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## Mt. Tshiaberimu 1997 – Research Expedition to a Nearly Lost Forest

The slogan of the *Berggorilla & Regenwald Direkthilfe* – direct aid – again proved true in the still politically instable situation of former Zaire. While most large governmental and non-governmental organizations in times of political changes wait until a stability is restored, the *Berggorilla & Regenwald Direkthilfe* wants to take action especially during these states of emergency for the preservation of the African tropical forests and their wildlife.

### Mountains of the Spirits

In the montane rain forest of Mt. Tshiaberimu along the westbanks of the Albertine Rift Valley in the east of the newly formed Democratic Republic of Congo, a considerably reduced and totally isolated population of gorillas still exists (see *Gorilla Journal* 13/1996). The area is part of the Virunga National Park and therefore receives international attention, also for conservation efforts. Thus, there is a realistic chance to save these gorillas and – in the long term – for a growth of their population.

In cooperation with the European *Dian Fossey Gorilla Fund* (DFGF-UK), which mainly funded the trip organized by Esteban Sarmiento and Thomas Butynski, the *Berggorilla & Regenwald Direkthilfe* participated in a research expedition to Mt. Tshiaberimu in June/July 1997. We financed the equipment for the rangers and the transport of this material to the area; two researchers participated in the scientific survey. The aim of the expedition, besides collection of basic biological data, was also to help improve the conservation of this region.

### Journey into a New Country

With 280 kilograms of ranger equipment, we travelled in convoy together with five other participants to the Democratic Republic of Congo. Our apprehensions were unfounded that the situation at the Kasindi border post would not allow us to pass due to fights in nearby Bundibugyo. After 4.5 hours of customs clearance, we passed the Congolese border.

We were welcomed by Jean-Paul Kambale Shabantu, at that time conservator of the Virunga National Park North Sector. He already had the working permits for every participant and an official ICCN (*Institut Congolais pour la Conservation de la Nature*) document which allowed us to pass every road-block unhindered. Our original schedule had to be changed because some time before Mobutu soldiers had burned the Semliki ferry. Consequently, we had to make a 120 km detour via Beni and Butembo, which took us 1.5 days longer, but this gave us the opportunity to have a look at the general situation in this region. In some parts of the northern Virunga Park we saw smoke clouds, indicating poacher activities as the conservator told us. On the roads as well as in the cities, there was a strong army presence, but the general mood of the Congolese seemed to be good. We also saw a lot of construction work and the availability of supplies seemed reasonable.

### In the Gorilla Bamboo Forest

At the park post in Burusi, a village at the edge of Mt. Tshiaberimu, the rangers were already waiting for us. Two days before, Thomas Butynski and Esteban Sarmiento had arrived and started their search for gorillas as well as their survey of birds in the research camp situated at 2,700 m in the central forest area.

Our first impression from the edge of the forest was confirmed inside the park: The extent of human encroachment, such as wood-cutting and -burning and gold mining, was enormous. Thomas Butynski, who had already surveyed this area in 1995, estimated a 10-fold increase of these human activities. We were also informed that the last forest elephants had been killed in spring 1997. According to various sources, during the war, chiefs of the surrounding communities had declared that the park borders no longer existed and encouraged people to use the land for their needs. The unarmed rangers were not able to put a stop to this.

On the first day in the main camp, a gold miner and a poacher were arrested. During our stay, about 40 wire snares were found, one of which had caught a blue monkey, another a black-fronted duiker. During the whole survey, a total of 120 snares were found as well as another blue monkey in a snare.

## Direct Aid Works Immediately

In view of this extremely difficult working situation, our delivery of equipment to the rangers was very well appreciated. In order to replace stolen material, the *Berggorilla & Regenwald Direkthilfe* brought the following items: 18 sleeping bags, 5 blankets, 15 rucksacks, 20 pairs of gum boots, 23 T-shirts, 8 ponchos, 60 pairs of socks, 3 tents, 8 water bottles, 3 binoculars, 2 compasses, 5 torches, 5 tarps, 6 water resistant bidons, stationery and other camp equipment. These materials and our acknowledgement of their efforts under difficult circumstances had a big impact on the motivation of the rangers and their superiors.

Claude Sikubwabo was equipped by *Berggorilla & Regenwald Direkthilfe* with 2 binoculars, 2 compasses, some other material and money as a replacement for the losses from the looting of his house. But even this seemed to us like a drop in the bucket. DFGF project assistant Vital Katembo told us that the monthly salary of US\$ 20 per ranger had so far only arrived irregularly.

