Karonga. There are also many old paths and tracks used by animals and poachers. We also kept campsites to a confined area and restricted any cutting of wood to what was absolutely necessary. In practise, the whole team including the scouts had to make use of open fires to cook in this environment. Clearing sites for tents in order to create a reasonably level base on which to sleep and creating sufficient clear area around them, and especially around the fire, for reasons of safety could not be avoided. We were aware of the slow growth of the trees in the *Brachystegia* woodland and careful thought about strategic placement of tents around the trees did avoid unnecessary cutting. Such tussock vegetation as had to be removed, we judged would re-establish reasonably quickly. The mature trees are an important habitat for many species and any cutting was restricted to fallen branches or younger timber. Restriction of usage is the best way to protect the habitat. It is also hard work cutting wood and a small amount of wood will go a long way on a fire if it is used with care.

A path travelled once is unlikely to cause significant damage to the vegetation and the passage of a few human feet is not considered to be a problem. However, the same path travelled many times can create a near permanent impression on the landscape. Understanding of this assisted the teams to minimise their impact on the park whilst on expedition.

The most obvious visible signs of the presence of a team are physical waste, in particular food wrappings and containers. We buried all waste, having burnt tins and paper on the fire first to discourage animals from digging it up again after our departure. Burning tins increases the rate of decay once they are buried. It is also very important to burn all plastic rubbish, which has potential to persist in the environment for many years, if not centuries. The rubbish pits were dug some distance from the water to avoid unnecessary pollution. Swilling from washing up should not be put directly into the stream and particular care is needed to ensure that this aspect of environmental hygiene is always observed, even with the small temporary camps. A simple soakaway was quite easy to create by lightly digging the soil surface of an area about a metre square. All pits were filled in properly before departure of the team.

Protection of drinking water supplies is paramount. Contaminated water used to wash uncooked food prior to eating, is a source of many expedition health problems. Biodegradable soap was used for washing up and any pots containing cooking oil were washed near the rubbish pit, with surplus oil being buried. Personal hygiene, particularly the use of shampoos, was conducted in washing bowls and the waste poured into the soakaway, or at least into the bush and not directly into the river. These measures were used to protect our own health and that of other species, such as amphibians and insect life that use the river environment.

Latrines, large or small, depending on the anticipated usage, were dug at all sites. They were screened where practical by small branches or grasses and constructed with a good wooden support platform to make sure that all visitors could be welcomed back in camp. They were dug to at least a metre deep and filled in completely when no longer required. Latrines should always be well away from a stream and at least 25 metres from the campsite, notwithstanding the difficulty of night visits in some areas. It is also recommended that the path is well marked and tents should not be adjacent to this path. Guy ropes often fell night-time explorers, who may be in a hurry!

Whilst focusing on control of local but important ecological impacts by the team it is important not to carelessly destroy many years of tree growth through lack of attention to fire management. Although the fire risk in an occupied camp may be very small, it is still important to avoid pitching tents either within ten metres of the central fire or within three metres of each other. Clear firebreaks are recommended. Where a more significant risk of fire may arise is on leaving camp without adequately extinguishing the fire. A sudden gust of wind can fan a fire into action and spread sparks far and wide. On leaving a site, fires should not only be extinguished fully but also covered with soil so the imprint is no longer visible.

Finally, no camp should be disbanded without a thorough and complete litter pick. This should include the smallest scraps of tissue and foil. It is ironic that minor litter, which has little real impact on the ecosystem itself, can be most offensive to the visiting teams who have come to see a true wilderness.

REFERENCES

Workman, C., Gimingham, A. and Jermy, C. 1995 Environmental responsibility for expeditions British ecological Society and the Young Explorer's Trust 1995

Flap-necked Chamaeleon *Michael Overton*

BOTANY REPORT

Joanna Walker, Hassam Patel and Marianne Overton

INTRODUCTION

The Nyika National Park is situated in Northern Malawi and is home to a wide range of flora and fauna. Large areas of the park are still unexplored, and little scientific research has been conducted in the explored regions. Because of this the park is of great interest to scientists, as there are many undiscovered species of plant and animals to be found.

The Nyika NationalPark is host to a wide range of habitat types, from open savannah on the plateau, to strips of rainforest and areas of evergreen and deciduous woodland in the mountainous regions. This means there are many diverse plant communities within the park, and all possibly supports plant life which may be new to science.

Figure 1 *Prunus africana*

It is not just the undiscovered species of the Nyika which are of interest; the park is a reserve for many threatened species of flora and fauna. Forest and riverine areas of the park support *Prunus Africana* (figure 1), which after having been exploited for commercial purposes are now legally protected, and are classified as vulnerable.

The bark of the *Prunus africana* tree is used for medicinal purposes.

METHOD

The expedition area was 10km x 10km as defined in the map at the beginning of this report. Areas of one square kilometre were selected at random and five 100m x 100m plots similarly selected within this were sampled in the large mammal surveys. For the botanical surveys, nearby plots that were reasonably representative were sampled. Other areas were also selected for sampling so as to include as many vegetation types as possible. Each plot was 4m x 4m, approximately 50m apart in transect lines. This was well suited to assessing riverine or narrow bands of vegetation, but 6.25 plots are needed to sample 0.01ha, found previously to be a representative sample area in woodland. (The previous study used a 5.6m string to create the radius of the sample area, equating to 0.01ha, which was suitable for comparing rainforest patches (Herd et al. in Overton 2003).)

A tape measure or measured string was used to mark out each plot. Within the plot every tree was recorded using its Latin name. The circumference of each tree was measured at breast height or 1.3m. (This is proportional to the diameter at breast height of 1.3m or DBH). The exact height at which the circumference was taken varied if the trunk was uneven and not representative at 1.3m. If the tree had more than one stem at that height, then these were totalled.

The overall height of the tree was then estimated using simple methods, but it is recognised that this will be less accurate than a DBH measurement, particularly in forest. (Mitchell 1974). Tree height can be measured using a home-made hypsometer. A simpler method is to cut a length of stick measuring exactly the distance between the eyeball of the observer and the farthest stretch of his grasping finger and thumb. The stick is then held vertically by its middle at this distance. The tree is then aligned using one eye and moving away from the tree until the top and base of the tree are exactly in line with the top and bottom ends of the stick. The distance measured between the observer's feet and the base of the centre of the tree trunk is the same as the height of the tree. It is important to assess the highest point on the tree and not the apparent highest point which may be a branch spreading downwards towards the observer. Tree heights were then grouped into 10m intervals for simpler analysis. Seedlings and saplings with a diameter of less than 5cms at 1.3m were listed in the species list for each plot, but were not considered to be contributing to the canopy and are not measured.

Once the trees had all been recorded the ground flora was noted. All species present within the plot were recorded. The number of saplings was not recorded, but this would give an indication of the potential for regeneration after disturbance by poachers or elephants, for example. The number of species per plot in each habitat type is compared.

Seventeen transects were completed, made up of 51 plots, a total of 816m² being sampled. We attempted to sample five plots each day between Transect 1 on July 19th and Transect 17 on 3rd August 2004. Care was taken to sample each type of habitat, in lowland, hillslopes and upper ridge altitudes. Habitats include *Brachystegia* woodland, low and upper riverine, low and upper grassland, rainforest patches and *Protea* scrub. The highland grassy dambo habitat found on the plateau was not well repesented in our expedition area. Table 1 describes the transect locations.

Table 1 Location and quantity of sampling

Transect	Locations	Habitat	Altitude ft	No. of plots	Map ref.
1	Along stream above Mpero River.	low riverine	3500	6	8470
2	West of Mpanda and Kawozya Hills	woodland	4500	6	8470
3	Hillslopes SW of Base Camp	woodland	4000	4	8368
4	data absent				
5	SW hillslopes between Mpanda and Kawozya	*Protea* / *Brachystegia*	4500	3	8265
6	Ridge SE of Mpanda	woodland/forest	6000	3	8871
7	Hillslopes SW of Mpanda	*Combretum*/	5000	3	8770
8	Hillslopes SW of Mpanda	*Brachytegia*	5000	4	8669
9	Grassland NW of Kawozya	grassland/*Protea*	6000	2	8964
10	Woodland slopes SW of Mpanda	*Brachytegia*/	5000	4	
11	Hillslopes NW of Mpanda	*Upaca*/	5700	4	8672
12	Upper hillslopes of Kawozya, above Mbindika R.	high riverine	5600	4	9065
13	Grassland ridge near Kawozya & riverine	grassland, riverine	5500	5	9165
14	Ridge near Kawozya camp, Mbindika River	grassland/shrubs	5500	1	8866
15	Rainforest gulley close to Bleak House	riverine forest	5900	6	8869
16	Ridge close to Bleak House 887702	open scrub, riverine	6000	5	8870
17	Remero Riverine vegetation	riverine	4500	1	9366

RESULTS

Vegetation types

The transects often covered more than one vegetation type. A breakdown of the plots by approximate vegetation types was done and each is characterised in table 2. DBH is the diameter at breast height. The most "common" species listed are those that were recorded at least three times within one vegetation type. A star indicates a tree or shrub species that had a diameter of 5cm or more at 1.3m height above ground level.

Table 2 Vegetation Types

Vegetation type	Altitude	Transects T Quadrats Q	Mean tree height(m)	DBH (cm)	No. of species /plot	/habitat	Common Species (*tree/shrub canopy species)
Lowland incl. riverine	3500	T1 Q1-6	5	13	28	134	*Brachystegia spiciformis Bauhinia petersiana Becium grandiflora *Combretum fragrans *Commiphora mollis Dicrostachys cineria *Diplorynchus condylocarpon Emilia antenulifera *Pterocarpus angolensis Pennisetum unisetum Rourea orientalis Strichnos potatorum *Vangueria infausta Vernonia myriantha
Low riverine Remero	4500	T17 Q1	7	33	24	24	*Rauvolfia caffra
Low woodland	4500	T2 Q1-6	8.7	8	27	115	Bulbostylis zambesiaca *Catunuregan spinosa *Combretum fragrans *Commiphora mollis *Diplorynchus condylocarpon *Euphorbia matabelensis *Julbernardia globiflora Stereospermum kunthianthum *Ormocarpum kirkii *Pterocarpus angolensis Stereospermum kunthianum Xerophyta equisetoides
Combretum/ Brachystegia woodland	4000 -5000	T3 Q1-4 T11 Q1	4	9	29	114	*Brachystegia glaucescens *Brachytegia microphylla *Combretum fragrans *Combretum molle *Dalbergia nitidula *Diplorhyncus condylocarpon Psychotria peduncularis var nyassana *Rourea orientalis Vernonia colorata
Brachystegia/ Protea woodland	4500 -6000	T5 Q1-3 T6 Q1 and 3 T10 Q1 T12 Q1	4	10	27	139	*Aeschyoneme nyassana *Brachytegia boehmii *Brachystegia longifolia *Brachystegia manga *Brachystegia spiciformis Bulbostylis zambesiaca Cyperus semitrifodus Droogmansia pteropus Elephantopus scaber Helichrysum kirkii Hemarthria altissima Monotes africanus Pavetta schumanniana Psychotricia heracleoides *Protea angolensis *Protea petiolaris Psychotria kirkii Spermacoce dibrachiata Themeda triandra

Table 2 Vegetation Types (continued)

Vegetation type	Altitude	Transects T Quadrats Q	Mean tree height(m)	DBH (cm)/plot	No. of species /habitat	Common Species (* tree/shrub canopy species)
Brachystegia/ no *Protea*	5000 5700	T8 Q3 T11 Q2	4.1 5.3	7 18	21 40	**Brachystegia allenii* **Brachytegia boehmii* **Julbernardia globifolia*
Uapaca dry woodland	5000 -5700	T10 Q2-4 T11 Q3,4	4.4	12	26	104 *Becium grandiflorum* **Brachytegia boehmii* *Cassytha filiformis* *Clematis scabiosifolia* *Droogmansia pteropus* **Faurea saligna* *Hemarthria altissima* *Indigofera longibarbata* **Julbernardia globiflora* **Kotscya sp.* *Monotes africanus* **Parinari curatifolia* *Psorospermum febrifugum* *Schistostephium artemisiifolium* *Temnocalyx obovatus* **Uapaca kirkiana*
Protea scrub	5600 -6000	T12 Q2 T9 Q1	2	5	27	52 **Protea angolensis*
Plateau Grassland	5500 -6000	T13 Q1, T14 Q1 T9 Q2	3.5	12	30	89 **Dombeya rotundifolia* **Polysphaeria dischistocalyx* **Polyshaeria lanceolata*
Upper Riverine	5500 5600 5900 6000	T13 Q2-5 T12 Q3,4 T15 Q6 T16 Q3,5	6.1	14	20	115 **Albizia gummifera* **Apodytes dimidiata* *Asparagus africanus* **Bersama abyssinica* *Bridelia micrantha* *Bridelia mollis* *Clausena ansata* *Desmodium repandum* **Ficus sur* **Cussonia spicata* *Flacourtia indica* *Garcinia huillensis* *Landolphia parvifolia* **Parinari excelsa* *Phaulopsis imbricata* **Phoenix reclinata* **Prunus africana* **Schrebera tricoclada* *Setaria plicatilis* *Syzygium cordatum* *Syzygium gerardii* **Vangueria infausta* **Teclea nobilis* **Vepris stolzii* *Vernonia myriantha*
Evergreen Forest	5900 6000	T15 Q1-5 T6 Q2, T16 Q4	6.3	17	21	94 **Apodytes dimidiata* **Bersama abyssinica* *Desmodium repandum* *Dietes irridioides* **Erythroxylon emarginatum* **Ficus sur*

Table 2 Vegetation Types (continued)

Vegetation type	Altitude	Transects T Quadrats Q	Mean tree height(m)	DBH (cm)	No. of species /plot	/habitat	Common Species (* tree/shrub canopy species)
Evergreen Forest continued							*Garcinia huillensis* *Landolphia parvifolia* **Macaranga capensis* *Poecilostachys oplismenoides* **Prunus africana* **Rhus anchietae* **Teclea nobilis* *Syzygium gerardii* **Vepris stolzii*
Highland grassland/ small scrub	5000 6000	T7 Q1, T8 Q1,2,4 T16 Q1,2	4.2	11	19	92	*Anona senagalensis* *Bauhinia petersiana* **Bridelia cathartica* *Clausena anisata* **Combretum molle* *Crossopteryx febrifuga* **Diplorhynchus condylocarpon* **Erythroxylon emarginatum* *Longicarpus capassa* *Pilostigma thoningii* **Pterocarpus tinctorius* **Rhus anchietae* **Rouria orientalis* **Teclia nobilis* *Terminalia stenostachya*
Acacia/ woodland	5000	T7 Q2-3	5.5	16	20	30	*Acacia polycantha* **Combretum collinum* **Markhamia zanzibarica*

Altitude

Lowland vegetation near the North Rukuru River at about 3500ft was mixed woodland and open grasslands cleared by human interference, grazing and floods. The vegetation is in contrast to that of the Remero River on the other side of the ridge, which is dominated by very large specimens of *Rauvolfia caffra*. The two sets of data had only two species in common, although their altitudes were not very different. These trees may have been preserved by their inaccessibility to logging. Low woodland at around 4500ft was not dominated by *Brachystegia* species, but large *Pterocarpus angolensis* trees were a distinguishing feature. Woodlands dominated by *Combretum* or *Brachystegia* are found at a range of altitudes, from 4000' to 6000'. In very thin soils on sunny slopes at about 5000-5700ft, *Uapaca* became dominant. Acacia appeared in some woodlands at this altitude. *Protea petiolaris, P. angolensis and P. welwitschii* were found in plots with *Brachystegia* from 4500' to 6000' At high altitudes on the ridge there was a mosaic of vegetation types. The two mountain peaks were rocky, but with grasses, herbs and small shrubs. Immediately below the peak of Mpanda was the *Protea* scrub belt. Below this, along the ridge between the two peaks, at or just below 6000ft, was a mosaic of *Brachystegia* woodland, evergreen forest patches and open grassland.

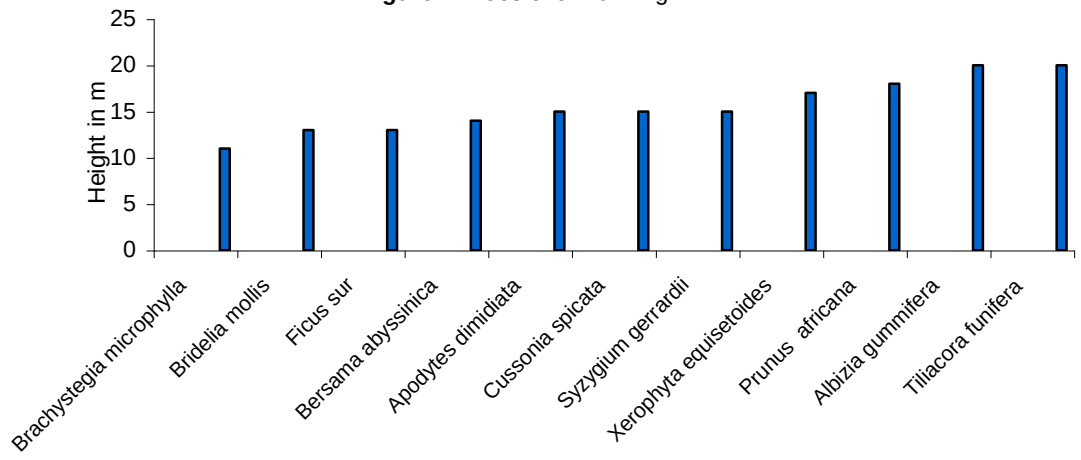
Common species

The species listed as "common" are those that appear in the quadrats three or more times for that habitat. It is naturally a longer list in habitats that were studied more, where the results will also be most representative. Evergreen forest and upper riverine forest have the most similarities, sharing eight common species. Rainforest patches often surrounded a highland water source, so that the two habitats blend indistinguishably. All other habitats shared very few species. Only *Brachystegia boehmii, Combretum fragrans* and *Diplorhynchus condylocarpon* appeared in more than two vegetation types. Two plots were very difficult to place into habitat type. T8 Q3 at 5000ft has *Brachystegia*, but no *Combretum*, nor *Protea*, and although tree heights were similar to grassland scrub, the number of trees was much higher. T11 Q2 at 5700' had much bigger trees and a higher diversity than the adjacent *Uapaca* dry woodland.

