

Rinderpest Surveillance in Uganda National Parks 1998–2003¹

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Introduction

Rinderpest (RP), commonly known as “cattle plague,” is an extremely contagious and lethal disease of cattle and buffalo. RP undermines food security and the livelihoods of farmers and pastoralists and promotes poverty in affected countries (Silva *et al.* 1998).

RP is caused by a paramyxovirus in the genus Morbillivirus along with the viruses of canine distemper, human measles, and peste des petits ruminants (PPR) (Russell and Edington 1995). The RP and PPR viruses are serologically related but not identical (Seifert 1996).

The known strains of RP virus are antigenically related and immunity, which develops after infection, is lifelong and protects against all other strains. The virus induces a strong immunological response, with antibodies detectable 5–10 days after infection.

Rinderpest is believed to have been introduced into Uganda in the 19th century, when there were no effective vaccines for the disease. Attenuated RP vaccines were available by the mid-1960s but only in sufficient quantities for eradication programmes to be conducted in already infected countries.

Between 1962–1972, a joint project (JP-15), funded by the European Union and the United States Agency for International Development (EU/USAID), was undertaken in 22 countries of eastern and western Africa. JP-15 decreased the incidence of RP and eradicated it in some countries. However, RP reemerged in 1976 in West Africa (Rossiter *et al.* 1983). Repeated outbreaks occurred throughout the 1980s.

In Uganda, RP recurred in Kotido (1980) and later spread to Luweero (1985), Jinja (1989), Arua (1988/1989), and Moroto (1994).

The Pan African Rinderpest Campaign (PARC) was launched between 1986–2000 in 34 countries of sub-Saharan Africa to tackle this re-emergence. Uganda, being a member

of the Global Rinderpest Eradication Programme (GREP) of the Food and Agriculture Organization (FAO) of the United Nations, implemented its programme between 1992–2001. PARC was replaced by the Pan African Control of Epizootics (PACE) programme in 32 African countries. The main emphasis of PACE is RP surveillance in both livestock and wildlife.

The last outbreak of RP in Uganda was in Moroto district in June 1994, and RP vaccination ceased in December 2001. Uganda remains at high risk of exposure because the last suspected foci of RP infection are believed to be in southern Sudan and the Somalia ecosystem. It is therefore important to conduct wildlife surveillance on sentinel wildlife populations as an early warning for detection of circulating RP virus. This is because the presence of vaccine-induced antibodies precludes the use of livestock in such surveillance programmes. Surveillance and disease testing in young livestock born after RP vaccination was discontinued will augment the wildlife surveillance data.

This paper describes the serosurveillance in wild animals, evidence of disease, significance of wildlife in maintenance of RP, the prediction of likely routes of RP infection into populations in Uganda, and confirmation of absence of the virus in the national parks (NPs).

Materials and methods

There are ten NPs, 14 wildlife reserves, and 18 sanctuaries (two for birds and 16 for mammals) in Uganda. Wildlife in these protected areas has been on the decline for the last two decades due to forage competition, disease, and poaching. This has been exacerbated by a lack of good security in some areas of the country.

¹See abstract on p.xxiv.

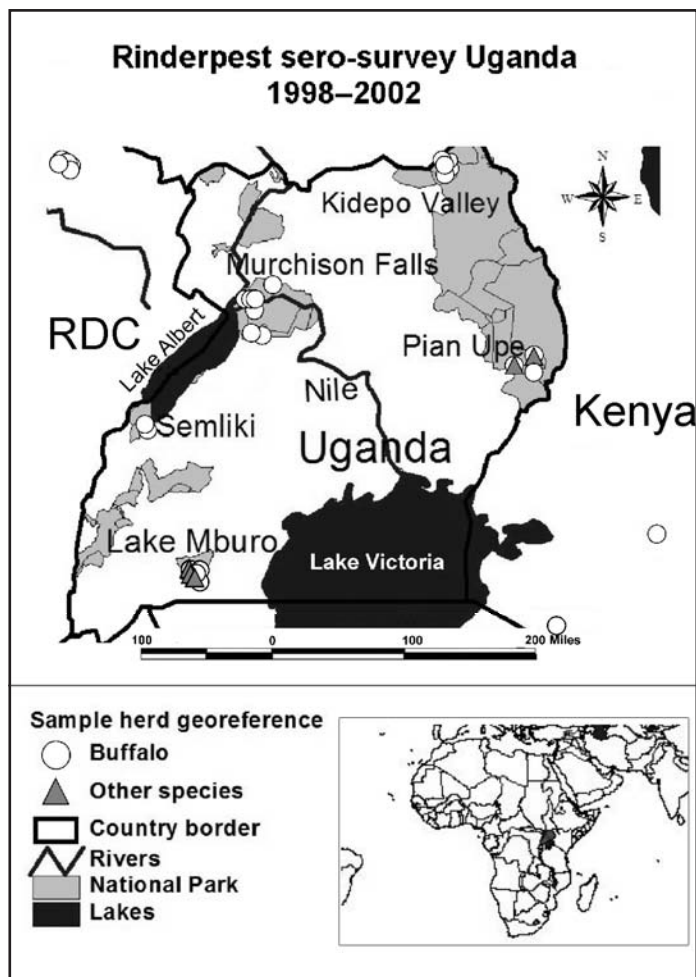
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Fig. 1. Sampling sites in Uganda



Sampling sites

The locations (Fig.1) were chosen to establish the following:

- the possibility of any previous circulating RP virus in the region of Karamoja (Kidepo NP and Pian Upe Wildlife Reserve)
- whether RP was a possible cause of death in bushbucks in September–October 1999 in Kibale NP
- the absence of RP virus in Murchison Falls NP where the disease had been reported in 1988
- the absence of RP virus in Semliki Wildlife Reserve because of close proximity to the Democratic Republic of Congo
- the identification of key wild animal populations for future monitoring

The choice of these locations had to be guided by the vegetation, security, and financial resources available for aerial support.