Research teams for the survey were established, focusing on mammals (E. Sarmiento, T. Butynski, V. Katembo, C. Sikubwabo, I. Weiche, M. Daly), birds (T. Butynski, C. Jackson, T. Imboma, J. Fuller) and botany (U. Karlowski, B. Bytebier).

## Biology of the "Mountain of the Spirits" – The Vegetation

The survey on the vegetation units of Mt. Tshiaberimu gave the typical impression of afro-montane forests. The biggest portion is covered by bamboo, followed by afro-montane secondary forest, forest dominated by *Podocarpus*, *Rapanea* and Rubiaceae, and ericaceous belt. An afro-alpine zone is lacking because the altitude of Mt. Tshiaberimu is about 3,100 m, whereas the afro-alpine zone of other regions starts at about 3,400 m.

During this first new botanical survey by Ursula Karlowski, 124 species out of 41 families were verified. B. Bytebier, who focussed on orchids, found 14 additional orchid species, so that in total the species inventory to date includes 138 species of higher plants. Most of these belong to the families Asteraceae (15), Orchidaceae (14) and Poaceae (8), Rosaceae (6), Rubiaceae (6), Apiaceae (5), Euphorbiaceae (5), Ranunculaceae (5), Acanthaceae (4), Cyperaceae (4) and Lamiaceae (4). The inventory does not take into account mosses, ferns and lichens.

The afro-montane rain forests are limited to the mountain regions of Africa and make up the smallest portion of all primary African biotopes. They are therefore among the most endangered tropical regions and a habitat to many endemic species. The conservation of these areas is not only necessary for the survival of many animal and plant species; these areas are also important headwaters of many rivers and play a crucial role in climatic and water conditions of an entire region.

A small overview on the mountain forest vegetation is provided by the following plant communities:

- afro-montane secondary forest, mainly at the park edge
- typical afro-montane clearings at the park edge
- *Macaranga-Xymalos* montane forest (park edge)
- bamboo zone (main plant communities)
- bracken fern dominated secondary vegetation in the bamboo zone
- *Podocarpus* forest
- *Rapanea-Galiniera* mixed forest
- ericaceous belt

Further on, surveys were made of the vegetation of a high altitude swamp and of sources at the influx of creeks.

## The Wildlife

Thomas Butynski and his group identified 80 bird species, with 15–16 of these endemic to the Albertine (Western) Rift. He stresses the importance of the region for the conservation of mountain forest birds. In contrast to the findings in 1995, there was little sign of small antelopes throughout the area. The only direct evidence was a freshly snared duiker in a poacher's trap. We assume that the increased poaching activities immensely impacted the numbers of these mammals.

Thomas Butynski confirmed the presence of Thomas' galago (*Galagoides thomasi*). Blue monkeys (*Cercopithecus mitis stuhlmanni*) were seen regularly. The search for the owl-faced monkey (*Cercopithecus hamlyni*) was not that successful. In the Tukote bamboo zone, we found fresh evidence of feeding activity normally ascribed to this species at 2,700–2,900 m.

During his 3-week stay, Esteban Sarmiento found and measured over 100 gorilla nests. He estimated that there were 14 individuals in 2 large groups, one including a 4–5 year old juvenile, and 2 solitary silverbacks. It is feasible that there is another "group" consisting of 2 individuals. The identification of this group is problematic, because they were nesting close to one of the other groups. A DNA analysis of hair, undertaken by Christian Roos/European Primate Gene Bank Munich, proved that the two silverbacks of these nest groups are different individuals. E. Sarmiento found that the groups ranged mainly in the central park area on the slopes of Mt. Tshiaberimu. We also found evidence of solitary silverbacks in the Tukote and M'Pens areas at about 2,900 m in the bamboo zone and mixed forest.

## The Future

At the end of our stay we discussed our suggestions for future work in the park with Vital Katembo and the conservator, e. g. the distribution of the rangers on more park posts, training of the rangers, regular patrols with written records, continuous presence of a project officer, sensibilization of the people and local chiefs in the surrounding communities.

We now want to reinforce our efforts for the conservation of Mt. Tshiaberimu, if possible in cooperation with DFGF-UK. Our main part will be to organize deliveries of equipment. We also want to provide the rangers with another tent for a patrol post and pay top-ups on their salaries. DFGF is trying to find a person who will be constantly present in the park for the next year or so to guide the rangers' work and improve the contact with the villages nearby. With this we hope that the gorillas of Mt. Tshiaberimu and their habitat will have a chance to see the next millennium with us.