Diversity
The highest number of species (139) was recorded in the *Brachystegia/Protea* habitat occurring in a wide range of altitudes, 4500'-6000', but many habitats were shown to support over a hundred plant species. Some vegetation types appeared to have a lower overall species count but this is likley to be simply insufficient sampling, as the number of species per plot is still high. The range per 16m² plot was 20-30 species with the exception of T11 Q2, mentioned above, which had 40 species.

Tree Heights
The average tree height was greatest (9m) in the low woodland 4500'-6000'. Exceptional trees were along the Remero River, averaging 7m high and 33cm diameter. The riverine and evergreen forests reached considerable heights and averaged over 6m. Most lowland *Brachystegia* (3500ft), *Combretum, Protea* and *Uapaca* woodland averaged 4-5m high. The *Protea* scrub was the shortest, at 2m average height. Even the grass was often a metre high, reaching over 2m in damp areas on the ridge. The mean height and the woody basal area has been shown to increase with rainfall. Also the impact of fire is greatest in the mid range of rainfall, where grass grows well and therefore burns most strongly (Scholes et al. 2002). This is not so where there is a ground water source or wetland area such as the riverine and forest areas. Figure 2 illustrates the maximum heights of the tallest trees, over 10m.

Figure 2 Trees over 10m high



Diameter at Breast height
The measured circumference of trees is likely to be more accurate than estimates of tree heights and is thus a better indicator of the maturity of the woodland areas. The average height for measurement was 117cms $\pm$ 26cms. The circumference of trees throughout the whole expedition area is shown in Figure 3. The first size class of 0-10cms is low because saplings of less than 4cms at 1.3m were not measured as contributing to the canopy, though they were listed as members of the understorey or ground flora. A normal distribution is seen, characteristic of a large sample. The exceptionally broad tree was *Albizia gummifera* with a circumference of 3.28m, found in the riverine forest along the Remero River in transect 17 quadrat 1. Also in that quadrat was *Rauvolfia caffra,* with a circumfrence of nearly 2m.

The diameter at breast height (DBH) is calculated as circumference divided by pi (3.142). For each vegetation type, the number of trees and shrubs in each diameter class were counted and calculated as a percentage of the total number of trees and shrubs recorded in that vegetation. These are shown in Figure 4.

The pattern of tree diameters for transect 11 quadrat 2 was similar to the adjacent *Uapaca* woodland and contained *Uapaca* seedlings, so these results were combined in the above graph. Transect 8, quadrat 3 was omitted, as it was unclear into which vegetation group it best fits.

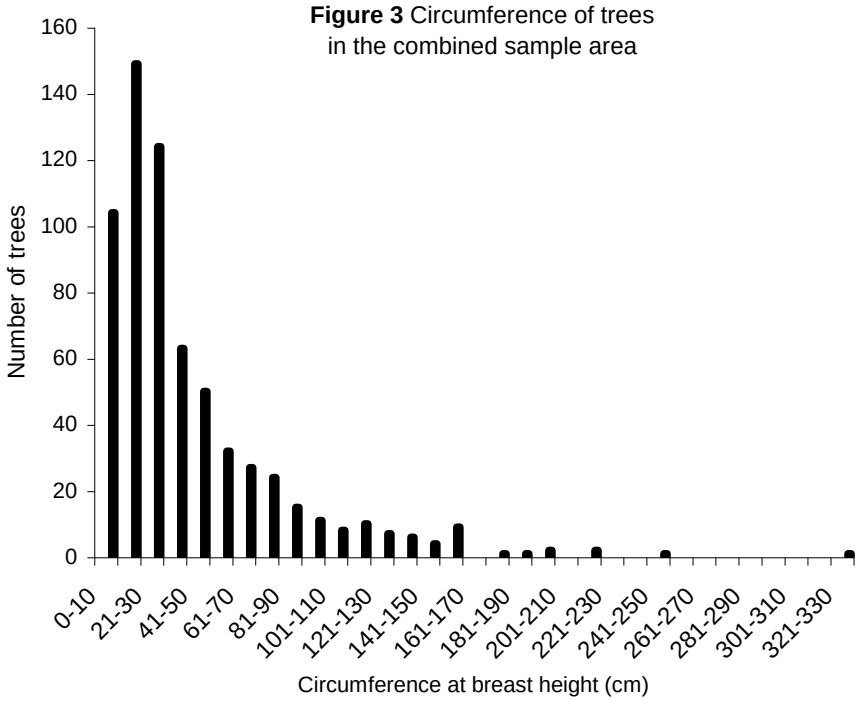
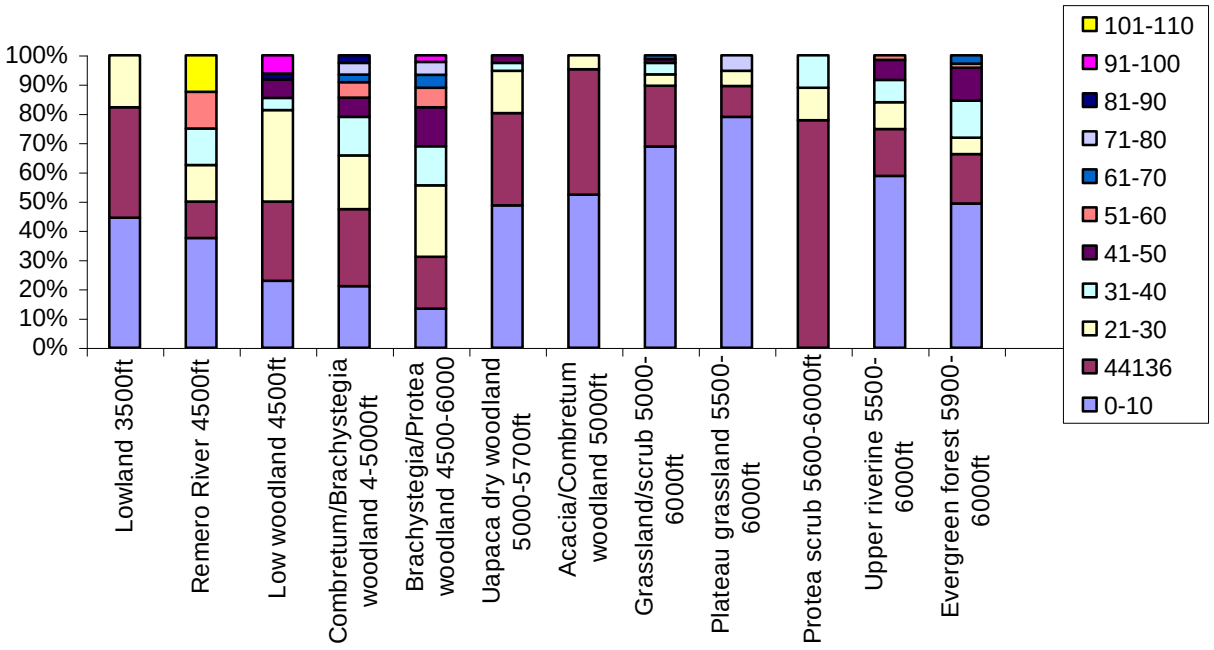


Figure 3 Circumference of trees in the combined sample area

Figure 4 Diameter of trees and shrubs in each vegetation type



The lowland survey plots had no trees of large diameter. There were a few large specimen trees adjacent to the North Rukuru River including the magnificent tree at Uledi Camp but these were exceptional and not included in the survey area. The lack of large, mature trees is likely to be the result of tree cutting in the past. However, regeneration of smaller trees, up to a maximum of 30cm in diameter, was good.

This contrasts with the low woodland further from the river, which was more stable and mature, showing a good range of tree diameters, up to 100cms. Undergrowth is inhibited the most in mature *Brachystegia* woodlands, when mixed with *Combretum* and especially when mixed with *Protea*, where the canopy was at its most dense. At higher altitudes, the *Protea* mixed woodland gives way to *Protea* scrub.

Protea scrub was exceptional in that it had no small trees of less than 10cm diameter and just a few large specimen trees. This could be the effect of fire, which is withstood by *Protea* and by large, isolated trees. There is thus little sign of succession into woodland suggesting a relatively stable vegetation. Grassland scrub and grassland also supported a few isolated very large trees, possibly remnants of previous copses and woodlands.

Woodland not dominated by *Brachystegia* was dominated by either *Uapaca* or *Combretum.* Woodland dominated by *Uapaca* often bordered *Brachystegia* in areas where felling had occurred by natural or human intervention. This woodland seemed more common on dry, sunny slopes, with few large mature trees. *Combretum* woodland with *Acacia* had no large trees with a diameter over 30cms.

Evergreen forests and upland riverine vegetation both demonstrated a high proportion of large, mature trees with some regeneration and smaller shrubs, particularly at the forest edges. There was a good number of trees in all size classes up to 70 and 60cms diameter respectively. The riverine vegetation along the Remero River was exceptional in that good numbers of trees in all size classes were found up to 60cms diameter, and then one outstandingly large group of *Rauvolfia caffra* and one *Albizia gummifera*, in the 101-110cms diameter range.

Descriptions of some vegetation types
Table 3 includes all species recorded as present in the quadrats, including the understorey or sapling species and ground flora. Tree and shrub measurements are included, so that the record is complete.

Lowland Vegetation 3500'-4000'
Transect 1 was at an altitude of about 3,500' to 4000' above sea level and dominated by very steep slopes that lead down to the stream. Lowland areas showed signs of substantial wet season floods, but the area is very dry in July. The most dominant species found within Transect 1 was *Pterocarpus angolensis (figures 5,6), Bauhinia petersiana (figure 7), Combretum fragrans, Commiphora mollis and Vangueria infausta.* These occurred in at least a third of the plots. Trees averaged 5m, but few exceeded 6m; *Pterocarpus angolensis, Pterocarpus tinctorius, Brachystegia glaucescens, Brachystegia spiciformis, Combretum fragrans, Commiphora mollis, Diplorhynchus condylocarpon* and *Terminalia stenostachya. Pterocarpus angolensis* is not uncommon in Malawi, but is a new record for the Park, this being the first botanical expedition to this remote, lowland at the northern extreme of the Park.

Figure 5 and 6 *Pterocarpus angolensis* tree and distinctive seedpod

Under these conditions we observed that the tree species normally remain relatively short. We expected to find that naturally short tree species would be more successful here and this was the

Figure 7 *Bauhinia* flower at the Lakeshore

case with beautiful *Bauhinia petersiana* or Orchid tree, also known as Camel's foot and Wild coffee bean. *Bauhinia petersiana* had an average height of 3.5m, which was not unusual for this site, as only a few species exceeded 6m.

Close to the Uledi camp was a stinging plant, *Mucuna coriacea*, shown in figure 5, which made the path to the river slightly more hazardous!

There was a high diversity with 134 species recorded within the six plots. The number of species per 4 x 4m plot ranged between 19 and 31.

Figure 8 *Mucuna coriacea*

Lowland woodland 4000'-5000'

Transect 2 plots 1-6

Transect 2 was variable, characterised by *Combretum* woodland, with *Commiphora mollis* being the most recorded species. This was only found in transect 1, 2 and 14. This species was previously found in 1998 and in 1999 (Overton 2000). Other trees common in this habitat are *Combretum fragrans*, *Julbernardia globifera, Diplorrhynchus condylocarpon, Catuneregam spinosa, Euphorbia matabelensis* and herbs *Stereospermum kunthianum, Xerophytum equisetoides and Bulbostylis zambesiaca. Brachystegia* was found in only one plot in transect 2 but was found in all but one plot of transect 3. Average canopy height was 8.7m and diversity was relatively high with 115 species. This high diversity of tree and scrub species suggests that transect 2 is a not an extreme environment.

Combretum/Brachystegia woodland 4000'-5000'

Transect 3 is characterised by a mix of *Combretum* and *Brachystegia* woodland. Transect 11, quadrat 1 had similar characteristics although higher in altitude. There was a higher diversity of species in T11 Q1, with 36 species, than in transect 3. However, there was no one dominant species, with almost equal numbers of *Combretum molle, Brachystegia microphylla, Dalbergia nitidula, Diplorhynchus condylocarpon* and *Combretum fragrans.* Average canopy height was low at 4m, though the trunks were of similar thickness to the taller trees on the lowland woodland (DBH 9cm).

Pterocarpus tinctorius shown in figures 9 and 10 is a new record for the Nyika, found in woodland transects 1, 2, 3 and 7.

Figure 9 and 10 *Pterocarpus tinctorius*, a new record

Figure 11 Upper boundary of *Brachystegia/Protea* woodland

Brachystegia/Protea woodland 4500'-6000'

There was a lower diversity at two plots in Transect 5, with 19 species, but in T12 Q1 a high diversity of 37 species. Overall the site was dominated by four species of *Brachystegia*, two species of *Protea* and *Aeschyoneme nyassana*. The height of the trees averaged 4m and did not exceed 5m. This site was situated on quite steeply sloping ground with little soil and the tree/scrub species may be stunted when compared to lower region species.

Brachystegia without Protea 5000'-5700"

At 5000ft in plot T8 Q3, the diversity, diameter and tree heights were low, in contrast to T11 Q2 at 5700ft, where the same species dominated, but tree height was 5.3m, diameter more than double at 18cm and the number of species per plot almost doubled to 40. Dominant species were *Brachystegia allenii, B. boehmii* and *Julbernardia globifolia.* Local topographical features can be very important factors.

Uapaca Woodland

Some areas of woodland were dominated by *Uapaca kirkiana.* The tree is considered to be a woodland species of wild loquat found "always on poor, shallow soils, in secondary Miombo woodland such as clearings and gaps, open woodland, and amongst rocks at medium altitudes 800-1900m (2600'-6175'), with good rainfall of between 500 and 1270mm" (www.fao.org). Some plots of T10 and T11 were dominated by this species, especially where flooding had washed away the soil and trees had been felled by elephants or humans in the past. Other common tree/shrub species were *Faurea saligna* or African Beechwood, also in the *Protea* family, *Parinari curatifolia, Brachystegia boehmii and Julbernardia globiflora.* A good diversity was seen, with 104 species of low average height (4.4m) and medium trunk diameter averaging 12cm.

Figure 12 Nyika endemic on poor soil of *Uapaca* woodland

Figure 13 Erosion in *Brachystegia* woodland

Protea Scrub

A remarkable habitat at 5600'-6000', with views overlooking the woodlands in the valleys below. The habitat is dominated primarily by *Protea angolensis,* also named the Northernwoodland Sugarbush, accompanied by an astounding array of herbs and grasses. A total of 52 species was found in only two plots in this dry season. Many small herb species would only be evident in the wet season.

Figure 14 *Protea petiolaris* or Sickleleaf Sugarbush

Highland Grassland

This habitat was found above the tree line on Mpanda and Kawozya and in clearings along the ridge between the peaks. A lower number of species was recorded for the grasslands in this dry season (92), a low tree/shrub height and low trunk diameter, although some large isolated trees were seen, particularly in damp hollows. Previous work in this open habitat in April 1997 and 2003 has revealed a large number of ephemeral, wet season plants (Overton 1998, 2004).

Figure 15 *Albuca altissima* in grassland on the ridge

Evergreen Forest

The area in which Transect 6 was conducted was a complete contrast to the previously examined sites. Transect 6 was carried out in a thin strand of evergreen forest, which was situated next to a spring. In this area a vast number of *Syzygium gerrardii* were found, which were not found at previous sites. This is a new record for Biosearch. It was also found within transects 12, 15 and 16, which were also within evergreen forest. These species, due to the constant presence of water in the area, are able to survive and out-compete the other species that dominate other areas of the park.

Figure 16 above Flowers of *Sysygium gerrardii*

Figure 17 left Three vegetation types on the ridge, Evergreen forest, Grassland and *Brachystegia* woodland.

Due to a supply of water and the lack of fire within the sites, the evergreen forest is productive all year round, which results in continued growth. This accounts for the tallest species of tree being found in these transects. Transect 6 recorded a *Prunus africana* reaching 12m, whereas in other areas of the park the greatest height recorded for other tree species was often only 5m. The average height of evergreen forest was over 6m with almost a hundred species present, dominated by large trees such as *Apodytes dimidiata, Bersama abyssinica, Erthroxylon emaginatum, Macaranga capensis and Teclea nobilis.*

Riverine Forest

Riverine forest has the large mature trees of the Evergreen forest patches, but more smaller trees giving a lower average trunk diameter and more species, encouraged by the edge effect. The riverine forest along the River Remero was unique in that it had substantial numbers of trees in all size classes up to a diameter 60cm and a number of trees *Albizia gummifera* and *Rauvolfia caffra* in a separate size class altogether at up to 110cm diameter.

FUTURE WORK

With the exception of the lowest areas, which are affected by humans and flooding, the height of the trees diminished with altitude or steepness of slope, except where water was captured and evergreen or riverine forests developed. In these habitats, very tall trees are found at high altitude and provide shelter for a unique array of flora and fauna. In future expeditions, it may be interesting to look at a few tree species, such as *Brachystegia*, and compare altitude and the degree of slope to tree height and girth. The effect of the burning could also be studied as there is no programme of early burning by the Parks authority and no poacher fires. Thus an interesting comparison can be made between this high ridge between the mountain peaks of Mpanda and Kawozya and the similar habitat of the Plateau itself.

The Nyika Park has many differing plant ecosystems, which may be determined by the geography of the land, however underlying factors, such as soil pH may also be affecting the plants distribution. This may also be an area of interest for investigation, following previous work by the Wye College 1972 expedition.