Sampling schedule

The samples were collected between 1998 and 2002 (see Table 1 for a summary of findings). In addition to the samples collected, the history of the previous disease situation, seasonal data, and other observations were made in each NP visited.

Kidepo National Park (1999 and 2002)

- Representative samples were collected from buffalo (two herds of 350 and 600 buffalo, respectively). The buffalo populations are close to the endemic foci of eastern equatoria and close to the cattle routes used by Toposa and Karimojong pastoralists.
- Different age groups (1.8–20 years) were sampled to confirm possible circulation of virus.
- Aerial darting was the method of choice.
- The last case of RP in this zone was reported in Moroto in June 1994.

Lake Mbuoro NP (1998 and 1999)

- Livestock (resident and migrant) and wildlife share pastures and water for most of the year (high contact risk).
- Representative samples were collected from buffalo and other ruminants (buffalo, impala, topi, and warthog).
- Different age groups were sampled.
- Ground darting was the method of choice (small area and suitable vegetation).
- Thirty impala samples, collected in 1998 by Dr. J. Okori of Makerere University, Kampala, were obtained.
- The last case of RP was reported in the 1950s.

Murchison Falls NP (2000 and 2002)

- Representative samples were collected from different species (buffalo, Uganda kob, hartebeest, oribi, and waterbuck).
- Different age groups were sampled.
- Large herds of buffalo (450+) were observed.
- Aerial and ground darting was used.
- The last case of suspected RP was reported in 1987/1988.

Kibale National Park (2000)

- Tropical forest (chimpanzee habitat) was observed.
- Samples were taken from buffalo only but Kibale NP has bushbuck, elephant, duiker, and some cattle on its eastern side.
- Wildlife and livestock have limited contact.
- Different age groups were sampled.
- Aerial darting was used.
- The last case of RP could have been in the 1950s.

Pian Upe (2000)

- Large numbers of wildlife (buffalo, hartebeest, Grant's gazelle, waterbuck, reedbuck, kob, oribi, roan) were observed.
- A large number of livestock was observed (high contact risk).
- Representative samples were taken from buffalo, roan, and hartebeest.
- Different age groups were sampled.

Table 1. Summary of rinderpest serosurvey 1998–2002

Year	Protected Area (# animals sampled)					Test (# positive antibody results)					
	Lake Mburo	Kidepo	Murchison	Pian Upe	Semliki-Kibale	C ELISA H RPV	C ELISA N-RPV (RBOK)	C ELISA N-RPV (RGK)	C ELISA N-PPR	C ELISA H PPR	VNT
1998	Impala (30)					0	0	8	0		0
1999	Buffalo (6)					0	0	0	0		
	Topi (3)					0	0	0	0		
	Warthog (1)					0	0	0	0		
1999		Buffalo (11)				0	0		0	1	
2000			Buffalo (17)			0	0	4	0	0	4
2000				Roan (1)		0	0	0	0		0
				Kongoni (2)		0	0	0	0		0
				Buffalo (6)		0	0	0	0		0
2000					Buffalo (16)	0	0	2	0		0
2002		Buffalo (17)				0					0
2002			Buffalo (8)			0					0

- Aerial darting was the method of choice.
- The last case of RP was reported in June 1994 in the Moroto district.

Sample analysis

During the sample analysis, six tests were used: C ELISA H RPV, C ELISA N RPV (RBOK), C ELISA N RPV (RGK), C ELISA N PPR, C ELISA H PPR, and the VNT. These tests were utilized to verify the existence of RP antibodies in the samples (Table 1). The samples are believed to be representative of the various populations from which they were collected.

Results from Pace Programme 2003

The results of RP wildlife surveillance in Uganda were obtained from four laboratories (CIRAD, Pirbright, Muguga, and Entebbe). See Table 1 for a summary of the samples, their origins, animal species, number collected, and test results.

Discussion

The results and their analysis indicated the following:

- C ELISA N RPV (RGK) is a highly sensitive test, but it is not very specific, making the chances of false positives very likely. The fact is that no outbreak has occurred since the investigations were done.
- Up to the year 2000, RP antibodies were detectable in the sentinel population (wildlife) in Uganda by VNT and C ELISA RPV (RGK).
- Results of VNT and C ELISA H RPV on the samples of the year 2002 were all negative.
- Fewer animals tested positive with C ELISA N RPV (RGK) test since 1988.
- Results of VNT tallied with those of C ELISA N RPV (RGK) on the samples from Murchison Falls NP indicated four positive animals in 2000.
- Of the places sampled, Lake Mburo, Kidepo, Murchison, Semliki and Kibale showed some animals with detectable RP antibodies.

Given this evidence of antibodies in the sentinel population in Uganda, it is necessary to maintain keen interest in and continue wildlife surveillance to guard against the possibility of disease resurgence. However, the seropositive animals were adults that could have been exposed to infection earlier in life.

Conclusions

Wildlife studies remain a very important component of RP surveillance. Sampling techniques and diagnostic tests, however, need to be improved so that RP virus can be detected if present.

It is evident that there is no RP virus circulating in wildlife in Uganda NPs. This is further supported by the passive surveillance data that is collected using forms completed monthly by district staff.

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