*Iris Weiche and Ursula Karlowski*

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## Mushamuka's Story: The Largest Group and the Longest Tenure

When his appearance was first recorded in 1971, Mushamuka was already fully matured. Adrien Deschryver, the first warden of the Kahuzi-Biega National Park, tried to habituate 2 groups of gorillas in the late 1960s and began taking visitors to these groups in the early 1970s. Mushamuka was the leader in one of the groups. Mushamuka means old and wise man in the Mashi language.

Alan Goodall, who studied the Mushamuka group in 1972, called him Kelele (noise in Swahili) in his book entitled *The Wandering Gorillas*. The group had 20 gorillas with 2 silverback males, 1 silverback/blackback male, 3 blackback males and 4 females at that time.

A big change came in 1975. The leader male of a neighboring group, the other habituated group, was wounded in several fights with a lone silverback and died. Several females were lured away from this group, moved with the lone silverback, and finally transferred into the Mushamuka group. The size of Mushamuka's group rose to 31 with 12 females in 1976 and to 42 with 17 females in 1978, which is the largest group size of wild gorillas in their natural habitats.

From 1979 to 1983, several maturing silverback or blackback males left the group. They took females and immatures to form new groups. Some females transferred into neighbouring groups. These movements resulted in reduction of group size by half until 1983. Another four maturing silverbacks left the group in 1984 and 1985. Mushamuka was tolerant toward these males, who occasionally mated with females. Nevertheless, they emigrated from the group before maturity. Mubalala, a son of Mushamuka, also left the group at 13 years old in 1986 and took 5 females from the group. He stayed in the peripheral part of Mushamuka's range and encountered with other groups frequently. He acquired several females during these encounters and the group size rapidly increased.

Nindja, another son of Mushamuka, gradually left the group. In 1987 he became a silverback at 12 years old and started to copulate with females. Mushamuka was very tolerant toward him, and several females were always around him. The group frequently splitted into two subgroups, one of which included Nindja and females. When he left the group in 1989, five females (1 adult, 2 young, 1 juvenile and 1 infant) followed him and they formed a new group. Nindja encountered with the other habituated group at the end of 1989 and fought with its leader male, Maheshe. After several fierce fights, Maheshe was seriously wounded, and Nindja acquired more females with immatures from the Maheshe group.

Another maturing son (Bwana) of Mushamuka also left the group with a few females in 1992. Maheshe disappeared in November 1993 for unknown reason (later it was proved that he had been killed by poachers), and the Maheshe group travelled without any silverback male. Lambchop and Mintsauce, maturing silverback males of the Mushamuka group, occasionally visited the Maheshe group. Lambchop finally associated with Maheshe's females since March 1995, and Mintsauce started to travel alone at the same period. The number of females decreased in the Mushamuka group probably because of Mushamuka's reproductive inability. Two infants were born in 1993. One infant was born in 1994 but died at 1.5 month old. Since then, no birth was recorded in the Mushamuka group.

Mushamuka disappeared in April 1997 and was estimated to die of old age. He looked very old with lean face, wrinkled neck and lost teeth. His estimated age was 43–46 years at this time. He has been known as a leader male since 1971. It means that he led the group for at least 26 years, which is the longest tenure of male gorillas known. After he was lost, 2 young males

### Change in Age-sex Composition of the Mushamuka Group

Year	Silver-back	Black-back	Adult female	Immature dependent	Immature independent	Unknown	Total	Source
1972	2	4	4	2	5	3	20	Goodall, 1977
1975	1				5	15	21	MacKinnon, 1978
1976	1		12			17	31	Yamagiwa, 1983
1978	1	4	17	9	11		42	Yamagiwa, 1983
1983	1	4	6	3	6		20	Yamagiwa, 1988
1985	1	2	6	6	5		20	This study
1987	1	2	7	6	7		23	This study
1989	1	1	6	6	5		19	This study
1991	1	2	6	8	2		19	Mankoto et al., 1994
1993	3	0	3	2	2		10	This study
1995	1	1	1	3	3		9	This study
1997		2	3	3			8	This study

Age classes: Silverback: male over 13 years old; Blackback: male 8–12 years old; Adult female: over 8 years old; Independent immature: 4–7 years old; Dependent immature: 0–3 years old

at 8–9 years old, 3 females and 3 independent immatures moved by themselves without any adult male.

Mushamuka's story was reconstructed by the data collected by John Kahekwa, Serundori Eloi, Mankoto ma Oyisenzoo and myself. Serundori was one of the guides who habituated Mushamuka in the early 1970s, and John initiated the recording of demography of all habituated groups in the early 1980s. Mankoto has been working as Park Warden since 1987 and established the monitoring system for each habituated group.