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www.protea.worldonline.co.za describes the Protea Atas Project for Southern Africa and includes keys for identification.

PLANT COLLECTIONS

Hassam Patel

COLLECTION

Specimens were collected if the plants were not well represented in the National Herbarium or were not previously recorded from the Nyika area and might therefore show type variations. Also any plants that needed confirmation of their identity by comparison with the reference collections were also collected. Methods of collection and preservation were the same as in previous expeditions. Representative parts of the plant were collected and pressed within hours. They were dried by changing the blotting paper daily, so that drying was as fast as possible.

28 species were collected between 12 July and 6 August 2004 in the northern Nyika hills. (See map at the front of this report.) The list of species collected on this expedition is shown in table 1. Species collected the previous year and identified at Kew in April are shown in table 2.

Table 1 List of specimens collected for the National Herbarium at Zomba

Collection No.	Name	Notes
7066	*Solenostemon schirensis* (Gürke) Codd.	
7067	*Pterocarpus tinctorius* Welw.	New to Nyika National Park
7068	*Agave* sp.	New to Nyika National Park
7069	*Pterocarpus tinctorius* Welw.	New to Nyika National Park
7070	*Ficus glumosa* Delile	New to Nyika National Park
7071	*Kalanchoe sp.*	New to Biosearch Nyika
7072	*Holostylon baumii* (Gürke) G.Taylor	New to Biosearch Nyika
7073	*Austrosynotis rectirama* (Baker) Jeffrey	New to Biosearch Nyika
7074	*Syzygium gerrardii* (Harv.) Hochst.	New to Biosearch Nyika
7075	*Pycnostachys sp.*	
7076	*Triumfetta pilosa var. nyassana*	
7077	*Plectranthus malawiensis* Mathew	New to Biosearch Nyika
7078	*Osteospermum nyikense* T. Norlandh.	New to Biosearch Nyika
7079	*Aeschynomene sp.*	New to Biosearch Nyika
7080	*Buchnera speciosa* Skan	
7081	*Commifora sp.*	New to Biosearch Nyika
7082	*Isoglossa grandiflora* C.B.Cl.	New to Biosearch Nyika
7083	*Macaranga mellifera* Prain	New to Biosearch Nyika
7084	*Dicliptera lingulata* C.B.Cl.	
7085	*Tragia bethamii* Baker	New to Biosearch Nyika
7086	*Clerodendrum capitatum* (Willd.) Schum & Thonn.	New to Biosearch Nyika
7087	*Vernonia adoensis* Schultz	
7088	*Keetia foetida* (Hiern) Bridson	New to Biosearch Nyika
7089	*Plectranthus stenosiphon* Baker	
7090	*Hippocratea goetzei* Loes	New to Biosearch Nyika
7091	*Dicliptera lingulata* C.B.Cl	
7092	*Rumex usambarensis* (Engl.ex Dammer)	New to Biosearch Nyika
7093	*Guizotia scabra* (Vis.) Chiov	

Hippocratea goetzii by *Joanne Walker*

SOME NEW BIOSEARCH RECORDS COLLECTED IN 2004
Photographs by Quincy Connell

Figure 7 *Plectranthus malawiensis* (7077) with *Cineraria sp.*

Figure 8 *Aeschynomene sp.*(7079)

Figure 9 *Tecomaria capensis (*1997,'99)

Figure 10 *Isoglossa grandiflora* (7082 in Transect 11 Q3)

Figure 10 *Pychnostachys sp.* (7075)

Figure 11 *Keetia foetida* (7088)

Figure 11 *Xerophytum splendens* (1998)

Figure 12 *Kalanchoe sp* (7071)

Figure 13 *Osteospermum nyikense* (7078)

Figure14 *Dissotis princeps* (not new)

Figure 15 *Dicliptera lingulata* (7084)

Figure 16 *Austrosynotis rectirama* (7073)

Table 2 Species collected in 2003 and identified at Kew Herbarium in April 2004

Collection No.	Name
6152	*Justicia linea rispica* C.B.Cl.
6980	*Dodonaea viscosa*
6801	*Achyrospermum cryptonthum* Baker
6359	*Stachys pseudonigricans* Gürke
6360	*Leucas tettensis* Valke
6922	*Plectranthus kapatensis* R.E. Fries
6326	*Helichrysum patulifolium* Baker
6195	*Ageratinastrum polyphylum* (Baker) Mattf.
6997	*Helichrysum forskalii* (J.F.Gmel.) Hilliard & Burtt
6154	*Conyza welwitschii* (S.Moore) Wild.
6938	*Helichrysum forskalii*
6925	*Bidens acuticaulis* Sharff.
6337	*Bidens acuticaulis*
6923	*Bidens acuticaulis*
6312	*Gerbera ambiqua* (Cass.) Sch.Bip.
6366	*Hirpicium gracile* (O.Hoffm.) Ross Lero
6323	*Adianthum reniforme* L.
6304	*Viola abyssinica*
6319	*Adenostemma caffrum* DC. Var. asperusa
6811	*Plectranthus paniculatus* Baker
6941	*Prunus africana*
6919	*Linum holstii* Engl. ex Witczck
6916	*Crataegus cuneata* Siebold & Zuce (Introduced at Chelinda office)
6993	*Amphicarpa africana* (Hook.f.) Harms
6984	*Rhyncosia nyikensis* Baker.
6317	*Lotononis stolzii* Harms.
6959	*Kotschya aeschynomene* Welw.ex Bak.
6930	*Crotalaria orthoclada* Welw.ex Bak
6797	*Indigofera atriceps* Hook.f.subsp. atriceps
6924	*Indigofera mimosoides* Baker

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ENTOMOLOGY

R.J.Murphy F.R.E.S

LIST OF IDENTIFIED INSECTS FOUND IN NYIKA NATIONAL PARK AS AT 12TH OCTOBER 2004

The arrangement of main families are in systematic order but sub families, genera and species are in alphabetical order for ease of reference.

Odonata (Dragonflies)

Zygoptera (Damsel flies)

Agriidae

PHAON IRIDIPENNIS *(BURMEISTER 1839)*

Chlorocyphidae
Chlorocypha consueta (Karsch 1899)
Platycypha caligata caligata (Selys 1853)

Chlorolestidae
Chlorolestes conspicua Selys

Lestidae
Lestes pallidus Rambur 1842

Protoneuridae
Chlorocnemis marshalli marshalli Ris 1921

Anisoptera (Open winged dragonflies)

Aeshnidae
Aeshna ellioti usambarica Forster 1906
Anax separatus Hagen 1867
Hemianax ephipigger (Burmeister 1839)
Orthetrum caffrum caffrum (Burmeister 1839)
Orthetrum Julia falsum Longfield 1955
Trimethis annulata (Beauvois 1805)
Trimethis arteriorosa (Burmeister 1839)
Trimethis werneri Ris 1912

Gomphidae
Notogomphus zernyi (St Quentin 1942)
Paragomphus cognatus (Rambur 1842)

Libellulidae
Atoconeura biordinata Karsch 1899
Crocothemis sanquinolenta (Burmeister 1839)
Palpopleura jacunda Rambur [1842]
Palpoleura lucia (Drury 1773)
Pantala flavescens Fabricius 1798
Porpax risi Pinhey 1958
Tramea basilaris Palisot de Beauvios 1817

Blattodea (Cockroaches)

All specimens awaiting determination

Isoptera (Termites)

Separate report by Dr Sarah Donovan

Mantodea (Praying Mantises)

Mantidae
Metentella mervensis Sj

Dermaptera (Earwigs)

All specimens awaiting determination

Orthoptera (Grasshoppers)

Encifera *(Crickets)*

Tettigoniidae
Ruspolia vicinus Walker
Zabalius orientalis Karsch

Caelifera *(Grasshoppers)*

Acrididae
Acorypha laticosta (Karsch 1896)
Acrida acuminata Stal 1873
Acrophymus sqamipennis (Brancsik 1897)
Catantops axillaries (Thunberg 1815)
Coryphosima stenoptera (Schaum 1853)
Cyrtacanthacris septemfasciata (Serville 1838)
Gastromargus africanus (Saussure 1888)
Gymnobothrus linea-alba I Bolivar 1889
Heteropternis couloniana (Saussure 1884)
Orthochtha dasycnemis (Gerstaecker 1869)
Tmetonota abrupta (Walker 1870)

Lentulidae
Usambillia olivacea Sjostedt 1909

Pamphagidae
Lobosceliana gilgilensis I Bolivar 1915

Pyrgomorphidae
Maura bolivari Kirby 1902
Phymateus viridipes Stal 1873
Phyteumas purpurascens (Karsch 1869)

Separate report by Karim Vahed on a further 60? species.

Phasmatodea (Stick insects)

All specimens awaiting determination

HEMIPTERA

Heteroptera (Stink bugs / Assassin bugs)

Belastomatidae
Lethocerus niloticus Stal

Coreidae
Anoplocnemis curvipes Fabricius
Anoplocnemis dallasiana L & S
Anoplocnemis montandorii Distant

MIRPERUS TONGORMA
Petascelis remipes Signoret

Lygaeidae
Lygaeus lemniscatus Stal
Spilostethus rivularis Germar

Pentatomidae
Agonoscelis pubescens Thunberg
Antestiopsis cincticollis Schaum
Atelocera attenuata Distant
Atelocera foveata Dallas
Dalsira atricostata Distant
Dismegistus royeri Jeanneli
Dysdercus fasciata Signoret
Encosternum delegorguei Scopoli
Natalicola delegorguei Spin
Nazara viridula Fabricius

Reduviidae
Coranopsis vittata Horvath
Ectomocoris cruciger Fabricius
Etrichodia crux (Thunberg)
Rhinocoris albopunctatus Stal
Rhinocoris erythrocnemis Germar
Rhinocoris neavei Bergoth 1912
Vitumnus scenicus Stal

Rhopalidae
Serinetha amicta Germar

Scutelleridae
Callidea drgii Germar
Deroplax silphoides Thunberg

Homoptera (Plant bugs)

Cicadidae
Ioba leopardina Distant
Koma bombifrons Karsch
Monomatapa insignis Distant
Orapa nyassana
Ugada nutti Distant

Circopidae
Ptyelus flavescens Fabricius
Ptyelus grossus Fabricius
Locris jugalis Jacobi

Coccidae
Gascardia brevicauda (Hall)
Saissetia oleae (Bernard)

Fulgoridae
Benamatapa marshalli Distant
Zanna clavaticeps (Karsch 1890)
Zanna pustulosa Gerstaecker
Zanna Tenebrosa Fabricius

Neuroptera (Ant Lions)

Mantispidae
Mantispa tenella Erichson

Myrmeliontidae
Banyutus idoneus (Banks)
Banyutus lethalis Walker
Hagenomyia lethifer (Walker)
Palpares sparsus McLachlan 1867

Psychopsidae
Silveria marshalli Mel

Coleoptera (Beetles)

Adephaga (Predatory Beetles)

Carabidae
Callistomimus rufiventris Brett
Cypholoba graphipteroides Guerin
Cypholoba tenuicollis Horni
Eccoptoptera cupricollis Chandois
Galeritiola inversa Basileusky
Psecadius obertheuri Gestro
Scarites senegalensis Dejean
Sterestoma stuhlmanni Kolbe

Cicindelidae
Cylindera marshallisculpta (W Horn 1913)
Dromica gracillis W Horn 1909
Dromica mauchi marshalli Peringuey 1894
Rhopaloteres grandis interruptoabbreviatus (W Horn 1921)

Dytiscidae
Hydaticus flavolineatus Boheman

Polyphaga (Leaf eating & other Beetles)

Buprestidae
Hoplistura disjuncta Fabricius
Psiloptera albomarginata Herbst
Psiloptera coleopteroides Sol
Sterapsis amplipennis Fahreus

Sternocera orissa variabilis Kerremans 1886

Cantharidae
Lycus murrayi Bourgoin

Cerambycidae
Callichroma leucorhaphis Gerst 1855

CEROPLESIS HAUSERI

Ceroplesis thunbergi Fahreus
Mimophrissoma livingstonei Sudre & Teocchi 2002
Oligomerus limbalis Harold
Prosopocera schultzei Kratz
Tragocephala ducalis White
Tragocephala frenata Gerst

Chrysomelidae
Asbecesta duviviari Jacobi
Bradlema neavei Heinze
Cassida suspiciosa Weise
Chrysomela saegeri Burgeon 1941
Corynodes dejeani Bertoloni
Gastrida abdominalis Chap
Hypercantha deverani Weise
Idacantha conifera Fairmaire
Phaedoria areata Fabricius

Cleridae

DIEROPLESIS 4 MACULATUS

Coccinelidae
Cheilomenes aurora (Gerstacker 1871)
Cheilomenes lunata (Fabricius 1775)
Chnootriba similis (Thunberg 1781)
Declivitata olivieri (Gerstacker 1862)
Epilachna ardiosiaca (Sicard 1912)
Epilachna dregei Mulsant 1850
Henosepilachna bifasciata (Fabricius 1781)
Henosepilachna quadrioculata (Kolbe 1897)
Lioadalia intermedia Crotch 1874

Curculionidae

LIXUS AREICATUS

Histeridae
Hister jeanelli Desbordes
Hister mechowi Schmidt
Kissister congoensis Burgeon
Tribalus floridus Vienna

Staphylinidae
Staphylinus subaenus Roth

Hispidae
Dactylispa pallipes (Kratz)

Hydrophilidae
Sphaeridium scarabaeoides Linnaeus

Lucanidae
Nigidius laticornis Boileau 1911

Meloidae
Coryna katonensis Pic
Coryna mylabroides Lap
Decatoma sobrina Peringuey
Mylabris amplectens Gerstaecker
Mylabris dicincta Berbl
Mylabris holocericea Klug
Mylabris tripartita Gerstaecker
Mylabris tristigma Gerstaecker
Synhoria cephalotes Ol

Melyridae
Apalochrus malachioides Fairmaire

EBAEUS CONFLUENS

Melyris atricornis Champ
Melyris nigripes Hav

Scarabaeidae

Aphodiinae
Aphodius bucolicus Bordat
Aphodius ciprianii Balthasar
Aphodius critchlowi Bordat
Aphodius gorillae Bordat
Aphodius humilis Roth
Aphodius kanemicus Endrodi
Aphodius kaszabi Endrodi

APHODIUS KORACSI

Aphodius lacunosus Schmidt
Aphodius leoninus Schmidt
Aphodius malawiensis Bordat
Aphodius noehaematiticus Landin
Aphodius nyika Bordat
Aphodius pauliani Endrodi
Aphodius pseudourostigma Balthasar
Aphodius punctiger Endrodi
Aphodius rothschildi Schmidt
Aphodius schoutedeni Boucomont
Aphodius strangularis Bordat
Aphodius teter s.l. Roth
Lorditomaeus horni (Balthasar)
Notocaulus machatshkei Endrodi
Notocaulus schoutedeni Boucomont

Cetoniinae
Ceratorrhina preissi Moser 1912
Chondrorrhina picturata Harold 1878
Cosmiophaenia rubescens Brancsik 1914
Daedycorrhina bidenticornis Allard 1985
Diplognatha gagates Forster 1771
Heteropseudinca moseri Hauser 1904
Heteropseudinca wentzle heckmannae Kolbe 1901
Melenesthes jocquei Allard 1968
Pachnodoides murphyi Alexis & Delport 2002
Poecilophila maculatissima Boheman 1860
Tmesorrhina runsorica rubripes Allard 1991

Coprinae
Caccobius inconspicuous Fahraeus 1857
Caccobius ocellipennis D'Orbigny 1913
Catharsius mossambicanus Ferreira 1960
Catharsius satyrus Kolbe 1893
Copris amyntor Klug 1855
Copris dudleyi Cambefort

Copris insidiosus Peringuey 1900
Copris integer Reiche 1847
Copris mesacanthus Harold 1878
Diastellopalpus fuelleborni (Kolbe 1900)
Diestellopalpus thomsoni (Bates 1888)
Heliocopris hamifer Harold 1878
Heliocopris hermes Gillet
Onitis sulcipennis Felsche 1907
Onitis vanderkelleni Lansberge 1886
Onthophagus abruptus D'Orbigny 1913
Onthophagus albipodex D'Orbigny 1902
Onthophagus biconifor D'Orbigny 1905
Onthophagus cinctipennis Quedenfeldt 1884
Onthophagus clitellarius D'Orbigny 1908
Onthophagus cribripennis D'Orbigny 1902
Onthophagus crucenotatus D'Orbigny 1905
Onthophagus dinoderus D'Orbigny 1913
Onthophagus foraminosus D'Orbigny 1902
Onthophagus gradivus Balthasar 1966
Onthophagus granosus D'Orbigny 1913
Onthophagus laminidorsis D'Orbigny 1902
Onthophagus naevius D'Orbigny 1913
Onthophagus parumnotatus Fahraeus 1857
Onthophagus perniger Boucomont 1930
Onthophagus quadrimaculatus Raffray 1877
Onthophagus simulator D'Orbigny 1905
Onthophagus subhumeralis D'Orbigny 1902
Proagoderus biarmatus D'Orbigny 1908
Proagoderus brucei (Reiche 1847
Proagoderus chrysopes (Bates 1888)
Proagoderus Dudley Cambefort 1980

Dynastinae
Pycnoschema scrofa Harold

Rutelinae
Popillia bipunctata (Fabricius)
Popillia browni Kolbe

Scarabaeinae
Anachalcos procerus Gerstaecker 1874
Garreta malleolus (Kolbe 1895)

Tenebrionidae
Catamerus rugosus Gahan
Catamerus sulcatus Fabricius
Distretus variabilis Gib
Lagria villosa Fabricius

Trogidae
Trox caffer liliana Scholtz
Trox nyansanus Haaf

Diptera (Flies)

Asilidae
Lamyra gulo Loew 1851
Laxenecera albicincta (Loew 1852)

Bombyliidae
Bombylius haemorrhoidalis Bezzi 1921
Exoprosopa magnipennis Bezzi 1924
Lithorhinia basalis Ricardo 1901

