

UNKNOWN DISEASE STRIKES BUFFALO AND BUSHBUCK IN ARUSHA NATIONAL PARK, TANZANIA - A case report.

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SUMMARY

Few weeks after the onset of heavy rains in April, May and June, 1997 a series of ungulate mortality in Arusha National Park was reported. It later became evident that they were caused by a disease outbreak. The nature of deaths could be distinguished from the ones experienced in African buffalo (*Syncerus caffer*) during the extensive drought at the beginning of the year which were drought caused. Intensive investigation revealed that 32 African buffalo and 22 bushbuck (*Tragelaphus scriptus*) were recorded dead. Mortality was also observed in 4 giraffes (*Giraffa camelopardalis*), 1 bushpig (*Potamochoerus porcus*) 1 dikdik (*Madoqua kirkii*) and 1 warthog (*Phacocoerus aethiopicus*). Although the disease was characterised by stomatitis lesions both serological and pathological findings confirmed absence of rinderpest and Foot-and-Mouth Disease infection. This case report briefly describes the measures undertaken to investigate the disease.

MATERIALS & METHODS

(i) Location

Arusha National Park is located about 30 kms north east of Arusha town and covers an area of 137 km². Due to human and livestock pressure the park has become an island of wildlife and separated from the formerly existing Ngaserai-Amboseli ecosystem, which re-joined

the park with the Amboseli National Park in Kenya.

(ii) Field investigation

A need for detailed veterinary investigation was relayed through the office of the Director of Park Management and Conservation of the Tanzania National Parks. Field investigation was conducted from 8th to 10th

July, 1997. and on 19th July, 1997.

The field work involved examination of buffalo herds, buffalo immobilisation, post-mortem examination and specimen collection, interviewing of park and neighbouring livestock staff at Ngarenanyuki Veterinary Centre; and examining the past records.

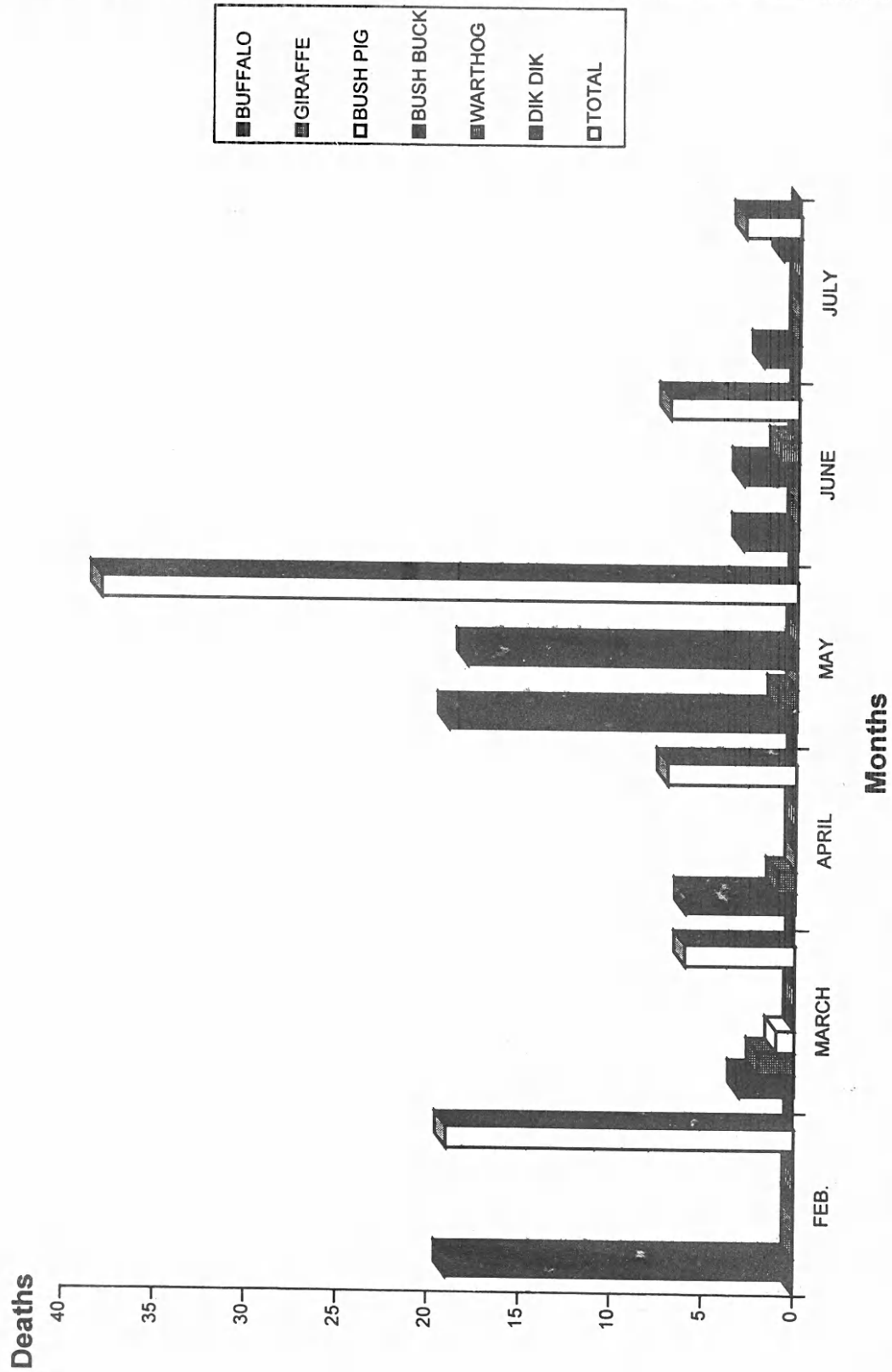
Autopsy was conducted to a carcass of a young buffalo (ANP 1) and one moribund adult buffalo among the Tursia hed (ANP 3) which was salvaged to enable collection of wide range of specimens. A number of tissues (frozen and in 10% formalin), faecal and blood samples were collected for laboratory examination. Only herparinized blood and serum, probang (oral scrapings) and interdigital scrapings; and faecal samples were collected from immonilised buffalo (ANP 2). Faecal material and saliva from the Uwanja wa Ndege herd (ANP 4) were also collected. Additional biological and tissue samples were cp;;ected a week later following immobilisation of 3 buffaloes ANP (5-7) from the