The demographic changes recorded in the Mushamuka group during 26 years were similar to those of mountain gorillas in the Virunga Volcanoes. They form uni-male cohesive groups. Both males and females tend to emigrate from their natal groups before maturity and only males spend a solitary life before establishing new groups. However, some aspects of individual movements are different from the Virunga gorillas.

Firstly, when leaving their natal groups, some maturing silverbacks took some females away with them and formed new groups without experiencing solitary life. Such cases have rarely been recorded in the Virungas, where most males tend to travel alone for several years before acquiring female partners. Secondly, when females transferred into other groups, they were often accompanied by immatures. Some of them were even accompanied by newborn babies, and they were accepted by the new silverbacks who were not biological fathers of these babies. In the Virungas, immatures rarely transferred into other units with their mothers or by themselves possibly because of frequent infanticide by the new males. All the infants transferred with their mothers were killed by the leaders of the new groups. By contrast, no infanticide has been recorded in the Kahuzi region.

The lack of infanticide may be responsible for relatively free movement of immature gorillas in the Kahuzi region. It may also influence male dispersal after maturity and females' choice to transfer. Most sons of Mushamuka tended to stay in the peripheral part of Mushamuka's range after emigration and form their own groups with familiar females instead of travelling alone. Mubalala, Nindja, Lambchop and Bwana are sons of Mushamuka. All of them have established their range around their father's range to form a patrilineal community.

We are now analyzing the demographic data on the habituated groups of gorillas in the Kahuzi-Biega National Park. Although the data are still insufficient to realize the life history of such long living animals, this analysis will hopefully find some unique features of their social life which seems to be different from that of mountain gorillas.

*Juichi Yamagiwa*

## **Nindja Is Dead**

The silverback Nindja died on October 30. Soldiers travelling in a truck on the main road which traverses the park saw him feeding in the bamboo and shot him, about 6 km from the park headquarters at Tshivanga. There are several versions of Nindja's death. His head and hands were removed from his corpse. A rumour reports that he was eaten and that the soldiers kept his skin. The person responsible for instigating the killing has gone into hiding. In mid-November, the gorilla group was relocated, and its members were still together, although there was no silverback to lead them. Nindja had been the dominant male in this group since 1989.

Nindja is the third silverback leader of the gorilla groups that have been habituated for tourism in the Kahuzi-Biega National Park to die within the last 4 years. Maheshe was killed in 1995, and Mushamuka disappeared earlier this year. Only Mubalala remains of the four famous silverback group leaders. His group was habituated for tourism in 1986.

## **Our National Parks are Vanishing and our Gorillas Threatened by Extinction**

The community of nature conservation and environmental protection is mourning. Just a reminder: South Kivu and North Kivu, provinces especially interesting for tourists, have recently lost a considerable number of rare animals that have inestimable value for tourism, economy, science and culture.

The Virunga and Kahuzi-Biega National Parks, national fortune and World Heritage Sites, were the scene of violence and massacres of the biological diversity during the war of liberation, especially for gorillas, elephants and hippos, but also for other animal and plant species.

In the Kahuzi-Biega National Park:

- The famous gorilla Maheshe, patriarch and leader of a group (15 members) was killed in January 1994 by poachers; they have been identified but were not punished in spite of the evidence.
- The gorilla Mushamuka, also a patriarch and family leader of 8 individuals, was killed in April 1997 by poachers that have not yet been identified.
- Very recently, on 30 October 1997, the gorilla Nindja, leader of a family of 29 members, was killed perfidiously with bullets.

Within 10 months, from October 1996 to July 1997, over 150 elephants were killed in the Kahuzi-Biega Park. Not only these species of wild animals are threatened by shameless poaching; the habitat – the forest which contains that biodiversity – is also in danger, because it is systematically destroyed by tree felling and fires that were set aflame by humans.

Let's not forget, and this has to be emphasized, that tourism in the east of the Democratic Republic of Congo depends on the national parks. We call these acts, which are disgraceful as well as reprehensible, sabotage of the economy of South Kivu. Their effect is that our province and our country lose natural riches that are unique in the whole world.

This is a real alarm call, a SOS by Mr. Bakinahe Stanislas, ICCN Pro-vincial Director for South Kivu and Maniema, which he directs to everyone (decision-makers, intellectuals, farmers, government officials, military, ...). At the moment, the personnel for surveillance of the parks and nature reserves (rangers) no longer have the working materials at their disposal which would allow them to ensure the protection of our national parks.

If we still do not take our responsibility to nature, how will we answer the questions of future generations?