Eristalinae
Senapsis dibapha Walker 1849

Platystomatidae
Bromophila caffra Macqart 1846

Syrphidae
Senapsis dibapha Walker 1849

Tachnidae
Dejeania bombylans Fabricius 1798

Trichoptera (Caddis Flies)

All species awaiting determination

Lepidoptera (Moths & Butterflies)

Heterocera (Moths)

Arctiidae
Amerilia bubo (Walker 1855)
Argina Amanda (Boisduval 1847)
Cyana pretoriae (Distant 1897)
Eyralpenus scioana (Oberthur 1880)
Galatra doriae (Oberthur 1879)
Macrosia chalybeata Hampson 1901
Nyctemera leuconoe leuconoe Hopffer 1858
Spilosoma lutescens Walker 1855
Spilosoma sulphurea Bartel 1903
Teracotona metaxantha (Hampson 1909)
Tumicla sagenaria (Wallengren 1860)

Cossidae
Azygophleps aburae Plotz
Azygophleps coffea Aurivillius
Eulophonotus myrmelion Felder 1874

Ctenuchidae
Syntomis cereera Linnaeus

Epilemidae
Leucoplema triumbrata (Warren 1902)

Geometridae

Ennominae
Aphilopota interpellans (Butler 1875)
Argyrophora trofonia (Cramer [1779])
Argyrophora variabilis Kruger1999
Ascotis reciprocaria (Walker 1860)
Chiasmia johnstoni (Butler 1894)
Chiasmia procidata semispurcata (Walker [1863])
Chiasmia rhabdophora (Holland 1892)

CHIASMIA TRISOLARIA

Coenina dentataria Swinhoe 1904
Colocleora divisaria divisaria (Walker 1860)
Colocleora faceta (Prout LB 1934)
Coleocleora leucostephana Prout
Cophophlebia olivata Warren 1894
Drepanogynis glaucichorda Prout LB 1916

EPIGYNOPTERYX ANOPTHALMA

Epigynopteryx flavedinaria Guenee
Epigynopteryx maeviaria (Guenee 1857)
Erastria madecassaria (Warren 1897)
Iodes flexilinea Warren 1898
Isturgia exospilata (Walker 1861)
Micrologia lutetincta Prout LB 1916
Nopia flexilinea Warren
Odontopera integraria Guenee
Oedicentra albipennis Warren 1902
Pareclipsis anopthalma Prout LB 1916
Psilocera pulverosa (Warren 1894)
Pycnostega obscura Warren 1905
Semiothisa subcurvaria Mabille 1897
Sphingomima variosa Prout LB 1915
Xanthis tarsispina Warren
Xylopteryx arcuata (Walker 1862)
Xylopterix interposita Warren
Zamerada crysopa Fletcher 1975
Zamerada dentigera Warren 1909
Zamerada dorsiplaga Prout LB 1922
Zamerada euerces Prout LB 1928
Zamerada fessa Prout LB 1912
*Zamer*ada *glareosa* Bastelberger 1909
Zamerada metroscaphes Prout LB 1912
Zamerada purimargo Prout LB 1912
Zamerada rubrifascia Pinhey 1962
Zamerada rufilineria Swinhoe 1904
Zamerada scintillans Bastelberger 1909

Geometrinae
Celedomphax anaplaga (Warren 1905)
Chlorosterrha semialba Swinhoe
Heterorachis simplicissima (Prout LB 1912)
Lophorrhachia rubricorpus (Warren 1898)
Omphacodes punctilineata (Warren 1897)
Paragathia albimarginata Warren 1902
Pingassa abyssinaria (Guenee [1858])
Pingassa murphyi Herbulot 1994
Prasinocyma nereis Townsend

Larentiinae
Asthenotricha dentatissima Warren 1899
Gonanticlea meridionata (Walker 1862)
Larentia bitrita (Felder & Rogenhoffer 1875)
Larentia sublesta Prout
Mimoclista annulifera Warren
Piercia bryophilaria (Warren 1903)
Piercia ciliata Janse 1933
Piercia impunctata Janse
Piercia pracinaria Warren 1901
Pseudolarentia megalaria (Guenee 1858)
Scotopteryx nictictaria (Herrich-Schaffer 1855)
Xanthorhoe exorista Prout LB 1922

Sterrhinae
Scopula latitans Prout LB 1920
Scopula opicata (Fabricius 1798)
Somatina sedata Prout LB 1922

Hepialidae
Antihepialus keniae Holland
Gorgopsis abbotti Holland
Gorgopsis caffra Walker 1856

Lasiocampidae

BOMBYCOPSIS INDECORA *WALKER 1865*

Diapalpus congreganus Strand 1913
Dipluriella songeana Strand 1913
Epicnapteroides lobata Strand 1913
Eutrica seriofasciata Aurivillius 1921
Gonometa griseocincta Hampson 1910
Lebeda mustelinia Distant 1899
Nadiasa cuneata (Distant 1897)
Odontocheilopteryx pattersoni Tams 1926
Opisthodonta cymographa (Hampson 1910)
Pachymetana sanquicincta (Aurivillius 1901)
Philotherma rufescens Whichgraff 1921
Pseudolyra lineadentata (Bethune-Baker 1911)
Shausinna affinis Aurivillius 1910
Streblote fusca (Aurivillius 1905)
Streblote pachyla Tams
Streblote vesta Druce 1888

Limacodidae

CHRYSOPOLOMA ISABELLINA *AURIVILLIUS 1895*

Crothema gloriosa Hering
Lembopteris neglecta Hering
Omocena dollmani Westwood
Pantoctenia gemmans Felder 1874
Parasa Tamara Hering
Susicina pyrocausta Hampson 1910

Lymantriidae

AGYROSTAGMA NIOBE *WEYMER*

Aroa discalis Walker 1855
Hyaloperina erythroma Coll
Laelia basalis (Walker 1855)
Laelia bifascia Hampson 1905
Laelia cuvivirgata (Karsch 1895)
Laelia fracta Shaus & Clements 1893
Leucoperina impuncta Butler
Narona varipes (Walker 1865)
Psalis pennatula (Fabricius 1793)
Pteredoa monosticta (Butler 1898)
Rhypopteryx rhodalipha (Felder 1874)
Rhypopteryx rubripunctata Weymer 1892
Stilpnaroma venosa Hering

NOCTUIDAE

Transferred Arctiids
Asota speciosa (Drury 1773)

Acontiinae
Amyna punctum (Fabricius 1794)
Ozarba heliastis (Hampson 1902)
Ozarba megaplaga Hampson

Agaristinae
Crameria amabilis (Drury 1773)
Ovios capensis (Herich-Schaffer [1854])
Pseudopais nigrobasalis Bart
Tuerta rema Druce

Amphypyrinae
Busseola fusca (Fuller 1901)
Callopistra maillardi (Guenee 1862)
Callopistra yerburii Butler 1884
Conservula alambica Gaede 1915
Conservula minor Holland 1896
Phalerodes cauta (Hampson 1902)
Spodoptera littoralis (de Boisduval 1833)
Tumidifrontia casteneotincta Hampson 1902

Catocalinae
Achaea finita (Guenee 1852)
Anomis flava (Fabricius 1775)
Anomis sobulifera Guenee 1852
Anticarsia irrorata (Fabricius 1781)
Audea fatilega (Felder & Rogenhoffer 1874)
Cyligramma latona (Cramer 1775
Davea humeralis (Hampson 1902))
Dysgonia angularis de Boisduval 1833
Gracilodes caffra Guenee 1852
Halochroa eudela Fletcher DS 1963
Heliophisma maculilinea
Hypersypnoides congoensis Berio 1954
Hypocala deflorata (Fabricius 1794)
Hypropra capensis (Herrich-Schaffer 1850)
Maxera marchalii (de Boisduval 1833)
Mocis undata (Fabricius 1775)
Ophiusa tirhaca (Cramer 1780)
Oraesia emarginata Fabricius 1794)
Orthreis divitiosa Walker 1869
Orthreis fullonia (Clerck 1764)
Orthreis materna (Linnaeus 1767)
Pandesma robusta (Walker [1858])
Rhandiphora cinctigutta (Walker 1862)
Remiga repanda (Fabricius 1794)
Serrodes partita (Fabricius 1775)
Sphingomorpha chlorea (Cramer 1777)
Trigonodes hyppasia (Cramer 1779)

ULOTHRICHOPUS HARDYI *CLIFTON*

Eutellinae
Caligatus angasii Wing [1850]
Eutelia bowkeri (Felder & Rogenhoffer 1874)

Hadeninae
Brithysana speyeri (Felder & Rogenhoffer 1874)
Diaphone eumela (Stoll 1781)
Diaphone lampra Karsch 1894)
Leucania prominenus Walker 1856
Leucania tacuna (Felder 1874)
Leucania uncinata (gaede 1916)
Rougeotia praetexta Townsend
Vietteania torrentium (Guenee 1852)

Heliothinae
Helicoverpa armigera (Hubner [1809])
Heliothis xanthiata Walker 1865

Hypeninae
Dichromia mesomeleana (Hampson 1902)
Hypena laetalis Walker [1859]
Hypena senialis Guenee 1854
Hypena strigata (Fabricius 1798)
Rhynchina tinctalis (Zeller 1852)

Noctuinae
Agrotis segatum (Dennis & Schiffermuller 1775)
Agrotis contiguens (Warren 1914)
Mentaxya atritegulata (Hampson 1902)
Mentaxya ignicollis (Walker 1857)

Plusiinae
Chrysodexis acuta (Walker 1858)
Plusia fracta Walker 1858
Plusia limbiralea Guenee
Plusia sestertia (Felder & Rogenhoffer 1874)
Syngrapha circumflexa (Linnaeus 1767)
Tricoplusia orichalcea (Fabricius 1775)

Sarrothripinae
Blenina albifascia Pinhey 1968
Blenina squamifera (Wallengren 1860)

Notodontidae
Achaera ochribasis (Hampson 1910)
Antheua simplex Walker 1855
Chlorocalliope calliope (Hampson 1910)
Disracha persimilis (Hampson 1910)
Hampsonita esmeralda (Hampson 1910)
Heraia thalassina (Hampson 1910)
Odontoperas voeltzkowi Aurivillius
Polienus albescens Gaede
Scalmicauda bicolorata Gaede
Scalmicauda tessmanni Strand 1911
Tronotus bettoni Butler 1898

Pterophoridae
Pterophorus candidalis (Walker 1864)

Pyraloidea

Crambidae

Musotiminae
Panoctima angustalis Hampson

Noordinae
Viettessa margaritalis (Hampson 1910)

Nymphulinae
Argyractis sambesica (Strand 1909)

Pyraustinae
Calamochrous flavimarginalis Hampson 1913
Loxostege plumbialis (Zeller 1852)
Loxostege venustalis Cramer 1782
Pyrausta incoloralis (Guenee 1854)
Uresiphita polygonalis (Dennis & Schiffermuller 1775)

Spilomelinae
Aetholessa floridalis (Zeller 1852)
Bocchoris inspersalis (Zeller 1852)
Epipagis cancellalis (Zeller 1852)
Eurrhyparodes tricoloralis (Zeller 1852)

FILODES COSTIVITRALIS *GUENEE 1862*
Ischnurges lancinalis (Guenee 1854)
Maruca vitrata (Fabricius 1787)

Marwitzia centiguttalis Gaede
Nausinoe argyrosticta (Hampson 1910)
Nausinoe geometralis (Guenee 1854)
Pagyda salvalis Walker 1859
Pagyda traducalis (Zeller 1852)
Palpita unionalis (Hubner 1796)

P1LOCHROSIS DICHOCROSIALIS *HAMPSON 1912*

Spoladea recurvalis (Fabricius 1775)
Syllepte ovalis (Walker 1859)
Syllepte purpurascens Hampson 1899
Syllepte sinuata Fabricus
Synclera traducalis (Zeller 1852)
Syngamia convulsa Meyrick
Syngamia fervidalis Zeller 1852

Pyralidae

Phycitinae
Dysphilia viridella Ragonot 1888
Ephestia cautella (Walker 1863)

Pyralinae
Aglossa rhodalis Hampson 1906

Saturniidae
Athletes gigas Sonthonnax 1904

ATHLETES SEMIALBA *SONTHONNAX 1904*

Aurivillius seydelli Rougeot 1962
Bunaea alcinoe (Stoll 1780)
Cirina forda (Bouvier 1927)
Decachorda fulvia (Druce 1886)
Decachorda rosea Aurivillius 1898
Epiphora imperator Stoneham 1933
Gynanisa carcassoni Rougeot 1974
Holocerina smilax (Westwood 1849)
Imbrasia conradsi (Rebel 1906)
Imbrasia ertli Rebel 1904
Imbrasia macrops (Rebel 1917)
Imbrasia macrothyris (Rothschild 1906)
Imbrasia murphyi (Darge 1992)
Imbrasia rectalineata (Sonthonnax 1899)
Imbrasia wahlbergi (Boisduval 1847)
Lobobunaea christyi falcatissima Rougeot 1962
Ludia delegorguei (Boisduval 1847)
Ludia orinoptena Karsch 1892
Micragone joiceyi nyassae Rougeot 1962
Orthogonioptilum adiegatum dollmanni Jordan 1922
Pseudaphelia ansorgei (Rothschild 1898)
Pseudobunnaea callista Jordan 1910
Pseudobunnaea irius Fabricius 1793
Pseudobunnaea tyrrhena maculata Bouvier 1930
Tagoropsis hannintoni Butler 1893
Ubaena dolabella (Druce 1886)

Sphingidae

Acherontia atropus (Linnaeus 1758)
Agrius convolvuli (Linnaeus 1758)
Andriasa contraria contraria Walker 1856
Andriasa mitcheli Hayes 1973
Basiothia charis (de Boisduval [1875])
Basiothia medea (Fabricius 1781)
Basiothia schenki Moschler 1872
Cephanodes hylas virescens (Wallengren 1858)
Chaerocina dohertyi meridionalis Carcasson 1968
Coelonia fulvinotata (Butler 1875)
Daphnis nerii Linnaeus 1758
Dovania poecila Rothschild & Jordan 1916
Euchloron megaera Linnaeus 1758
Falcatula falcatus Rothschild & Jordan 1903
Hippotion celerio (Linnaeus 1758)
Hippotion eson (Cramer 1779)
Hippotion osiris (Dalman 1823)
Leptoclanis pulchra Rothschild & Jordan 1903
Leucophlebia afra Karsch 1891
Leucostrophus alterhirundo D'Abrera 1987
Lophostethus dumolinii dumolinii (Angas 1849)
Macroglossum trochilus (Hubner 1823)
Macropoliana ferax (Rothschild & Jordan 1916)
Neopolyptychus compar Rothschild & Jordan 1903
Nephele accentifera Beauvois 1805
Nephele comma Hopffer 1857
Nephele lannini Jordan 1926
Nephele vau (Walker 1856)
Polyptychopsis marshalli (Rothschild & Jordan 1903)
Polyptychus baxteri Rothschild & Jordan 1907
Polyptychus coryndoni Rothschild & Jordan 1903
Pseudoclanis kenyae Clark 1928
Rhodafra marshalli Rothschild & Jordan 1903
Sphingonaepiopsis ansorgei Rothschild 1904
Temnora burdoni Carcasson 1968

TEMNORA ELEGANS POLIA *ROTHSCHILD 1904*

Temnora funebris (Holland 1893)
Temnora plagiata fuscata Rothschild & Jordan 1902
Temnora pseudopylas Rothschild 1894
Temnora pylades tanganyikae Clark 1928
Temnora marginata (Walker 1850)

Thyretidae
Automolis laterita Herrich-Schaffer 1855
Automolis pallens Bethune baker
Thyretes negus Wallengren

Yponomeutidae
Yponomeuta strigillata Zeller 1852

Rhopalocera (Butterflies)

Hesperiidae
Abantis paradisea (Butler 1870)
Abantis zambesiaca (Westwood 1874)

ACADA BISERIATUS *(MABILLE 1893)*

Acleros mackenii (Trimen 1868)
Ampitta capenas capenas (Hewitson 1863)
Artitropa milleri Riley 1925

ARTITROPA REDUCTA *AURIVILLIUS 1925*

Borbo borbonica borbonica (Boisduval 1833)
Borbo fallax (Gaede 1916)

Borbo gemella (Mabille 1884)
Borbo micans (Holland 1896)
Borbo perobscura (Druce 1912)
Borbo sirena (Evans 1937)
Calleagris hollandi (Butler 1897)
Calleagris jamesoni jamesoni (Sharpe 1890)
Celaenorrhinus galenus (Fabricius 1793)
Celaenorrhinus handmani Berger 1976
Celaenorrhinus zanqua Evans 1937
Chondrolepis telsignata (Butler 1896)
Coeliades forestan (Stoll 1872)
Coeliades pisistratus (Fabricius 1793)
Fresna nyassae (Hewitson1878)
Gegenes niso brevicornis (Plotz 1884)
Gomalia elma (Trimen 1862)
Gorgyra bibulous Riley 1929
Gorgyra johnstoni (Butler 1894)
Kedestes barbarae barbarae (Trimen 1873)
Kedestes brunneostriga (Plotz 1884)
Kedestes callicles (Hewitson 1868)
Kedestes wallengrenii fenestratus (Butler 1894)
Metisella decipiens (Butler 1896)
Metisella formosus formosus (Butler 1894)
Metisella medea nyika Evans 1937
Metisella orientalis orientalis (Aurivillius 1925)
Metisella perexellens perexellens (Butler 1896)
Metisella quadrisignatus quadrisignatus (Butler 1894)
Meza larea (Neave 1910)
Parosmodes morantii morantii (Trimen 1873)
Platylesches ayresii (Trimen 1889)
Platylesches lamba Neave 1910
Platylesches picannini (Holland 1894)
Platylesches rasta rasta (Evans 1937)
Platylesches robustus robustus Neave 1910
Sarangesa astrigera Butler 1894
Sarangesa lucidella lucidella (Mabille 1881)
Semalea arela (Mabille 1891)
Semalea pulvina (Plotz 1879)
Spialia depauperata depauperata (Strand 1911)
Spialia dromus (Plotz 1884)
Spialia mafa mafa (Trimen 1870)
Spialia spio (Linnaeus 1764)
Tagiades flesus (Fabricius 1781)
Teniorhinus harona (Westwood 1881)
Zenonia zeno (Trimen 1864)

