



Geneviève Libeau : "The eradication of rinderpest, a relief in both human and economic terms".

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The World Organization for Animal Health (OIE) recently announced the eradication of rinderpest. After smallpox, this is the second disease man has succeeded in eradicating. CIRAD played an active role alongside international organizations in the vaccination campaigns, and in developing the diagnostic and surveillance tools, that enabled this eradication. Interview with Geneviève Libeau, a virologist at CIRAD.

Rinderpest originated in Eurasia, and was imported into Africa in 1889, when the Italian army brought animals carrying the virus in to feed their troops in Ethiopia. Since then, the disease has wreaked havoc. What exact impact has rinderpest had in Africa?

Geneviève Libeau: For several centuries, rinderpest has been seen as the most virulent cattle disease. The African pandemic is a clear illustration of this. When rinderpest was introduced into Africa in the late 19th century, the disease was so virulent that 80 and even 90% of African herds were decimated. The daily lives of local people centre on animal production, which supplies protein and animal draught and lies at the heart of exchanges and trade. When a disease decimates a herd from one day to the next, the effects are catastrophic. It is estimated that a third of the population in Ethiopia died of hunger. Moreover, any countries harbouring the virus were hit with an export ban.

When did things start looking up?

G.L.: The development of a vaccine was a decisive step. An initial vaccine for goats saw the light in 1920. CIRAD immediately transferred this success to the field, using African strains. The advent of vaccine protection was the main factor in the impressive growth in the number of animals in Africa at the time. In the 1950s, a new vaccine was developed using cattle cells. During the 1950s, the available vaccine already worked relatively well, and was commonly used in the bush. However, vaccination operations were not coordinated. It was not until the start of vaccination campaigns that the disease really began to die out. An initial campaign, PC 15, meaning joint project 15, was carried out in the early 1960s. CIRAD was heavily involved. Over fifteen years, it considerably reduced the presence of the disease and even eradicated it from several countries in West and East Africa. However, the disease reappeared in the 1980s, which was when people realized that campaigns needed to be consolidated over the long term. An emergency campaign was launched in 1981 in West Africa. It was led by Yves Cheneau, a vet working for CIRAD. The following year, another vet specializing in rinderpest, Alain Provost, alerted the European Development Fund (EDF) in Brussels of the need for a new pan-African vaccination campaign. At the time, he was Director of the Institut d'élevage et de médecine vétérinaire des pays tropicaux (IEMVT), which subsequently became a CIRAD department, and he was convinced rinderpest could be eradicated.

Are a vaccine and vaccination campaigns enough to eradicate a disease?

G.L.: Eradication is only possible under certain conditions. Firstly, a vaccine has to be both effective and economic if it is to be produced in large quantities. For rinderpest, this was the case as long ago as the 1960s. There are other conditions intrinsic to the disease: rinderpest is transmitted directly from animal to animal and causes easily recognizable symptoms; there is no reservoir population, and the disease does not cause latent or persistent infections. Lastly, eradication calls for political commitment and motivation on the part of the countries concerned, and the support of the international community.

What part did CIRAD play in eradicating rinderpest?

G.L.: Numerous staff members worked in the field on vaccination or vaccine production, or on an international level, to lobby international bodies in favour of campaigns.

At the start of the 1980s, surveillance and diagnostic tools were brought in to boost the arsenal and enable eradication. This is what we have worked on, on a large scale, since the laboratory opened. During campaigns, it was important to know what populations had been vaccinated and on what scale. Vaccination was done on a huge scale, since in the case of morbiliviruses, the target is 80% vaccine cover. This drove us to develop surveillance tools capable of monitoring populations on a large scale.

Lastly, in the 1990s, our knowledge of part of the genome enabled us to determine what types of strains were circulating in the last disease foci. This meant we could pinpoint the zones that were still at risk, particularly in East Africa. We monitored virus circulation in Kenya step by step, and noticed that contact between wildlife and domestic animals was a major factor in disease circulation. After halting vaccination, we monitored sentinel populations of wildlife species in central and East Africa, by analysing thousands of serum samples. This continued until 2005 to prove that the virus was no longer circulating.

Is eradication final, or might the disease reappear one day?

G.L.: When we talk about eradication, it is important to know whether we mean the disease or the virus. Rinderpest is no longer circulating in the animal population worldwide. However, the virus is stored in laboratories. There is therefore always a risk of a strain escaping from the laboratory, as we saw with smallpox.

The eradication process was checked by the OIE, which obtained from each and every country an assurance of the traceability of the existence - or non-existence - of the virus. The process was a long-term one, starting with the halting of vaccination. This was a relief in economic terms, not because of the cost of the vaccine, which is very low, but because of the huge cost of vaccination campaigns. The last cases were seen in Kenya in 2001.

Rinderpest is obviously not the only disease that causes damage, but its eradication is one step in the right direction.

Interview by Elsa Bru