# Endoparasites in Gorillas and Humans in the Same Habitat

It has been shown that almost all free-ranging animals have parasites. As sick individuals are actually observed only rarely, the parasites' impact on the host animal had been underestimated for a long time. It is now well known, however, that parasites introduced by humans and those that appear after restriction of the habitat can have a very severe, although perhaps temporary, impact on free-ranging animals.

Primate species are increasingly threatened by the destruction of their tropical habitats. They are forced to retreat to protected areas which are continually decreasing in size. Studies have shown that parasite infestations increase in "stressed" ecosystems or, alternatively, that habitat destruction leads to the disappearance of certain parasite species. This means that parasites can serve as sensitive indicators of changes in the ecosystem.

## Parasites of Gorillas

Studies in American zoos and on free-ranging mountain gorillas have shown that in captivity parasites accounted for most deaths in gorillas between 2 and 12 years of age. In free-ranging mountain gorillas, they were the third most frequent cause of death. With the growing risk of decreasing genetic variety in threatened populations, the survival of the individual gains special significance. This is particularly true for the gorilla, as all gorilla subspecies are included in the *IUCN Red List of Threatened Animals*. Prophylactic measures for the prevention of new infections and for restricting the spread of existing parasite species may gain considerable importance for free-ranging gorillas in the future.

My Ph.D. study, in which the parasites of a free-ranging population of eastern lowland gorillas (*Gorilla gorilla graueri*) were determined for the first time, was funded by the DAAD (German Academic Exchange Service) and supported by the GTZ (German Technical Assistance). During the study I also collected data on gorilla behaviour and ecology which helped to explain the occurrence and distribution of parasites within and between gorilla groups, as well as between humans and gorillas. As part of the study, the humans living close to the park borders were examined, too. Park staff were also recruited from this population.

The Kahuzi-Biega National Park is the only protected area in which tourists may visit eastern lowland gorillas. Helminths (worms) were found in 67% of gorilla dung samples, and protozoans (single-celled organisms) in 12%. One tapeworm specific for gorillas which is transmitted by oribatid mites, 5 genera of roundworms and two protozoan genera could be detected. None of the gorillas showed signs of illness during the entire duration of the study. However, when certain parasites (tapeworms, 'small' eggs) were passed, diarrhoea occurred more frequently.

All identified genera of helminths appeared to be the same as those of the other gorilla subspecies. The proportion of eastern lowland gorillas passing parasites lies between that of mountain and western lowland gorillas. The difference in parasite infestations among subspecies may be influenced by ecological and social factors. This has already been indicated by studies on other primate species. With respect to ecological and social factors, the position of the eastern lowland gorillas in the mountainous section of the Kahuzi-Biega National Park lies also between the other subspecies.

In this context it is interesting to note that liver flukes, which are transmitted by ants, do not occur in eastern gorilla populations living at greater altitudes. Similarly, tapeworms transmitted by oribatid mites do not occur in the habitat of the western lowland gorilla. This suggests that either the transmitting species are missing in those areas or the gorillas do not ingest them.

## Environmental Effects

Results of the study indicate that in the tropical rain forest, the conditions for the survival and the spread of parasites are favourable the whole year round. Seasonal fluctuations were found mainly in parasite species transmitted by intermediate hosts. For example, in eastern lowland gorillas there was a significant difference in the tapeworm infestation during and after the dry season, as well as during and after the time in which the gorillas ingested mainly fruits and bamboo. Similarly, in a species of roundworm (the transmitting host is not yet known) there were significant differences between the dry season and the rainy season. The reproduction of the intermediate hosts and the ingestion by the final host (i.e. gorillas) is probably influenced by rainfall, temperature and the switch between preferred food plants (*Myrianthus*, bamboo, lianas).

A comparison of the four gorilla groups which I studied showed that the infestation with parasites increased with group size but not with the number of animals. The home ranges of the four groups overlapped to different extents and the groups' day ranges differed considerably in length. The group whose home range overlapped most extensively with those of other groups and who had the shortest daily ranges, was most infested with parasites. Conversely, the group with the longest day range and least overlapping home range was the one with the least parasite infestation. This may indicate that repeated utilization of an area in short intervals results in higher parasite infestation.

If individual gorillas are considered, there is a clear correlation between parasite infestation and the age of the host. However, direct physical contact, such as between mother and dependent offspring, did not seem to have an impact on the transmission of parasites. All parasite species increased from infants (up to 3 years) to juveniles; 2 out of 6 parasite genera increased until maturity. This might indicate the development of an immune reaction to certain parasite genera, but this has not yet been investigated in gorillas.