Papilionidae

PAPILIO DARDANUS TIBULLUS *KIRBY 1880*

Papilio demodocus demodocus Esper 1798
Papilio jacksoni nyika Cottrell 1963
Papilio mackinnoni isokae Hancock 1984
Papilio nireus lyaeus Doubleday 1845
Papilio ophidecephalus mkuwadzi Gifford 1961
Papilio pelodurus vesper Le Cerf 1924
Papilio phorcas nyikanus Rothschild & Jordan 1903
Graphium angolanus angolanus (Goeze 1779)
Graphium leonidas leonidas (Fabricius 1793)

Pieridae

Appias Sabina phoebe (Butler 1901)
Belenois aurota aurota(Fabricius 1793)
Belenois creona severina (Stoll 1781)
Belenois rubrosignata kongwana Talbot 1943
Belenois thysa (Hopffer 1855)
Belenois zochalia agrippinedes (Holland 1896)
Catopsilia florella (Fabricius 1775)
Colias electo Strecker 1900
Colotis antevippe gavisa (Wallengren 1857)
Colotis danae annae (Wallengren 1875)
Colotis dissociates (Butler 1897)
Colotis eris eris (Klug 1829)
Colotis euippe omphale (Godart 1819)
Colotis evenina casta (Gerstaecker 1871)
Colotis regina Trimen 1863
Eurema brigitta brigitta (Stoll 1780)
Eurema desjsrdinsii marshalli Butler 1898
Eurema hecabe solifera (Butler 1875)
Eurema mandarinula (Holland 1862)
Eurema senegalensis (Boisduval 1836)
Leptosia alcesta inalcesta Bernardi 1959)
Mylothris agathina agathina (Cramer 1779)
Mylothris crawshayi crawshayi Butler 1896
Mylothris ruppellii rhodesiana Riley 1921
Mylothris sagala dentatus Butler 1896
Nepheronia argia mhondana (Suffert 1904)
Nepheronia thalassina sinalata (Suffert 1904)
Pinacopteryx eriphia eriphia (Godart 1819)

Nymphalidae

Acraeinae

Acraea acuta Howarth 1969
Acraea aganice nicega (Suffert 1904)
Acraea anacreon bomba Grose-Smith 1889
Acraea caecilia pudora Aurivillius 1910
Acraea calderena calderena Hewitson 1877
Acraea encedon encedon (Linnaeus 1758)
Acraea epaea melina (Thurau 1903)
Acraea eponina (Cramer 1770)
Acraea goetzei Thurau 1903
Acraea insignis insignis Distant 1880
Acraea johnstoni johnstoni Godman 1885

ACRAEA LEUCOPYGA *AURIVILLIUS 1904*

Acraea perenna thesprio Oberthur 1893
Acraea periphanes Oberthur 1893
Acraea pharsalus pharsaloides Holland 1892
Acraea pudorella detecta Neave 1910
Acraea scalivittata Butler 1896
Acraea ventura ventura Hewitson 1877
Hyalites parei orangica Henning 1996
Pardopsis punctatissima (Boisduval 1833)

Daninae

AMAURIS ALBIMACULATA LATIFASCIA *TALBOT 1940*

Amauris crawshayi crawshayi Butler1897
Amauris echeria serica Talbot 1940
Amauris ellioti junia (Le Cerf 1920)
Danaus chrysippus eagyptus (Schreber 1759)
Tirumala Formosa formosa (Godman 1880)

Satyrinae

Aphysoneura pigmentaria obnubila Riley 1923
Bicyclus anynana anynana (Butler 1879)
Bicyclus campina campina (Aurivillius 1901)
Bicyclus cooksoni (Druce 1905)
Bicyclus cottrelli Van Son 1952
Bicyclus dancklemani (Rogenhoffer 1891)

Gnophodes betsimena diversa (Butler 1880)
Henotesia simonsii (Butler 1877)
Henotesia ubenica Thurau 1903
Melanitis leda helenae (Westwood 1851)
Melanitis libya Distant 1882
Neita extensa (Butler 1898)
Neocoenyra gregorii Butler 1894
Physcaeneura pione Godman 1880
Ypthimomorpha itonia (Hewitson 1865)

Argynninae
Issoria smaragdifera smaragdifera (Butler 1895)
Lachnoptera ayresii Trimen 1879
Phalantha aethiopica Rothschild & Jordan 1903

Nymphalinae
Antanartia dimorphica dimorphica Howarth 1966
Antanartia schaeneia dubia Howarth 1966
Cynthia cardui (Linnaeus 1758)
Junonia antilope (Feisthamel 1850)
Junonia archesia (Cramer 1779)
Junonia artaxia Hewitson 1864
Junonia cuama Hewitson 1864
Junonia hierta cebrene Trimen 1870
Junonia natalica (Felder 1860)
Junonia octavia sesames (Trimen 1883)
Junonia orithya orithya (Linnaeus 1758)
Junonia terea elgiva Hewitson 1864
Junonia touhilimasa Vuillot 1892
Junonia tugela aurorina Butler 1894
Salamis anacardii nebulosa Trimen 1881
Salamis parhassus (Drury 1782)

Limenitinae
Bebearia orientis orientis (Karsch 1895)
Byblia anvatara acheloia (Wallengren 1857)
Byblia ilithya (Drury [1773])
Crenidomimas concordia (Hopffer 1855)
Cymothoe cottrelli Rydon 1980
Cyrestis Camillus sublineata Lathy 1901
Euphaedra crawshayi Butler 1895
Eurytella dryope angulata Aurivillius 1898

EURITELLA HIARBAS LITA *ROTHSCHILD & JORDAN 1903*

Hamanumida daedalus (Fabricius 1775)
Harma theobene blassi (Weymer 1892)
Neptidopsis ophione ophione (Cramer [1777])
Neptis alta Overlaet 1955
Neptis aurivillii Schultz 1930
Neptis incongrua incongrua Butler 1896
Neptis laeta Overlaet 1955
Neptis melicerta (Drury 1773)
Pseudacraea deludens murphyi Hecq 1991
Pseudacraea lucretia expansa (Butler 1878)
Pseudargynnis hegemone (Godart 1819)
Sallya amulia rosa (Hewitson 1877)
Sallya boisduvali boisduvali (Wallengren 1857)
Sallya garega (Karsch 1892)
Sallya morantii morantii (Trimen 1881)

Charaxinae
Charaxes achaemenes achaemenes Felder & Felder 1867
Charaxes acuminatus nyika Van Someren 1963
Charaxes ameliae amelina Joicey & Talbot 1925
Charaxes ansorgei levicki Poulton 1933
Charaxes aubyni australis Van Someren & Jackson 1957
Charaxes baumanni whytei Butler 1894
Charaxes bohemani Felder & Felder 1859
Charaxes brutus natalensis Staudinger 1885
Charaxes candiope candiope Godart 1924
Charaxes castor flavifasciatus Butler 1895
Charaxes dilutus veneris White & Grant 1989
Charaxes dowsetti Henning 1989
Charaxes druceanus proximans Joicey & Talbot 1922
Charaxes fione Henning 1977
Charaxes guderiana guderiana (Dewitz 1879)
Charaxes macclounii Butler 1895
Charaxes nichetes leoninas Butler 1895

CHARAXES NYIKENSIS *VAN SOMEREN 1975*

Charaxes phaeus Hewitson 1877
Charaxes pollux geminus Rothschild 1900
Charaxes protoclea azota (Hewitson 1877)
Charaxes varanes vologesis (Mabille 1876)
Charaxes violetta melloni Fox 1963
Charaxes xiphares ludovici Rousseau-Decelle 1933

Lycaenidae
Actizera lucida (Trimen 1883)
Actizera stellata (Trimen 1883)

ALAENA NYASSA MAJOR *OBERTHUR 1888*

ALAENA RETICULATA *BUTLER 1896*

Aloedes conradsi angoniensis Tite & Dickson 1968
Aloedes griseus Riley 1921
Aloedes molomo handmani Tite & Dickson 1973
Anthene amarah amarah (Guerin-Meneville 1847)
Anthene definita definita (Butler 1899)
Anthene kersteni (Gerstaecker 1871)
Anthene lasti (Grose-Smith & Kirby 1894)
Anthene ligures (Hewitson 1874)
Anthene liodes (Hewitson 1874)
Anthene lunulata (Trimen 1894)
Anthene rubricinctus anadema (Druce 1905)
Aphnaeus erikssoni rex Aurivillius 1909
Aphnaeus marshalli Neave 1910
Axiocerces amanga amanga (Westwood 1881)
Axiocerces nyika Quickelberge 1984
Axiocerces punicea punicea (Grose-Smith 1889)
Axiocerces tjoane tjoane (Wallengren 1857)
Azanus jesous (Guerin 1847)
Azanus mirza (Plotz 1880)
Azanus moriqua (Wallengren 1857)

AZANUS NATALENSIS *(TRIMEN 1887*

Cacyreus lingeus (Stoll 1782)
Cacyreus palemon (Stoll 1782)
Cacyreus virilis Stempffer 1936
Capys brunneus brunneus Aurivillius 1916
Capys connexivus connexivus Butler 1987
Cupidopsis cissus (Godart 1824)
Cupidopsis Jobates jobates (Hopffer 1855)
Deudorix antalus (Hopffer 1855)

Deudorix caerulea Druce 1890
Deudorix camerona Katanga Clench 1965
Deudorix dinochares Grose-Smith 1887
Deudorix kafuensis Neave 1910
Deudorix lorisona coffea Jackson 1966
Deudorix magda Gifford 1963
Deudorix Montana (Kielland 1985)
Deudorix zeloides Butler 1901
Eicochrysops eicotrochilus Bethune-Baker 1924
Eicochrysops messapus mahallakoaena (Wallengren 1857)
Euchrysops barkeri (Trimen 1893)
Euchrysops dolorosa (Trimen 1887)
Euchrysops subpallida Bethune-Baker 1923
Euchrysops unigemmata (Butler 1895)
Harpendyreus hazelae Stempffer 1973
Harpendyreus juno (Butler 1897)
Harpendyreus marungensis marungensis (Joicey & Talbot 1924)
Hemiolaus caeculus caeculus Hopffer 1855
Hypolycaena buxtoni Hewitson 1874
Hypolycaena auricostalis auricostalis (Butler 1897)
Hypolycaena pachalica Butler 1888
Hypolycaena philippus philippus (Fabricius 1793)
Iolaus (Epamera) alienus alienus Trimen 1898
Iolaus (Stugeta) bowkeri nyasana (Talbot 1935)
Iolaus (Epamera) congdoni Keilland 1985
Iolaus (Argiolaus) lalos lalos (Druce 1896)
Iolaus (Epamera) nasisii (Riley 1928
Iolaus (Argiolaus) pamelae Heath 1983

IOLAUS (EPAMERA) SIDUS *TRIMEN 1864*

Iolaus (Argiolaus) silarus Druce 1885
Iolaus (Argiolaus) stewarti Heath 1985
Iolaus (Epamera) violacea (Riley 1928)
Lachnocnema bibulus (Fabricius 1793)
Lachnocnema durbani Trimen 1887
Lampides boeticus (Linnaeus 1767)
Lepidochrysops chalceus Quickelberge 1979
Lepidochrysops cupreus (Neave 1910)
Lepidochrysops desmondi Stempffer 1951
Lepidochrysops intermedia cottrelli Stempffer 1954
Lepidochrysops nyika Tite 1961
Lepidochrysops pampolis (Druce 1905)
Leptotes jeanneli (Stempffer 1935)
Leptotes marginalis (Stempffer 1944)
Leptotes pirithous pirithous (Linnaeus 1767)
Lycaena phlaeas abbottii (Holland 1892)
Mimacraea marshalli marshalli Trimen 1898
Ornipholidotes peucetia peucetia (Hewitson 1866)
Pentilla tropicalis (Boisduval 1847)
Phlaria heritsia virgo (Butler 1896)
Spindasis mozambica (Bertolini 1850)
Triclema nigeriae (Aurivillius 1905)
Tuxentius calice calice (Hoppfer 1885)
Tuxentius ertli (Aurivillius 1907)
Pseudonacudaba sichela sichela (Wallengren1857)
Uranothauma antinorii felthami (Stevenson 1934)
Uranothauma cordatus (Sharpe 1892)
Uranothauma crawshayi Butler 1895)
Uranothauma cuneatum Tite 1953
Uranothauma falkensteni (Dewitz 1879)
Uranothauma nubifer (Timen 1895)
Uranothauma poggei (Dewitz 1879)
Uranothauma vansomereni Stemffer 1951
Uranothauma williamsi Carcasson 1961
Zizeeria Knysna (Trimen 1862)
Zizula hylax (Fabricius 1775)

Riodinidae
Abisara neavei cf congdoni Keilland 1985

Hymenoptera (Bees & Wasps)

Bees

Anthrophoridae
Amegilla acraensis Fabricius1793

AMEGILLA TORRIDA *SMITH*

Anthrophora plumipes Fabricius
Mesotrichia flavorufa D & G
Xylocopa caffra Linnaeus 1767
Xylocopa corinata Smith 1874
Xylocopa flavobicincta Grib
Xylocopa lugubris Gerstaecker 1857
Xylocopa nigrita (Fabricius 1775)
Xylocopa senior senior (Vaehal 1899)

Apoidae

APIS MELLIFERA MONTICOLA *SMITH*

Apis mellifera scutellata Lepeltier
Thyreus abyssinicus (Radoszkowsky)
Thereus calceatus (Vaehal)

Megachilidae
Chalicodoma bombifrons (Gerstaecker 1857)
Chalicodoma pseudomegachile kigonserana (Friese 1903)
Megachile felina Gerstaecker

Wasps

Brachonidae
Archbracon servillei Brulle
Serraulax decemmaculatus Szepligeti 1911

Ichneumonidae
Asprynchotus guenzii (Tasch)
Enicospilus pacificus

Mutillidae
Stenomutilla cf beroe Peringuey

Pompilidae

ANOPILUS FUSCUS

Hemipepsis dedjas Guerin

HEMIPEPSIS IMPERIALIS *SMITH*

Hemipepsis ochropus Stal

HEMIPEPSIS TAMISIERI *GUERIN*

Psammochares plumbeus Fabricius

Psammochares cf semirufus Haupt
Pseudogenia flavotegulata Bingh

Scolidae
Campsomeris hymenaea Gerst
Megameris labilis Schulz 1906
Scolia erithropyga
Scolia morio Fabricius
Scolia Tropicana nigersima

Sphecidae
Ammophila benniensis (Palisot de Beauvois)
Ammophila punctaticeps (Arnold)
Chalybion laevigatum Kohl
Chlorion haemorrhoidalis Fabricius
Chlorion pelopoeformis Dahlboom
Liris pempesiana Bisch
Philanthus stygius Gerstaecker
Philanthus triangulatum diadema Fabricius
Podolonia tydei Le Guillay
Scelifron spirifex Linnaeus
Trachysphex ambiguous Arnold 1923

Vespidae

ANCISTROCERUS LINEATICOLLIS *CAM*
Antipiona silgos (Saussure)
Belognaster clypeata Kohl 1894
Belognaster dubius Kohl
Belognaster fascialis du Buysson 1906
Belognaster filiventris Saussure 1853
Belognaster griseus Fabricius
Belognaster laevigatum Kohl
Belognaster nobilis Gerstaecker
Belognaster vasseae du Buysson 1906
Delta emarginata
Delta pulchemimum
Eumenes maxillosus De Geer
Odynerus ardens var junodi Gribodo 1895
Odynerus radialis Saussure 1854
Odynerus ventralis Saussure
Polistes marginalis Fabricius
Polistes smithi Saussure
Trachymeus cf vulneratus
Synagris prosperina niassae Stadel

Formicoidae (Ants)

Separate report by Dr C.B.Cottrell

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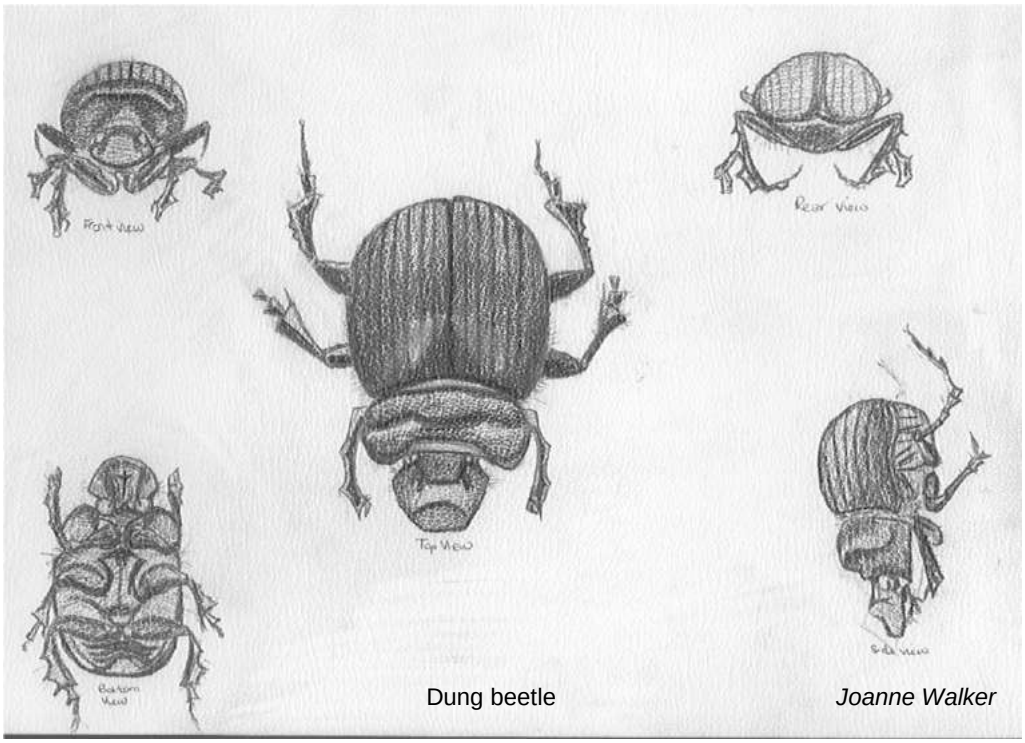


Dung beetle *Joanne Walker*

LARGE MAMMALS

Natalie Benson, Sian Phillips and Marianne Overton

ABSTRACT

The relative abundance of large mammals in the northern hills of the Nyika National Park, Malawi is assessed using tracks, signs and droppings. A ten by ten kilometre square is assessed using 71 randomly selected plots, equating to almost 0.01% sampling coverage. This is the first time ever that the large mammal populations have been formally assessed in this remote and inaccessible area, but some broad comparisons are made with previous Biosearch studies in nearby areas. A poaching report accompanies this study and the impact of poaching is considered.