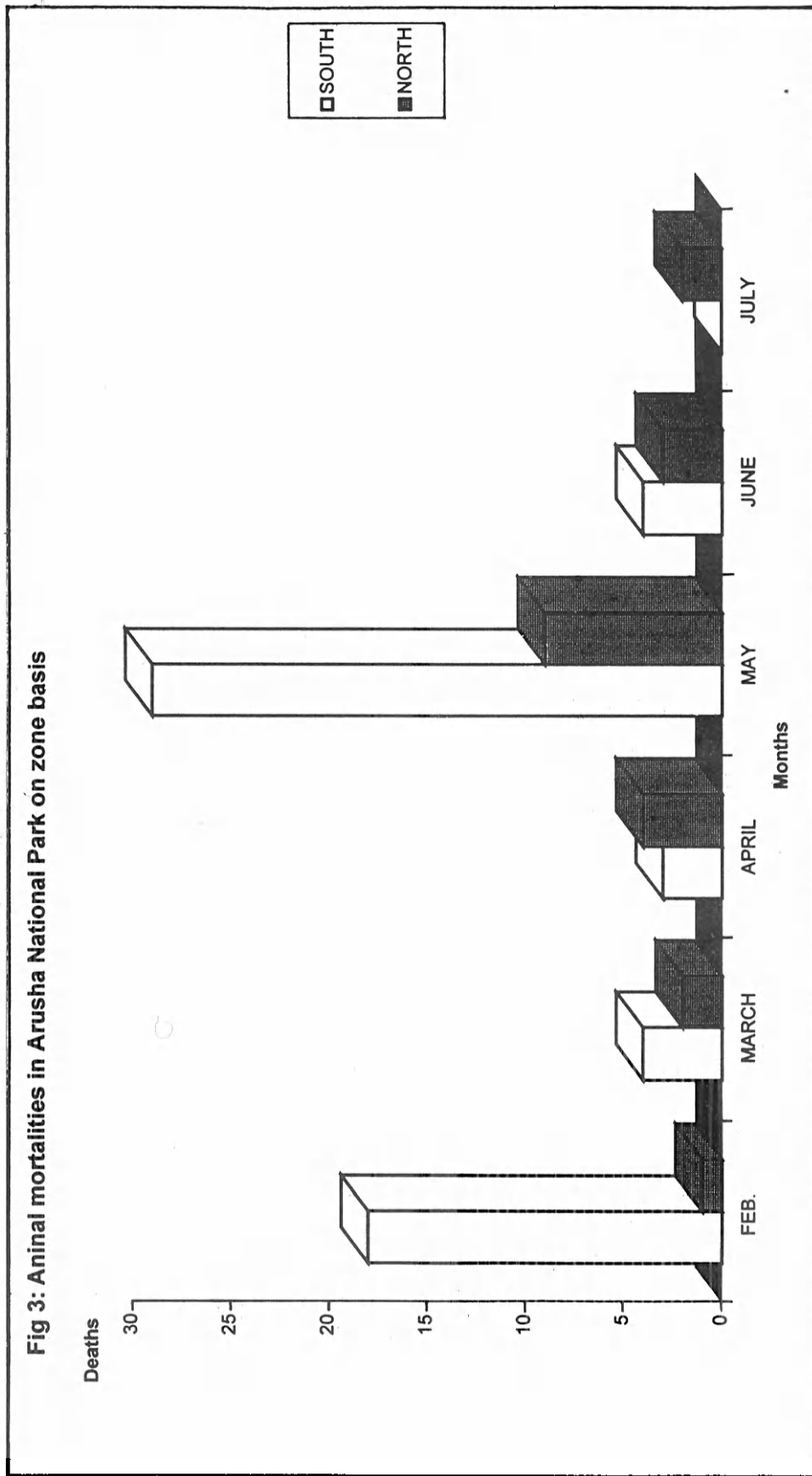
Mommela lodge herd and post mortum of a buffalo calf (ANP 8) from Uwanja wa Ndege herd.