There were no statistically significant differences in parasite infestations between male and female adults. It was found that females, especially lactating females, tend to pass parasites somewhat more frequently than silverbacks. This might indicate the influence of intrinsic (internal physiological) factors such as hormones. Alternatively, changes in feeding behaviour caused by gestation and lactation, such as increase of food quantity and foraging in more accessible places, may affect the parasite infestation.

## Parasites in the Human Population

54% of the human population in the surroundings of the Kahuzi-Biega National Park passed parasites. Although most genera were different from those of the gorillas, all parasites identified in humans may potentially be infectious for primates. Particularly alarming was the high number of potentially infectious protozoans. Three times as many humans were infected with pro-

tozoans (*Giardia* and *Entamoeba*) than gorillas. Gorillas are not considered natural hosts for *Entamoeba*. Studies in captivity have shown that these parasites can cause severe symptoms and frequently even death, especially in young animals up to 2 years of age. This is exactly the age group that most often approaches tourists and park staff. Protozoans can be transmitted from humans to gorillas more easily than helminths directly via smear infection from faeces to the mouth. *Giardia* is found ten times as frequently in humans than in gorillas. The possibility of transmission of these parasites from humans to gorillas cannot be excluded because of the gorillas' close contact to people.

### Conclusions and Consequences

- The studied gorillas are living in balance with their parasites. A reduction of the protected area, which would result in a more intensive utilization of home ranges by the gorillas, might increase the infestation with parasites and disturb the balance.
- In the rain forest, the occurrence of parasites transmitted by intermediate hosts is clearly influenced by ecological factors. Changes in the frequency of these parasites might indicate changes in the ecological conditions.
- The human population close to the park is infected with parasites to a high degree. So far, the human parasites have overlapped only slightly with those of the gorillas. Both populations have parasites which are transmittable to the other population, however, and the risk of infection is considerable.

Practical measures should include:

- Constant monitoring of the parasites of gorillas and park staff. Contact between gorillas and people other than rangers should be prevented. This requires a more careful habituation; the gorillas should always retain a certain shyness of people and their settlements.
- The gorilla habitat should be conserved in its existing size and structure, especially in regard to the variety of food plants.

### Tourism

If the concept of tourists visiting gorillas is to be maintained, the following measures should be taken in order to protect the gorillas from parasites and other infectious diseases:

- The minimal distance between gorillas and humans during visits should be increased.
- Park staff and tourists should be informed about the risks of infections and the importance of keeping a certain distance from the gorillas.
- It is urgent that toilets be constructed for tourists and the population in the park's surroundings.
- Park staff have to be paid a sufficient salary which encourages them to inform tourists of the regulations and to ensure that they follow these rules.
- It should be a requirement of visiting permits that visitors are obliged to follow the instructions given by park staff.
- Tour operators should pass on the rules and regulations to their customers even before they leave for their trip and inform them about the restrictions that they will have to respect in order to preserve the health of the animals.

Tourism conducted according to these guidelines could support the conservation of gorillas without exposing the animals to considerable health risk.

Ute Eilenberger

### Parasites of Different Gorilla Subspecies

Subspecies	<i>Gorilla gorilla</i>	<i>graueri</i>	<i>beringei</i>	<i>beringei</i>	<i>gorilla</i>
Country	D.R.Congo	Rwanda/D.R.Congo	Uganda		Gabon
Author	Eilenberger	Hastings	Ashford		Landsout-Soukaté
Year	1993	Redmond/Jolly	Ashford		Goussard
		1992/89/84	1996/90		1995/83
Samples studied	1048	128/84/44	305/41		109/84
Infection with parasites	67%	100%	100%		84%
Total helminths	67%	96%	100%		max. 36%
<i>Anoplocephala gorillae</i>	26%	51%	89/84%		
<i>Strongyloides fuelleborni</i> /spp.	7%		16/21%		10%
Strongylides ( <i>Oesophagostomum</i> spp.)	43%	18%	89/100%		18%
<i>Probstmayria</i> spp.	11%	80%	/100%		
<i>Gongylonema</i> pos.					8%
Oval eggs	3%				
Very long eggs	8%				
Protozoans (total)	11%				
<i>Giardia lamblia</i>	0.8%	x			
<i>Enteromonas hominis</i>	10%				
<i>Entamoeba coli</i>		x			
<i>Entamoeba histolytica</i>		x			
<i>Entamoeba hartmanni</i>		x			2%
<i>Iodamoeba buetscheli</i>		x			