INTRODUCTION

The need for National Parks in Africa is well demonstrated by the huge diversity of mammal species present in Nyika National Park. Nyika is Malawi's largest national park covering over 3,100 square kilometres. At the heart of the park, and rising to over 2000 metres, lies the gently undulating Nyika Plateau. There are over 95 species of mammal in the area which consists of 33 “large mammal species” (Johnson, 1993). Nyika National Park is home to notable populations of Eland (*Taurotragus oryx)*, Roan Antelope (*Hippotragus equinus),* Leopard *(Panthera pardus)* and Common Duiker (*Sylvicapra grimmia)*. Small populations of Kudu (*Tragekaohus strepsiceros),* Elephant (*Loxodonta Africana)* and Buffalo (*Syncers caffer)* are also found in the area. Previous Biosearch expeditions (1997-2003) have recorded presence of 28 large mammal species in the northern valleys (Overton 2003)

Unfortunately the survival of some of these species is constantly under threat by continued poaching and burning within the park. This means current data on the diversity and distribution of the mammal populations within Nyika is essential to aid the scouts and other personnel of Nyika National Park in designing and employing adequate management strategies. This information can ensure the anti-poaching patrols by scouts are well directed.

The first Biosearch Nyika expedition in 1997 established a baseline and a system of monitoring, which is easily reproduced. Subsequent expeditions have repeated the methods of surveying large mammals in the same areas in 1997, 1998, 1999, 2001and 2003. Similar surveys were carried out in the SE of the Park in 1999 and this study in 2004 covers an entirely new part of the northern hills of the park. Previous studies have been in the drier July/August season, with the exception of the south east park study in September 1999 and the 1997 study and the first expedition in 2003, which took place in March/April.

SURVEY AREA

Location of the survey area in the northern hills of the Nyika National Park

The original survey area, worked from Nganda prior to 2004, covers about 500km$^{2.}$ At the outset in 1997, fifty kilometre squares (10%) were selected at random and grouped according to their topographical areas for comparison; High plateau edge, Chipome/Mondwe valley and the Sawi Guwu hills and lowlands on the other side of the ridge (to the northeast). Topographical areas of these northern hills were mapped by Wye College in 1972 (Wye College 1973). These same kilometre squares are monitoring sites that have been studied in successive years, allowing comparison of populations between years and between topographical areas.

On this expedition a completely new part of the northern hills was studied. We covered an area of 10km x 10km. This is mainly covered by the Kisyombe 1:50000 map (sheet 1033B2) but overlaps with Nganda (1033B4) to the south. The most southerly point of the square is immediately north of our most northerly squares studied previously. The most northerly part is 2km south of Uledi. The area includes both the peaks of Mpanda and Kawozya and centres on the high ridge between the two peaks. The distribution of these randomly selected kilometre squares is shown in map 1.

The altitude ranges from 3200' nearest Uledi to over 7200' on Kawozya. Most of the plots were between 4000' and 6000' feet. (There were 10.5 plots under the 4000' and ten over 6000', and 43.5 plots at altitudes between.) The altitude at which *Protea* species dominated the landscape in these driest hills of the extreme north of the Park was around 6000'. Below this was almost entirely fairly open woodland, dominated by *Brachystegia* and *Faurea sp.* with a grassy understorey, of a density limited by the steepness of the slope and lack of soil. The area was tinder dry with some riverine forest and very little dambo area. Forest patches and open grassland also appeared on the slopes above 6000'. There were a number of cleared grassland areas that have never returned to woodland since the departure of humans from this extension of the Park in 1978. Most of the river tributaries were dry and only the main river branches held water, even at the highest altitudes. We have little data to support but the evidence we have suggests that the rainfall in this part of the Park is the least, being in the rain shadow of the plateau itself.

METHOD

Choice of methods for large mammal sampling are described and discussed in previous reports, but primarily in the first study, carried out in 1997 (Overton 1998). It is not feasible to rely on sightings because of the difficulty in moving about in the terrain without disturbing wildlife, the density of bush in some areas and the difficulty in getting sufficient data to show significant trends. Since the historic signing of the agreement between Malawi and Zambia to jointly manage vast, adjacent parks, there is a new project satellite-tracking four tagged elephants from the Vwasa Reserve about 80km away, as the crow flies. Three elephants on the Nyika were tagged in what was described by the participants as a really dangerous exercise. A further three elephants have been tagged further south in the Kusungu Park, but these are distant and although theoretically linked to the Nyika by a strip of forest reserve, there is little sign of this on the ground. A further three elephants have been tagged in North Luangwa, Zambia, about 25km away from the forest strip, as the crow flies. (Africa Geographic. 2004) The two to three years of monitoring will provide useful data. Further studies planned for the "Transfrontier" by the Department of Parks and Wildlife in the new partnership includes a "census of wildlife populations" with a view to assessing the future viability of these areas as tourist destinations. There may also be introduction of game species.

Methods using tracks and signs are fequently used to assess animal populations and the rate of decay correllates with rainfall (Barnes et al. 1997). Carrying out our studies in the dry season means that little or no rain is experienced throughout the study period. The print-holding capacity of the ground does vary and is only overcome by obtaining a significant amount of data in each area, including a representative sample of ground cover. Sampling in 10% of the squares, fifty plots, each of 100x100m, equated to a survey sample size of 0.5% and was shown to be reasonably representative (Overton 2003).

Relative Abundance Scores

The relative abundance scores (RAS) are based on tracks, signs and droppings as well as the occasional sighting. Since some animals make more signs than others, the relative abundance scores do not give us exact populations but give indices of populations. For each species, the scores allow us to compare the amount of activity in different areas or at different times. For each species, the total score per fifty plots is compared.

Procedure

Each of the kilometre squares was divided into 100mx100m plots. Five of these plots were then selected randomly for the detailed surveys, so that 50,000m² or 5% was surveyed in each square kilometre. This gives a representative sample of the mammals present in that kilometre square.

Within each plot five team members walked parallel along the mid-line of each 10m interval, looking at the 5m either side of their path. The team members noted all signs, droppings and prints and called these out to the recorder. Using this method, two sweeps were required to cover the entire plot. The scouts trained the teams in the identification of tracks and droppings. In addition, the proportion of bare ground, rock, grass, shrub, canopy cover and marsh in the plot was recorded and in April, the effect of any recent rains.

Some areas were inaccessible. If a randomly selected plot was seen to cover impassable terrain, the only realistic option was to discard it and select another random set of co-ordinates. This does mean that a few habitat areas are not accounted for, for example the dense, impenetrable forest patches on

the plateau. The terrain also meant that some plots were 200m by 50m, which saved traversing ravines and unnecessary river crossings - although these were sometimes attempted! These variables would be similar from year to year, as long as sufficient plots are surveyed.

The first data in 1997 set the precedent of including signs of all ages, because of the uncertainty of definition. Tracks, droppings, grazing and scratchings almost invariably disintegrate each rainy season and are therefore very unlikley to be more than a year old. However, tree damage from elephants and aardvark holes can last a very long time. Notes are made on the recording sheets if the signs are clearly more than a year old and this is taken into account when interpreting the data.

Droppings are taken as that done in “one sitting”, not individual boluses.

Some species were only noted outside the plots. This was recorded separately and added to our list of species as qualitative data. People were encouraged to note map references, particularly for sightings.

Data Handling
There is a record sheet for each plot. The location is verified and accompanying notes checked in case of any exceptional variable that would mean the plot would have to be discarded from the study. Then for each species, the total scores are added. Some animals make numerous scratchings and tracks, which could bias the results although the activity may only be limited to a small area. To overcome this, we have implemented a maximum of three points for tracks and signs for any one species in any one plot. Droppings and sightings, however, are more indicative of the actual number of animals and so do not have a maximum applied. For each plot and for each species, the score for droppings and sightings is added to the score for tracks and signs and then summed for fifty plots in one area. If slightly more or less plots are completed, the totals are calculated per fifty plots.

Prior to 2004, the five plots for each square were summed as a square before being added into the whole. This was not possible this time, because many squares had less than five plots completed. The totals for fifty plots should be unaffected.

RESULTS AND DISCUSSION

Species list
A list of the 33 species previously recorded in the Nyika National Park is given below in Table 1. Those animals named in bold type were directly sighted on the expeditions. The number of large mammal species reported in the squares was 26, including the smaller Scrub Hare, Genet and Caracal. Elephant Shrew, Mole Rats and Rats were recorded when they were encountered, although they are small mammals and not included here. A species list appears in Table 1 below. The systematic order followed here is according to Ansell and Dowsett (1988) after Meester et al. (1986). Some species were only recorded outside the plots. Bold print indicates that the species was sighted in the Park during the expedition. Species marked with an asterisk were not recorded in the 2004 expedition survey area, although cats and otter in particular may have been present.

Notes on Interesting Species Recorded
The Red rock hare was first described from the Nyika Plateau and is believed to be an endemic sub species (Ansell and Dowsett 1988). It is described as nocturnal, living in rocky hills and sheltering among boulders and in crevices. Experts varied as to whether it is social or not. This is a first record for Biosearch in this new area that includes high, rocky peaks of Mpanda and Kawozya.

Lion was recorded in this area on the reconnaissance in 2003, but was not recorded in this 2004 expedition. There were a number of reports of a pride near the Zambian Resthouse on the western side of the Park, approximately 40 km away. Lion is believed to have been absent for many years prior to two sightings on the Plateau in 2000 and in 2001.

The Honey Badger is a red data species and occurs in all types of habitats and probably at all altitudes. They are solitary or in pairs and terrestrial but will climb trees for honey. Found throughout Malawi although there is no record from the Mulanje massif. (Ansell and Dowsett 1988)

Table 1: Species List 1997 - 2004
Large mammal species recorded in the northern hills of the Nyika National Park.

Yellow Baboon	*Papio cynocephalus*
Scrub Hare	*Lepus saxatilis*
Rock Hare	*Pronolagus rupestris nyikae*
Porcupine	*Hystrix africaeaustralis*
Side-striped Jackal	*Canis adustus*
Cape Clawless Otter*	*Aonyx capensis*
Civet	*Civettictis civetta*
[1]**Rusty-spotted Genet***	*Genetta rubignosa*
[2]Banded Mongoose	*Mungos mungo*
Slender Mongoose	*Galerella sanguniea*
Honey Badger	*Mellivora capensis*
African Striped Weasel*	*Poecilogale albinucha*
Spotted Hyaena	*Crocuta crocuta*
Leopard	*Panthera pardus*
Lion	*Panthera leo*
[3]Caracal or Red Lynx*	*Felis caracal*
Serval*	*Felis serval*
Wildcat*	*Felis silvestris lybica*
[4]Tree Hyrax*	*Dendrohyrax arboreus*
African Elephant	*Loxodonta africanus*
Burchell's Zebra*	*Equus burchelli*
[5]Aardvark	*Orycteropus afer*
Bushpig	*Potamochoerus porcus*
Warthog*	*Phacochoerus aethiopicus*
Buffalo	*Syncerus caffer*
Bushbuck	*Tragelaphus scriptus*
Kudu	*Tragelaphus strepsiceros*
Eland	*Taurotragus oryx*
Common Duiker	*Sylvicapra grimmia*
Red Duiker	*Cephalophus natalensis*
Roan Antelope	*Hippotragus equinus*
Reedbuck	*Redunca arundinum*
Klipspringer	*Oreotragus oreotragus*
Grysbok	*Raphicerus sharpei*

[1] Only one previous record from the Nyika National Park which was questioned as it is believed to be absent from the montane areas. (Ansell & Dowsett 1988) Not in Johnson (1990).
[2] Species not recorded in *A Visitors Guide to Nyika National Park, Malawi* (Johnson c.1990), but listed as widespread in lowland areas in *Mammals of Malawi* (Ansell and Dowsett, 1988) and signs positively identified by Park scouts. The Slender mongoose droppings were clearly rich in termite heads and diggings were located at such sites.
[3] Only one unconfirmed record for the Nyika. (Ansell & Dowsett 1988)
[4] Tree hyrax is a Red Data species first recorded by our Biosearch expedition upon capture of a poacher (Overton 2003).
[5]Species not formally confirmed as being present in Nyika National Park. Large holes in termite mounds are locally accepted as indications of their presence.

Number of Species recorded
The number of species recorded within the plots was 21, similar to previous years. The Rock Hare has not been previously recorded. There were no signs of Wild Cat, Otter or Zebra. The absence of Zebra is not surprising as we recorded previously that Zebra confines itself almost entirely to the Nyika Plateau (Overton 1999). Previous studies have shown numbers of Wild Cat and Otter to be very low and localised, so it is reasonable to assume that they may well be present, although not recorded in this study. This very northern region was distinctly drier, with most watercourses dry and vegetation more sparse than the previous expedition areas. Although not analysed, the print holding quality *may* have been less than the valleys previously studied, with a slightly higher proportion of steep slopes covered in a gravel of quartz micre schist.

Comparison of zones
The relative abundance of signs of activity for each species in each plot is shown in Table 2.

Three topographical zones were recognised within the 10x10km study area, the lowland most northerly area, below 4000', hills and valleys up to 6000', and highland ridge between Mpanda and Kawozya above 6000'. The number of whole plots studied was 10.5 in the lowland area, 43.5 in the hills and valley between 4000' and 6000', and 17 plots on the ridge above 6000'.

The vegetation in terms of percentage cover of trees and of grass cover is shown in Figure 2. The grass cover shows a clear increase with altitude, limited at lower slopes partly by the tree canopy and partly by bushes and shrubs. The tree canopy is reduced at the upper slopes and confined to patches above the *Protea* scrub layer, which occurs at around 6000' in this area of the Park. (For example, *Protea* is noted as dominant in several plots of square 12, and plot 886704, in particular.) The tree canopy at the lowest levels appears to have been reduced by previous human activity, prior to the area being proected as part of the National Park. Regrowth may be further inhibited by flash floods and to a small extent by grazing cattle, signs of which were found in every plot of kilometer square 2, (grid reference 8272), four kilometers south of Uledi, close to the North Rukuru River.

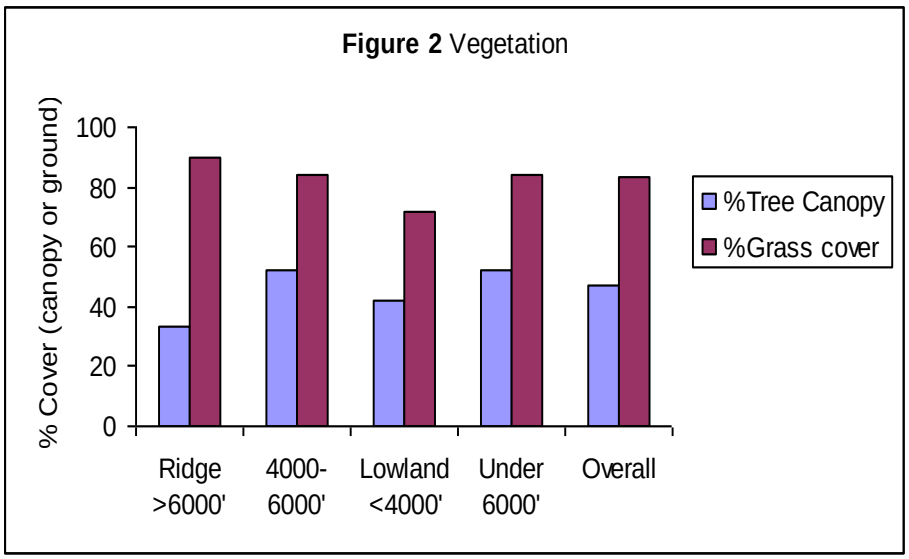


Figure 2 Vegetation

Effect of altitude on distribution of large mammals.
Figure 3 illustrates the effect of the altitudinal zones on the natural activity of some large mammals. More signs of activity from Bushpig and Mongoose were found on the upper slopes. Buffalo and Roan Antelope showed a similar pattern, but the amount of activity was generally low. Activity signs of Common Duiker, Hare and Baboon were greatest at the lower areas. Grysbok showed a similar pattern, but fewer. Hyaena seemed to be equally active at all three altitudinal zones.