Chemical immobilisation of animals was done using a combination of 9.8mg Etonphine HCL (M99^R, C-vet, Bury St., Edmunds, UK), 80mg Xylazine (Chanazine^R, Chanelle Pharmacenticals Manufacturing Ltd., Loungrea, Co. Galway, Ireland) and 750 IU Hydluronidase (Hyalase^R, Cp Pharmacenticals Ltd., Wrexham, UK which was added to accelerate absoption. The drugs were delivered using projectile syringes (darts) fired frin a dart-gun (Pneudart Inc, Williamsoport, PA USA Model 171 No. 1889) projected from a 4-wheel deive landrover. Animal reversal was done by intravenous administaration of 12mg Diprenorphine HCL (M1010^R, C-vet, Bury St., Edmunds, UK). All animals recovered within a average of 2 minutes following antidote administration and joined the rest of the herds.

Immobilisation was conducted using a dart gun and projectile syringes loaded with 9.8 mg Etorphine HCl

Fig 2: Animal mortalities recorded in Arusha National Park February - July 1997





(C-Vet) and 50 mg Xylazine HCL. (Chanazine). The animal was revived using intravenous injection of mg Diprenorphine HCL.

(iii) Laboratory Examination
Specimens collected were submitted to the VIC Arusha for bacteriological and pathological examinations. Other specimens including sera, oral probang and scrapings were submitted to Onderstepoort Institute for Exotic Diseases, Republic of South Africa for Foot-and-Mouth Disease (FMD) testing and typing; duplicate sera were also submitted to Animal Disease Research Institute (ADRI), Dar es Salaam and Kabete Veterinary Laboratory, Nairobi for rinderpest diagnosis.

OBSERVATIONS

(i) History

General assessment of the buffalo grazing areas indicated high interaction between wildlife and livestock especially on the north eastern side of the park in Farm No. 40 and 41 (Fig. 1). Also a livestock market at Olkung'wado, which attracts cattle from various places in

Monduli, Arumeru, Hai and Rombo districts is located only less than kms from the park border.

Reports of FMD outbreak in cattle in the hole of Ngarenanyuki ward in February 1997, rinderpest at Olmolok in March same year were obtained at the Veterinary Centre, Ngarenanyuki. Olkung'wado village was also reported to be endemic for tick borne diseases especially heartwater which killed about a 100 cattle at the end of last year. This area is a compulsory dipping zone under livestock regulations (Dr. R.L. Kimaro, Arusha Regional Veterinary Officer, 1997 Pers. comm.)

Within the park, mortality started in buffaloes as early as February 1997 (Fig. 2). Most of the deaths occurred around water pools and lakes where animals were seen downed in mud. Deaths declined dramatically following rains where water and pasture became available in March. Deaths again picked up slowly in April and reached climax in May where 39 carcasses were recorded (Fig. 2.) The records showed that

the southern part of the park was the most affected (Fig. 3).

(ii) Clinical and pathological findings

Clinical signs observed in buffalo consisted of excessive salivation, dullness, reluctance to walk, lameness and deaths. Dead animals showed blisters in the mouth, interdigital space and on the coronary band. The bushbucks, in addition to the above signs showed eye discharges and lesions and were always mobbed with swarms of flies. Severe diarrhoea and dehydration were significant in some buffalo examined. Emaciation and rough hair coat were generalised features in most of the buffaloes. Neither fresh blisters nor erosions were seen in the animals immobilised and or autopsied despite their severe debility and salivation observed.