## Parasites in the Human Population

Total helminths (n=263)	54%
Thin-shelled worm eggs in intestines:	
Hookworms	2%
<i>Ascaris</i>	41%
<i>Trichuris</i>	29%
Total protozoans (n=209)	29%
<i>Giardia lamblia</i>	11%
<i>Entamoeba coli</i>	12%
<i>Entamoeba histolytica</i>	4%
<i>Iodamoeba buetscheli</i>	5%
<i>Entamoeba nana</i>	2%

Numerous people have contributed to the success of this inter-disciplinary study, and I am very much obliged to all of them. However, I owe particular thanks to the DAAD for their financial support. I thank the Berggorilla & Regenwald Direkthilfe for facilitating the connection with GTZ. I would not have been able to conduct the fieldwork without the support of the GTZ, IZCN, the management and colleagues of the PNKB, and the management and colleagues of LWIRO. For personal support in the field I owe particular thanks to my extraordinarily capable colleague James Safari and pygmy chief Pili Pili and his staff. It was only possible to conduct this study as the fieldwork for a Ph. D. thesis because K.-H. Zessin, University of Berlin, acted as my supervisor.

## Mgahinga Gorilla National Park

It is impressive to note what Klaus-Jürgen Sucker achieved during the 5 years that he worked in the Mgahinga Gorilla National Park, a habitat of the mountain gorillas on the northern side of the Virunga Volcanoes.

From 1989 until the sudden end of his work in 1994, the protected area was enlarged and turned into a national park, the boundaries were clearly marked and protected and he ensured that the local people would benefit from tourism in the area.

Three years after the murder of Klaus-Jürgen Sucker, it is still amazingly evident that his strategy for protecting the area was well-planned and optimally suited for the conditions in the area. The forested area, which once was strewn with snares for wild animals and threatened by deforestation to make way for potato farming, is now a promising habitat for rare plant and animal species of the afro-montane and afro-alpine region – despite the civil war in this area.

Not only the area of the park covered with primary vegetation appears to thrive; the central region of the area covered with secondary vegetation has also developed into valuable secondary forest (*Hypericum* forest). Noteworthy was the blooming and subsequent mass extinction of the *Mimulopsis arborescens* vegetation at the Sabinyo volcano this year.

However, in vast areas of the succession area, afro-montane grassland predominates, and the natural regeneration of the vegetation is halted. The invasion of Australian plants (*Eucalyptus* spp., *Acacia mearnsii*) continues to spread in an uncontrolled manner.

The positive development of the flora and fauna in this area that we were able to observe since 1989 can only persist if the local population living close to the boundaries of the national park continue to accept the park as such. The park is an important source of income for the villagers and the benefit sharing program that the management has implemented supports the people living near the park: 20% of the entrance fees to the Mgahinga Gorilla National Park are used to support projects within the communities adjacent to the park. The money is currently being used to support the construction of schools in three adjacent communities. This has strengthened the hopes of the people in the Kisoro region that their situation will improve, which was indeed one of the reasons why they agreed to establish the park in the first place. Substantial financial independence was also achieved for the management of the national park: The salary for all the park rangers can now be covered with the proceeds from tourism. This fortunate situation – being independent of external funding – is the basis of a sense of confidence that prevailed among the people we came in contact with during our visit.

Richard Bukowa (Warden for Law Enforcement and Tourism) informed us of a failed attempt by tourists to bribe the rangers. These tourists wanted to arrange an illegal tour to the mountain gorillas, but instead were escorted out of the park, and their money was not accepted. (In July 1997 the number of visitors to the habituated gorillas in Uganda was exceptionally high, since gorilla tourism in Rwanda and the Democratic Republic of Congo was temporarily halted at that time.)

On the other hand, the flourishing business with gorilla tourism has produced massive changes in the daily duties and priorities of the rangers. At the moment, they are primarily concerned with managing the problems which have ensued due to the high number of visitors to the park. The consequences of this may be that the control of the boundaries of the national park, anti-poaching patrols and measures against wood-cutting in the area are neglected. We frequently found damage in the border wall along the park and traced small used paths which led into the park.

Our starting point for cooperating with the management of the park is our interest to ascertain the number of unhabituated gorilla groups and solitary animals in the park. Except for the composition of the habituated gorilla group (2 silverbacks, 3 adult females, 2 juveniles and 2 babies), there is no recent information on the number of unhabituated gorillas in the Mgahinga Gorilla National Park. We suggested that the population of unhabituated gorillas should be monitored with financial support from *Berggorilla & Regenwald Direkthilfe*, and this was favorably received. Ignatius Achoka, the new head of the park, started to organize patrols that are especially concerned with these issues.