Some species were previously found to prefer the lower zones, and the reduction in this region may be due to poacher pressure. Figure 4 illustrates the species that are reduced at lower levels. Of these, the exception is the Roan Antelope, which is characteristically found on the higher slopes, preferring the high open grasslands. Kudu, Bushbuck, Porcupine and Buffalo would normally occur equally or in greater numbers at the lower altitudes. Kudu originally ranged throughout Malawi except the montane areas. They inhabit woodlands and thickets, including secondary growth after cultivation and occur in groups of one to four. They are a large antelope and have a remarkable capacity for survival for such a large antelope, but populations seem to be inhibited by poaching in this area. Porcupines and Bushbuck were found throughout Malawi, including the montane areas and one would expect all three species to be in good numbers at the lower altitudes of this region. The African Buffalo is usually associated with woodlands, grasslands and thickets, or forest patches and originally ranged over the whole of Malawi, except the highest altitudes (Ansell 1988). They are non-territorial and traditionally occur in large herds, small batchelor groups or singly, as loan old males. Their absence from the lowest altitudes and their small numbers probably indicates the extent of human influence. Some species were very little recorded; these are shown in figure 5. The Honey Badger is known to be rare. The Civet and Leopard are soft-footed predators and would be harder to record. However, the

Elephant, Aardvark, Eland and Grysbok are well recorded by this method. The low number of records for these species is of concern.

Figure 4 Large mammals whose numbers are reduced at lower levels

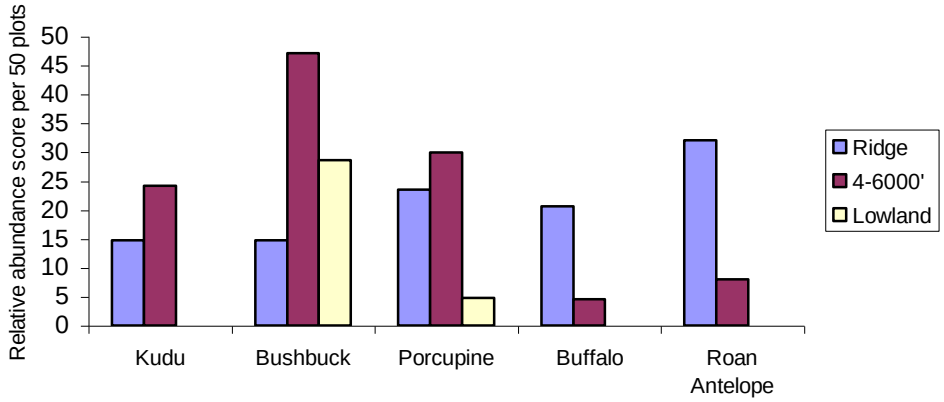


Figure 3 Mammals whose distribution varies with altitude

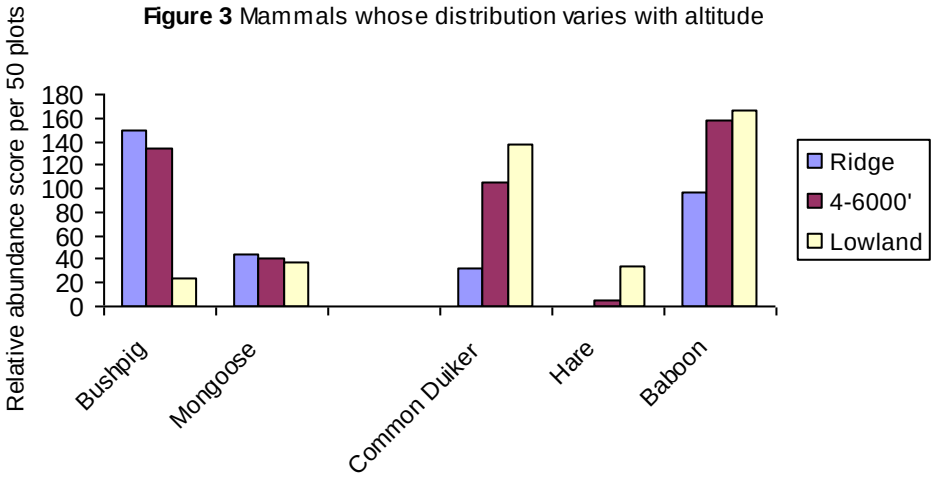
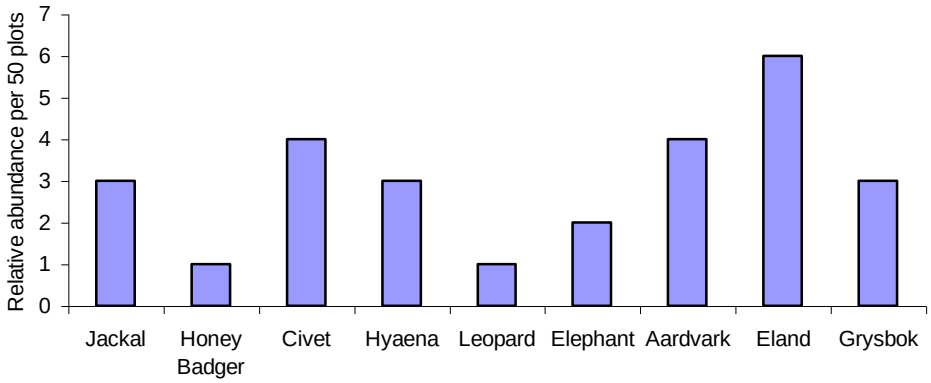


Figure 5 Large mammals with a low recorded activity



Comparison with previous years

Dry season July/August surveys have been carried out in the northern hills immediately south of this expedition area in 1998, 1999, 2001 and 2003. Three topographical areas were previously studied; the Sawi-Guwu Valley lowlands down to 3,500', the Chipome Valley between 4,500 to 6,000' and

Plateau above 6,000' to 7,500'. Geographicaly, the Chipome Valley is comparable to the mid-altitudinal range or "slopes" of this study, also dominated by *Brachystegia* woodland. The ridge between the two Peaks of Kawozya and Mpanda are equivalent in habitat to the Plateau, above the *Protea* layer, dominated by grasslands and with forest patches.

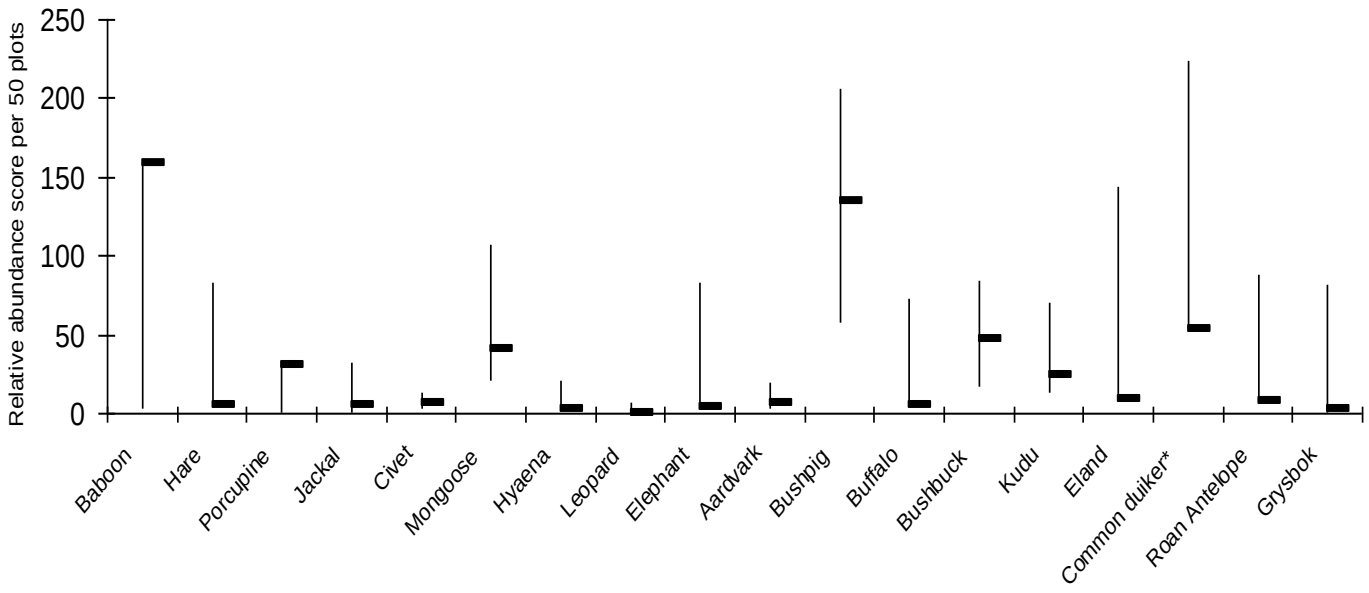
Comparison of two woodland areas, slopes below the ridge (2004) and the Chipome Valley (1999-2003) is shown in table 3 and illustrated in figure 6.

Table 3 Comparison of relative abundance of large mammals on the slopes of the Mpanda-Kawozya Ridge with the Chipome Valleys.

	Bab	Har	Por	Jac	Civ	Mon	Hya	Leo	Ele	Aar	Bp	Buf	Bush	Kudu	Ela	Comm	Roan	Gry	No. of species
1998 Chipome	2	32	3	24	8	38	8	6	78	16	79	43	36	17	51	108	87	3	22
1999 Chipome	39	49	1	32	3	94.7	20	0	83	19	115	72	84	70	144	430	24	0	22
2001Chipome	53	67	0	0	2	20	10	0	82	3	57	23	17	13	8	270	40	20	16
2003 Chipome	90	82	12	0	13	107	2	2	37	5	206	25	68	52	24	446	30	81	23
Ave	46	57	4	14	6	64.9	10	2	70	11	114	41	51	38	57	314	45	26	
2004 Ridge slopes	159	5	30	5	7	40	2	0	3	6	134	5	47	24	9	106	8	2	21

Figure 6 Comparing activity of large mammals on the slopes of the Mpanda-Kawozya Ridge with the Chippome Valleys

- marks the 2004 result, vertical line is the range from all valley surveys 1998-2004



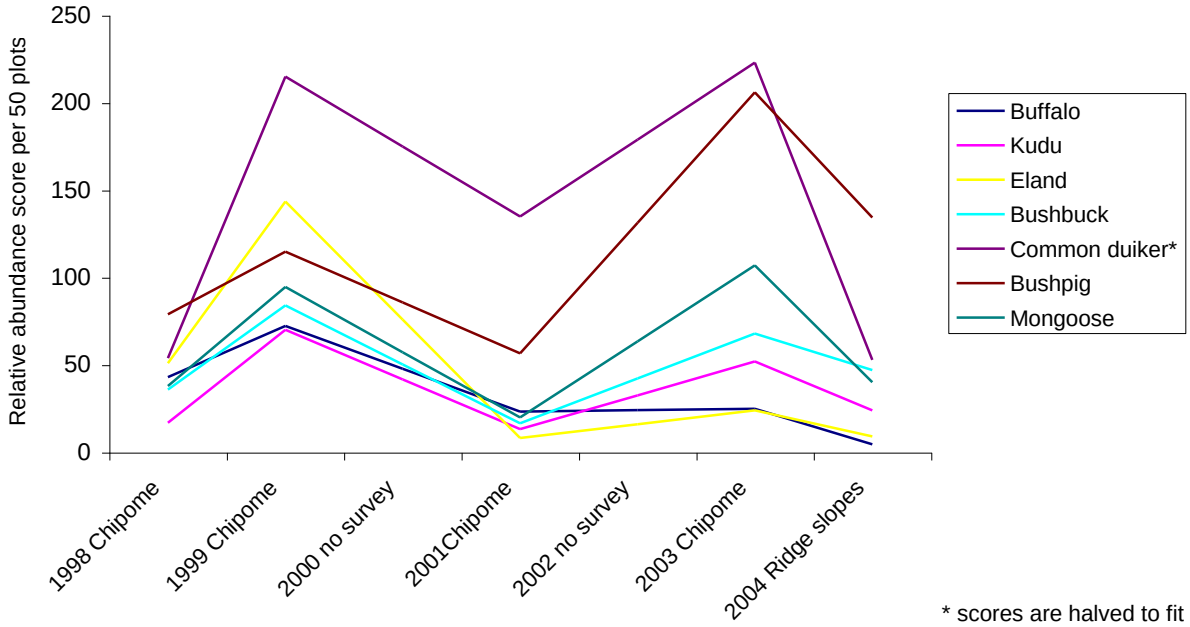
Brachytegia Woodland areas

Almost all mammals that occurred in both sets of data were far lower in the 2004 survey area on the slopes of the Mpanda-Kawozya Ridge than in the Chipome Valleys. Indeed, the activity levels were often well below the range of results recorded in the previous years since 1998. It is possible that the print -holding capacity of the ground was markedly different in the two areas or that rainfall has been markedly less in this more northern area, so that fewer prints are made. The data would need to be repeated in a further year to ascertain this. However a species such as Common duiker normally records such high data through producing copious droppings rather than tracks. Droppings would remain on the ground in the drier areas, but it is possible that fewer are produced, if feeding is dry and reduced. The exceptions are the Baboon, Mongoose and Bushpig, all of which are prodigious diggers in their search for food and so leave many signs. Digging may be greater in dry areas, where there are fewer options for food. More baboons were seen here than ever before in our study areas, with a troop counted in at 80 individuals in one troop that came into Base Camp. A second troop of fewer individuals was also seen. Baboons may also have flourished by feeding on the crops of the village down close to the North Rukuru River.

Woodland Population Changes over time

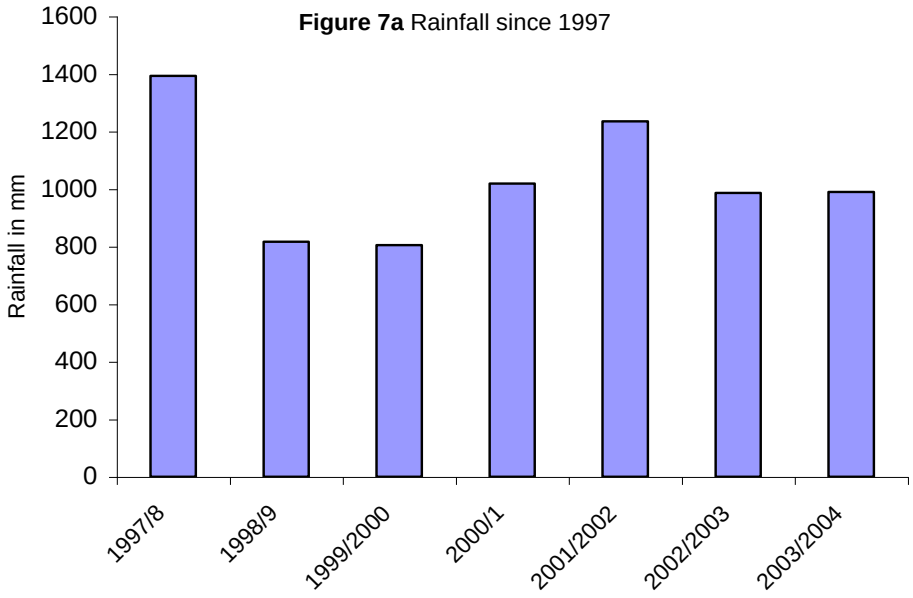
It was previously noted that some species showed a distinctive pattern of activity over time, either due to poaching pressures or environmental factors (Overton 2003). These are shown in figure 7. Elephant and Aardvark showed a similar pattern, though less marked. For the two dry seasons where no survey took place, the line is simply extrapolated.

Figure 7 Large mammals in woodland



* scores are halved to fit

Figure 7a Rainfall since 1997



We have now obtained the rainfall data from Chelinda for that period. There does seem to be a correlation where a good rainy season is followed by an increase in the relative abundance scores for these species.

An exception to the pattern is the Baboon, which has been on the increase throughout the period of study. Evidence of poaching the baboon populations was found, so their populations are increasing despite this pressure. Baboons do stay close to human habitations around the edge of the Park

(personal communication) but this increase is seen deep within the Park. The most likely explanation of the increase in baboons is the reduction of their major natural predator, the leopard. Leopard is soft-footed and direct records are therefore few. Records are too low to see a trend. The best measure of their population may well be the populations of their prey species which indicates a fall in the predator species.

In stark contrast, there is a fall in the elephant population, which is of considerable concern. It is possible that these dry, far northern valleys are less attractive to elephant at this time, but signs of

Figure 8 Baboon Activity

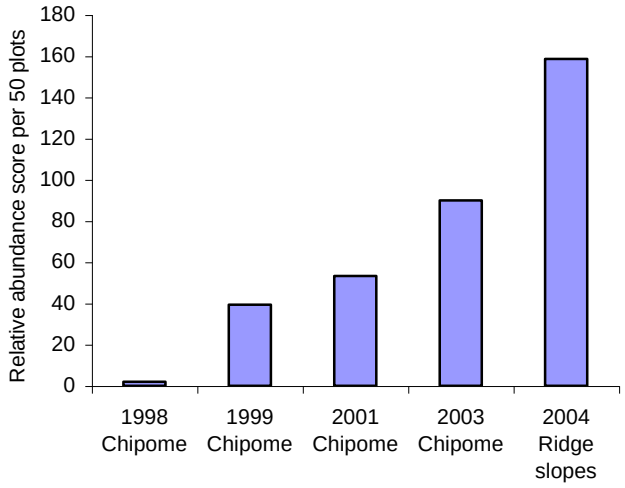
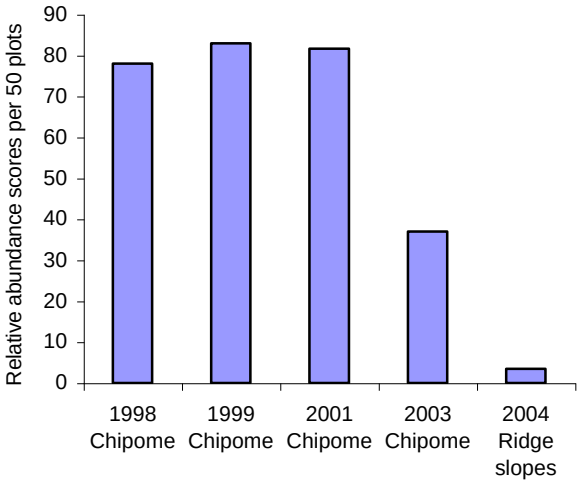


Figure 9 Elephant Activity



elephant damage last for years, and droppings and prints stay at least since the previous rainy season. Elephant populations are clearly low in this area.