In one carcass of a young buffalo (ANP 1) autopsied, anaemia and heavy ascarid worms infestation leading to intestinal obstruction were notable features. Blood slides and impression smears revealed no haemo-parasites.

An emaciated adult buffalo (ANP 2) immobilised at Tursia showed no active inflammation of the hoof or other associated tissues. Scars of healed ulcers on the interdigital space were noted and collected for laboratory examination.

The animal also has heavy lice infestation and infection of the skin causing generalised reddening. No mouth lesions were evident.

The moribund buffalo (ANP 3) was diarrhoeic and highly emaciated. Heavy infestation of live and skin infection were notably significant. There was extensive haemorrhage of the small intestine while the ileo-cecal junction looked normal. Thread worms were abundant in the large intestine. The animal showed no active lesions both in the mouth and on the legs.

(iii) Laboratory findings

Fecal samples subjected on floatation and sedimentation at VIC Arusha revealed high strongyle worm and fluke ingestion in all the samples examined. Serum samples submitted to the Animal Disease Research Institute

(ADRI) Dar es Salaam have tested negative for rinderpest. These sample were tested on ELISA (Enzyme Linked Immuno-sorbent Assay) a specifiv test for Pan African Rinderpest campaign (PARC). Comparative results for rinderpest at Kabete Veterinary Laboratory where part opf the samples were sent were also negative. Serological and probang samples examined at Onderstepoort Institute for Exotic Diseases have also tested negative for Foot-and-Mouth Disease.

DISCUSSION

Following the history obtained and clinical signs observed it is indicative that the ungulate population in Arusha National Park, in particular buffalo and bushbuck, were exposed to a stomatitis and a ulcerative condition.

Several stomatitis/ulcerative diseases have been reported in cattle in Tanzanila while serological findings has also indicated presence of such diseases in wildlife. At the beginning of the year, Foot-and- Mouth Disease was confirmed in cattle within a short distance from the park

(J. Mollel, VIC Arusha, 1997 Pers comm while rinderpest was confirmed in Hai, Monduli, Karatu and Ngorongoro districts (MAC, 1997). Clinical rinderpest in wildlife has been reported in buffalo, eland and kudu in Tanzania early 1980s (Nyange *et al*, 1983). Absence of specific antibodies from sera collected from buffaloes in Arusha National Park collected a month later after the peak of the outbreak indicates that the animals were not exposed to neither rinderpest not Foot-and-Mouth disease viruses.

Diseases such as Infectious Bovine Rhinotracheitis, Malignant Catarrhal Fever, Blue Tongue, Herpes virus 2 and 3 which cause oral lesions in domestic cattle have been confirmed serologically in Tanzania wild ungulate (Hamblin *et al*, 1990, Davis *et al*, 1981). These diseases were not tested in the tissue and serological samples collected from Arusha National Park.

Diarrhoea and lameness were significant features of the disease which killed buffaloes ad bushbucks in Arusha National Park. Although heavy worm infestation was diagnosed in all the fecal

samples collected and even in the necropsy done to one buffalo calf, it is difficult to affirm helminthiasis as the cause of mass mortality to adult buffaloes and bushbucks. It was obvious that the home range of buffaloes has been greatly affected by human encroachment (Fig 1) on the park forcing them to stay in specific localities of kraals unlike their natural gregarious habit. This could be a cause of stress to these animals leading to lowered immunity. Also this causes accumulation of egg parasites in those places. Despite these findings the effect of helminthiasis to this species could be expected to be fatal to young stock and not adults. However, the role of worms in buffalo neonatal mortality need further investigation. Presence of lameness complicated even further the diagnosis. Further work still needs to be done on the population and specimens collected to make the diagnosis.

The degree of interaction between wildlife and livestock particularly at Farm No. 40 and 41 (Nasula/Momela) is very high and therefore pose big risk for disease

transmission between the two populations. Presence of livestock market at Olkung'wado village which is only 4 kms from the park border, and where animals are brought from all places in Arusha and Kilimanjaro regions add even more risk and pressure to wildlife populations. Wildlife are not regularly treated or immunized like domesticated species. Since it may seem unlikely to transfer the market to a distant place, possibilities such as fencing of the livestock on the northern part of the park should be considered. This method has been practiced elsewhere in order to avoid disease transmission (Anderson E.C. 1997, pers comm).

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