

Barcelona: Ebola infection in gorillas

“We Will Not Give Up!”

Ten years ago Barcelonean primatologist Magdalena Bermejo started to investigate western lowland gorilla populations in the Republic of Congo. Since then she has lost more than 90% of her research subjects to Ebola outbreaks.

In a recently published short note (*Science* 314: 1564) Magdalena Bermejo and her co-workers reported that the Ebola virus has decimated ape populations in forests in the northwest of the Republic of Congo. According to their data, in recent years Ebola has killed around 5,000 gorillas in the study area. The dramatic ecological implications of these results together with the hysterical popular reputation of Ebola have brought this research to the attention of the media. Reports echoed throughout the world on radio and television, in newspapers and magazines.

Although Magdalena Bermejo works for the University of Barcelona, she spends most of her time in Africa. However, we were lucky enough to find her in Barcelona whilst preparing for her next field trip and were able to talk to her about her work.

Magdalena Bermejo started working in Africa about ten years ago as a primatologist for ECOFAC, a European Programme for Conservation and Rational Utilization of Forest Ecosystems in Central Africa. ECOFAC projects have a common aim: making



Magdalena Bermejo:
Bigger worries than Africa's stinging insects.

the conservation of biodiversity compatible with the sustainable development of local communities. Projects focus on ecologically exceptional sites in Central Africa. In close cooperation with its traditional dwell-

ers, scientists try to find out which forest resources can be rationally exploited to the benefit of both the indigenous population and the environment.

More scarce than expected

Magdalena's destination was a unique region in western equatorial Africa, around the border between Gabon and the Republic of Congo, where relatively intact forests house the bulk of the world's western lowland gorillas. She was joining a pilot gorilla-based ecotourism project in the Lossi Sanctuary (around 300 km²), in the vicinity of the Odzala National Park. Their mission was to investigate gorilla populations in the area, to locate the main groups, to learn about their biology and their habits and to try to habituate them to the human presence.

However, as work progressed, certain unexpected circumstances arose. Magdalena's group and other groups of researchers working in Gabon noticed that, in certain areas, ape populations were more scarce than expected. In 2003 an international group of scientists, including Magdalena, announced a “Catastrophic ape decline in western equatorial Africa” (*Nature* 422: 611). They reported that ape populations in the area had declined by more than half in 20 years, and augured that, if radical measures were not urgently adopted, apes could become extinct in a few years.

Catastrophic decline

Their surveys showed that the decline in ape populations correlated fairly well with distance from the nearest of Gabon's four major urban centres, and concluded that commercial hunting was the primary cause. While traditional subsistence hunting by natives had very little effect on ape populations, the expansion of mechanized logging and transportation infrastructures and the concentration of logging employees in the cities were promoting a profitable bush meat trade. The report stated: “Organized groups of hunters use logging roads and vehicles to penetrate deep into remote areas (including parks and wildlife



Western lowland gorilla: One ebola outbreak killed 91 of 95 identified individuals

reserves), then export bush meat to nearby logging towns (where logging employees eat more bush meat than local villagers), regional transportation hubs, and even large cities hundreds of kilometres away”

That wasn't all. In the same report the scientists began to indicate that Ebola is another important threat of yet unknown dimensions for apes. Since 1994, ape carcasses had been found near the sites of certain human Ebola outbreaks in Gabon. By 2000, surveys in the Minkébé (a region of about 32,000 km², with low hunting pressure) yielded a drop of about 99% in ape populations in relation to previous surveys in 1991. Also in Lossi, where Magdalena was monitoring her study population, up to 32 gorilla and chimpanzee carcasses were found and about 90% of the 143 previously identified gorillas had disappeared. The Ebola

virus was detected in 9 out of 12 analyzed carcasses.

Ebola hemorrhagic fever is a highly virulent disease endemic to western equatorial Africa. The Zaire species, the cause of the registered Ebola outbreaks in humans and apes in the Congo and Gabon, has the highest mortality rate. It has killed about 1,000 people in several outbreaks registered since it was discovered in 1976. The virus is transmitted by direct contact with the blood, body fluids and tissues of infected persons or animals. Fruit bats have been proven carriers of the Ebola virus in the region (*Nature* 438: 575), but some other yet unidentified species might host the virus as well. It has been shown that different viral strains caused the epidemics in the region, suggesting diverse viral introductory events from the natural host (*Science* 303: 387).

Found, and killed

Although the loss of most of their gorillas had been an unexpected setback, at the Lossi Sanctuary they decided to go ahead and start the original program again. By September 2003 seven new gorilla social groups were identified and their sleeping nests monitored on a biweekly basis. Unfortunately, Ebola reappeared again and between October 2003 and January 2004, killed 91 of the 95 identified gorillas. From 2004 to 2005, the surveys covering almost 5,000 km² around the Sanctuary estimated that Ebola had killed about 5,000 gorillas in a region of at least 2,700 km² to the west of Lossi (*Science* 314: 1564). What could be the cause of such a dramatic carnage? “We don’t know yet, says Magdalena. I guess some Ebola epidemics have always occurred there. Perhaps the tremendous impact of the last one was the very high gorilla densities in the affected area. The close contact between different groups probably facilitated the spread of the virus”.

Joining forces

Now they are planning to establish a new experimental area in the vicinity of Lossi to investigate Ebola’s epidemiology. In addition, several Ph. D. students from Barcelona University are going to join Magdalena’s research in Lossi. “Although only three gorilla groups with three individuals each remain in the Sanctuary, we are not planning to give up. Our experiences with the local communities have been very posi-

tive. Their concern and collaboration fulfils one of the main goals of the project. Their response has made the effort up to now worthwhile”.

Magdalena can not hide the fascination she feels for those people. Their way of living, their values, their attitude... “And I am not the only one; a few weeks were enough for many of our visitors to become captivated by them”.

Helpful people

ECOFAC projects require a collaborative effort of experts in different fields: biology, veterinary, socioeconomics and politics. Since the appearance of Ebola the help of experts from the World Health Organization has also been very important.

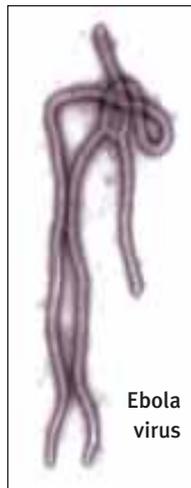
“During the first Ebola outbreak everything happened so quickly that in a few days several people died before we could do anything. Also their burial rituals facilitated the transmission of the virus. It was not so easy to convince the natives that the death of a whole family was not a matter of magic but of contagion. The introduction of some simple preventive habits made the second outbreak almost innocuous for the local communities”.

Magdalena is also convinced that all those impressive ape nest surveys that they performed throughout the forest, covering thousands of square kilometres,

would never have been possible without the help of the local assistants. Indeed, an activity planned for next year is the recruitment and training of trackers from four countries in Central Africa. “Tracking in the forest is a traditional but highly specialised activity. As a result it is extremely difficult to find a good tracker with the aptitude to collaborate in scientific or tourist expeditions. After many years we have had the fortune to find a couple of them with amazing tracking abilities”.

A lot has been done but there is still a lot more to do. Magdalena’s research demands intense dedication. “I know other researchers spend most of their time inside their labs. This is not so bad. Of course, when you have to spend long periods of time camping in the forest you really miss some basic commodities. However, it also has its compensations. The worst thing is the insects that sting and bother you all the time. Without the insects it would be fine...”

RAFAEL FLORÉS



Ebola virus