Comparison of large mammal populations at high altitudes

The Mpanda-Kawozya ridge is a relatively narrow strip of plateau-type vegetation with rolling hills, rainforest patches and open grasslands. Very small streams provide water, even on the ridge itself. Some species normally associated with lower *Brachytegia* woodland do extend onto the relatively narrow ridge, crossing over the ridge. Fingers of more dense vegetation do extend high up the sheltered valleys. Thus populations of Buffalo and Kudu were found on the ridge, but not on the plateau itself.

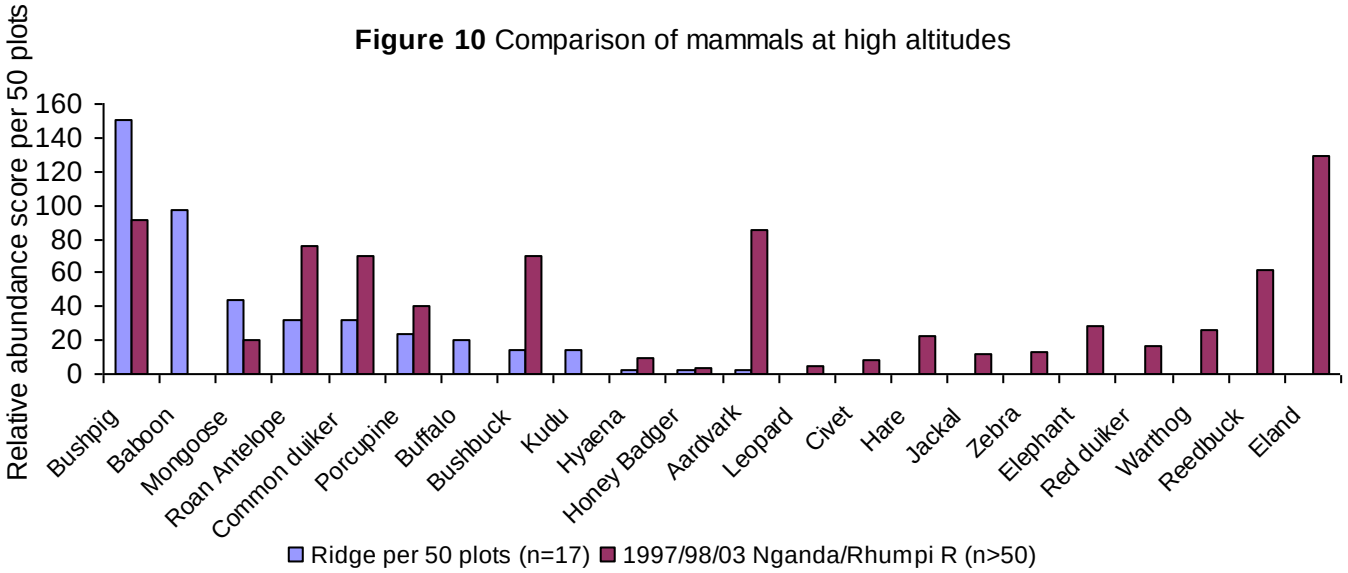
The species present on the ridge are shown in Figure 10 and compared with those found previously on the plateau.

Many species found on the plateau were missing from the ridge, notably Eland, Zebra, Reedbuck and Warthog. Eland is found on lower slopes but it seems that Zeba, Reedbuck and Warthog are highland animals, reluctant to drop down off the plateau and are thus isolated from the ridge. Roan Antelope however, has crossed over and it would be interesting to find out if this population was isolated and genetically different from that on the plateau.

Elephant is in low numbers in the expedition area and so it is not surprising that it was not found on the ridge. There were plenty of signs of Baboon, but no sign of Leopard, which was disappointing.

The accuracy of results is increased by combining plateau data from 2003/1998 and 1997, so that this data is representative. The 2004 sample size was 17 plots 100x100m on the ridge between the two peaks. The ridge is itself a relatively small area, so 17 plots is a fair sample size for the area.

Figure 10 Comparison of mammals at high altitudes



CONCLUSION

The number of species in these dry, northern valleys was on a par with that in the Chipome and Mondwe Valleys. Lion was not recorded on this expedition, though there was an unconfirmed sighting on the recconaisance visit in the previous year. Very striking is the reduced numbers of signs over all species and the increase of the prey species, Baboon. The print-holding quality of the ground is less in this dry region, so a clear comparison is difficult to ascertain. The effect of this difference is lessened in our system of analysis as it gives higher priority to droppings and figures for these were also lower in this area than in the Chipome/Mondwe Valleys. Signs of poaching were found, in particular on the lower slopes of the Kawozya, which is the area closest to the plateau. Poaching is clearly having an effect on the large mammal populations.

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Impala at South Luangwa *Joanne Walker*

POACHING REPORT

Andrew Bourne and Roxanne Magee

INTRODUCTION

This survey was designed to report the amount of evidence and activity of poaching, found within the area covered by the large mammal and botanical surveys, carried out the same year by the Biosearch Nyika expedition.

The survey of the Nyika national park was carried out in the north east of the park as shown on the map of poaching evidence below.

METHOD

The survey was carried out at the same time and places of the large mammal and botanical surveys. Any evidence of poaching was recorded, by photograph where possible, and then destroyed using the most appropriate method available.

EVIDENCE OF POACHING ACTIVITY

Below are the dates and grid references, where available, for the evidence found by the expedition. The records are divided into the two main groups for ease of reference. The signs are marked on the map and accurate grid references from o/s maps Kisyombe 1033B2 and Nganda 1033B4 are given.

Kawozya group

15 July	Fifteen bird snares	828726
	Two elephant shrew snares	828726
	Poaching trail (2 weeks old) - 4 poachers heading south.	828726
16 July	Two guinea-foul snares	825757
20 July	Poacher hut/camp	872643
	Two fire shelters	876645
	Wood cutting	876655
22 July	Burning	824703
	One-day old human footprint	830700
23 July	Wood cutting/string making	842685
	Scouts found poaching camp built in March	881669
	Eighteen wire snares (2 weeks old)	881669
	Zambia poachers spoon in tree, possible signpost?	859675
25 July	Burnt poacher hut	881669
26 July	Poaching camp from March found	899659
	Tree bark taken for plates to hold honey.	899659
	Poaching camp found (est. March)	900660
27 July	Snare found along river (2weeks old)	893657
	Two drying wracks from march	917655
	Path going south to north	909655

29 July	Beehive/nest found with rock in and old fire at bottom	865675
31st July	Poaching camp found around Bleak House	890705
	Poaching camp found at Camp Andy	896706
1 August	Poaching trail found	902715
	Poaching trail found	902713
	Poaching of honey found	903703
3 August	Large poaching spoon found near Camp Andy. Scouts say spoon is large enough for 9-10 poachers	896706
4th August	Poaching spoon found near Camp Overton	867696
	Poaching fire seen north of Kawozya	

Mpanda group

15 July	Poaching of honey	832737
	Poacher's shoe	832737
21 July	Burning – two sites	822697
22 July	Pitfall trap (30 years old)	872704
25 July	Honey poaching (2 weeks old)	878683
	Poaching camp (3 years old)	891681
	Drying wrack	895689
27 July	Camp fire, spoon, rifle sticks (one month)	866701
1 August	Poaching trail	861722
2 August	Poaching trail and Zambian matches found	853733

Descriptions of evidence

Much of the poaching evidence found by the group in the survey area has distinct cultural significance and can be used to shed light on the origins of some of the poachers.

Cooking spoons
Several cooking spoons where found within the survey area (around abandoned camps, beside streams/rivers, etc.). Since the shape and form of cooking spoons are very traditional they can be used to trace the origins of those who made them. Malawian cooking spoons have a narrow handle and a triangular flattened paddle. Zambian cooking spoons have a thick handle and the paddle is essentially just a flattened part of the wood.

Matches
One piece of evidence that was collected was a box of matches of a type used primarily in Zambia.

Burning
Poachers burn down sections of the National Park in order to drive animals towards poachers, to reduce cover and to attract game onto the new shoots when they appear. Some fires may be started to collect burnt small mammals.

Poaching equipment/devices
Many of the snares, which we found in the survey, were made of thin winch wire. This can be cheaply purchased and can easily be made into snares. Other snares were made of string. Due to the

proximity of the villages of Uledi and Kopakopa these snares where almost certainly set by the local Malawian people.

Poaching huts/camps
From discussions between the group and the game scouts, the construction of the camps and huts found in the survey area was deemed to be of Zambian origin. The huts and camps dated from the rainy seasons of the last three years. During this time the North Rukuru River at Uledi floods and the game-scouts and people from this locality are cut off from the Nyika National Park.

Rifle sticks
The group found rifle sticks on July 27. These are thin but sturdy sticks used by the poachers to clean out their firearms.

Pit fall traps
Although one trap was found, the game scouts explained that it was approximately thirty years old and that this type of trap was no longer in use in the area. A tree of about 10cm diameter had grown up from the depths of the pit.

Poached materials
We found evidence of poaching animals for bush meat. This included poaching equipment, snares and remains of animals, such as bones around campsites. The location of campsites is also a good indication of what animals were being taken, since the hut/camp found on 23 July was surrounded by evidence of animals such as bush pigs and baboons.

Honey poaching was also found to be widespread and many hives have been opened, smoked-out and raided by humans.

Comparison with Biosearch Nyika 2001

The Biosearch Nyika poaching report from the 2001 expedition, by Mark Gilroy, states that “a lot of the poachers are ex-military men with illegal fire arms and good survival/hunting skills.” The scouts, in the discussions that they had with the group, echoed this sentiment. Gilroy also states that the poachers that enter the National Park originate from within Malawi and its bordering countries such as Zambia and they number from 2 to 5 in a group. Again this statement was repeated to the group by our scouts, although we were operating on the north east side of the park, more accessible from the west, compared with much of the evidence from 2001 coming from the Sawi-Guwu valley area.

DISCUSSION

Much discussion on poaching is in the Large Mammal Survey report of this publication, but further comments are made here. Malawi is a country with 54% of the population below the poverty line (NationMaster.com 2004), thus the temptation to poach wildlife is considerable. The small string snares to trap elephant shrews and the larger wire snares to trap Roan antelope and other large mammals give clear indication that both large and small mammals and birds, are being removed from the park.

Poaching in the park is not new. The pit-fall trap found on 22 July indicates that poaching methods have changed with time. The evidence that some of the snares are made of winch wire, which must be purchased for the purpose, suggests that poaching in this area of the National Park is done at least by some, for commercial reasons and not for subsistence. Today snares, be they wire or string, are the main method of poaching. However, the game-scouts have evidence of Zambian and Malawian-made guns, and the rifle sticks found by the expedition, give a clear sign that fire-arms are used for poaching purposes. Since the poaching of animals in the area surveyed is primarily done with snares, it is indiscriminate. This can lead to destruction of species and biological balances and a loss of biodiversity. The deforestation, produced by the burning of sections of the park by the poachers adds to this problem.

The game scouts do not reach the area surveyed by this expedition all year round as the river at Uledi floods in the wet season and cannot be crossed safely. Because of this, the poaching groups that work within this area of the Nyika National Park are, on the whole, larger, with the smallest consisting of four people and the largest with nine to ten, as shown in our records. Since the groups of poachers appear to be larger they may be able to stay within the survey area for longer. This allows them to fully exploit the opportunity they are given when the river floods and the game scouts are excluded from the park.

Evaluation

The survey was linked with the large mammal survey areas, so some parts of the region were not searched. Excluding camp rest days, we had two teams spending an average of six hours a day out in the field over twenty-five fieldwork days, a total of around 1,500 man-hours.

Another obvious limitation was the time frame. We spent a relatively short time in the area during the dry season. Wet season results may have been quite different. Repeating this survey would build up a good picture of the poaching activity that occurs in the area.

Further studies in the villages would allow for a broader understanding of the relationship between the National Park and the people who live around it. This is the foundation of the ongoing Border Zone Project run by the Nyika National Park. Closer working between the Zambian and Malawian authorities under the new agreement is likely to bring important progress in protection of the wildlife reserve.

ADDITIONAL REFERENCES

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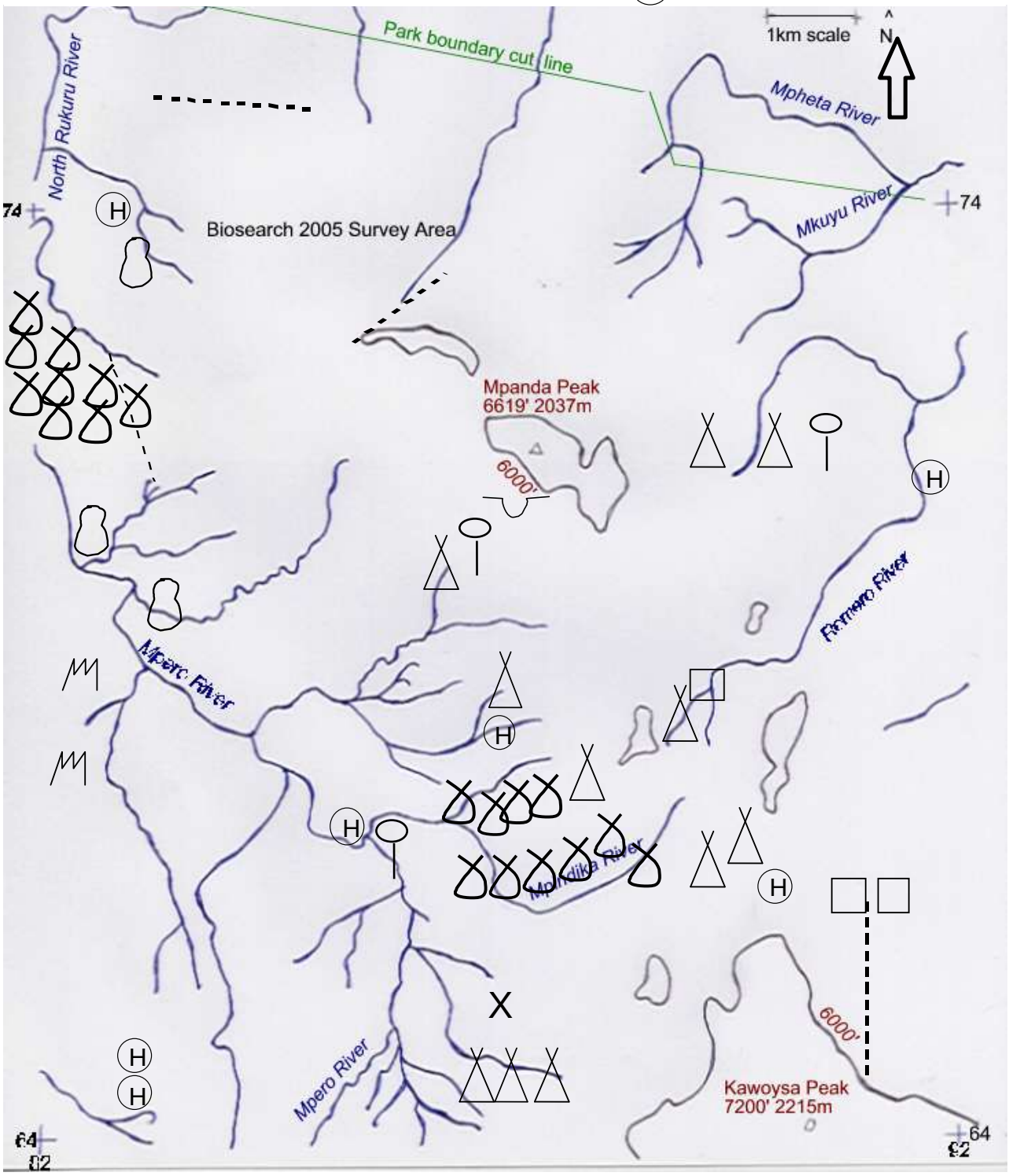
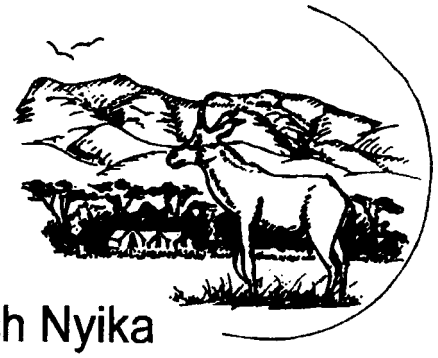
NationMaster.com 2004

Vervet monkev *Joanne Walker*

Map of Poaching Evidence

Trail
Pitfall trap
Burning
Footprint
Spoon
X Wood cutting
Drying Rack
Snare
Poachers Camp
H Honey Poaching





ACHIEVEMENTS OF BIOSEARCH 2004

Congratulations and thanks to each team member. Individually and together they have:

- made a substantial contribution to the long term conservation research project working with the Malawi Department of National Parks and Wildlife. By conducting carefully planned scientific surveys to places normally inaccessible, even to the game scouts, who also need our logistical back up. This international interest and sound research leads to an increase in resources to protect the Park.

- trekked, lived and worked in one of Africa's true wilderness areas, almost inaccessible, with no people and no roads. They have experienced a wild place that few are privileged to see and they have learned how to live in that environment. They have tackled the physical and psychological demands of living in a wild place.

- Contributed to this book, which is available to further their careers.

- achieved success in the Nyika, where they have enjoyed the wilderness on foot safely and without damaging their environment.

- have closely shared trials and tribulations, made good friends and useful contacts with members of other Universities and professionals in Malawi.

- have supported the work of Malawian team members, many of whose names are becoming very familiar in our reports. They have said they greatly appreciate the support of the team members and their colleagues in the Nyika National Park, encouraging them in an otherwise daunting task.

The project has enabled Malawian scientists to travel to other countries to present their findings and to partake in partnership work. A Malawian MSc has been achieved on the small mammal research of the Biosearch expeditions. A Malawian botanist has been able to travel to Britain to work at the National Herbarium and Botanic Gardens at Kew, London, working alongside a host of specialists.