Despite this encouraging news about the successful preservation and conservation of the Mgahinga National Park, it should not be forgotten that this park only comprises a small area of the total habitat of the mountain gorilla. To ensure the survival of the whole population, improvements in the two other parks of the Virungas, the Parc National des Volcans (Rwanda) and the Virunga National Park (D.R. Congo) are urgently needed.

Ursula Karlowski and Iris Weiche

## New Gorilla Census in Bwindi

A team of scientists has found that nearly 300 gorillas are still living in the Bwindi Impenetrable National Park. A similar number (290–310) had also been found during the period of 1987 to 1993 when all groups were identified and monitored by Thomas Butynski and his team.

The new census, conducted in October and November 1997 by WCS (*Wildlife Conservation Society*), IGCP, ITFC (*Institute*

of *Tropical Forest Conservation*) and UWA (*Uganda Wildlife Authority*), resulted in 292 gorillas from 28 groups, along with 7 lone silverback males. The researchers followed trails and counted nests. To reduce the possibility of missing groups or counting them twice, more survey teams were used than in the past, and the counting took place over a shorter period of time. They also collected hairs from every nest for DNA fingerprinting, to confirm that no groups were counted twice, and to understand the genetic differences between the populations in Bwindi and the Virungas. Teams consisted of national park staff from Uganda, Rwanda, and D.R. Congo as well as visiting scientists from conservation organizations.

Angela Meder

Taken mainly from an article published by WCS

## Karisoke Research Center

*June 1997:* The security situation in the Parc National des Volcans deteriorated considerably; exchanges of gunfire occurred with increasing frequency. The staff of the Karisoke Research Center (*Dian Fossey Gorilla Fund*) suspended all monitoring and anti-poaching activities on June 17th, two weeks after the government parks service, ORTPN, stopped all tourism.

*July 1997:* Some people living around the park took advantage of the lack of protection for the park's flora and fauna, and the intensity of illegal activities became extremely worrying. There were cattle grazing in the forest, substantial areas of bamboo were cut, and large quantities of antelope meat were coming out of the park for sale in local markets. Evidently many snares have been set.

*August 1997:* Karisoke staff negotiated access to the gorillas with a local army commander. This was agreed to as no infiltrators had been encountered during preceding military patrols. On August 4th, Karisoke staff located all three research groups, but the gorillas fled at the approach of the trackers. One new baby was seen in Beetsme's group. We have had no detailed information about the gorillas since.

It goes without saying that the Government of Rwanda is doing all it can to restore peace and stability in the northwest of Rwanda, however, it is still impossible for us to work in the park. One of our trackers, Nshogoza Fidele, who began work with Dian Fossey in 1978, was murdered by the Interahamwe.

The mountain gorillas are more threatened by armed combat now than ever before. But another great danger comes from poachers, whose antelope snares can easily trap a gorilla, at a time when they are particularly vulnerable. In the last 2 weeks (October) a young female gorilla at Jomba, Virunga National Park, D.R. Congo, has been observed with a serious snare injury. This injury was detected as guides with ICCN are now able to visit three gorilla groups from Jomba, and in fact reopened to tourists on September 10th. All activities in the Parc National des Volcans, Rwanda, remain suspended.

Liz Williamson

## Certification Withdrawn

For many years, the timber company Leroy Gabon (a subsidiary of the French company Isoroy, owned by the German company Glunz AG since 1992) has had permission to log in a vast area of primary forest in and around the Lopé Reserve in Gabon.

In October 1996, the FSC (*Forest Stewardship Council*) granted Leroy Gabon a certification for their scheduled logging in the Lopé Reserve. This certification approves the sustainable and careful management of the forest. Many rain forest organizations strongly complained about this certification and questioned the credibility of the certifier SGS which had assessed the logging operations of Leroy Gabon. Scientific investigations had shown before that Isoroy did not manage the forest in Gabon sustainably and that the requirements for a certification according to the FSC principles were not fulfilled.

In September 1997, the situation was reviewed again by the FSC; they came to the conclusion that Leroy did not qualify for the certification and that it should immediately be withdrawn. FSC stated that SGS had made a mistake. To prevent this from happening again, FSC also decided to suspend any certification of logging in primary forests for 6 months.

This does not mean that Leroy will stop their activities in this area. Indeed, there are reports of former Isoroy managers who say that the company has completely given up the idea of having their timber certified because they would not get enough profit from their activities if they had to accept restrictions. Due to financial problems, Isoroy now apparently no longer plans to manage their concessions in Gabon sustainably, but instead intends to extract as much money as possible as quickly as possible – also in the Lopé Reserve.

Angela Meder