[19] CONSERVATION MEDICINE IN ACTION: ONGOING INVESTIGATIONS INTO A SEVERE DISEASE OUTBREAK IN THE NGORONGORO CRATER, TANZANIA DURING 2000/2001?

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Between May 2000 and April 2001, there was a major die-off of wildlife in the Ngorongoro Crater, Tanzania. A team of experts was brought into the Crater to investigate the causes of this severe die-off. All experts agreed on the fact that several interacting factors probably contributed to this abnormally high mortality. Tick-related diseases were identified in rhinos, lions and buffalo, but the impact of these diseases was exacerbated by other factors, such as malnutrition caused by prolonged drought, which almost certainly increased susceptibility to disease. It is unlikely that these diseases alone would have resulted in high mortality in the absence of other contributory factors. On the other hand, it had to be investigated, where this disease came from, as two black rhinos had been translocated into the Ngorongoro Crater in December 1997 from Addo Elephant National Park.

Between May 2000 and January 2001, five black rhinos (out of 18), 800 buffalo (out of 5000), 30 lions (out of 60), one of the three cheetahs, 200 Gnus and a few zebras died. The death of the South African female black rhino was attributed to an accident, probably a fight with an elephant. Her calf was killed by lions a few weeks earlier. Mortality of the other three black rhino individuals was linked to a tick-borne disease caused by two protozoan parasites just recently identified as *Babesia bicornis* spec. nov. and *Theileria bicornis* spec. nov.. This disease was probably fatal in rhinos this year only because of nutritional- and other stress. The cause of death in the 30 lions has not been identified definitively, but probably resulted from an interaction of several factors, including heavy ectoparasite burdens, high levels of blood parasites and stress. Canine distemper virus, which has infected a large proportion of the crater lion population, is not thought to have been a primary cause of death in this outbreak but may have modified susceptibility to other diseases. The death of 800 Buffalo were associated with tick-borne diseases concomittant with massive tick infestations and severe malnutrition and heavy tooth-ware from old grass.

In all death cases, the question arose, how this tick-infestation, and hence tick-born disease, could have spread in the Crater with such high mortality. For this complex investigation experts from many different disciplines, such as ecologists, water-, tick-, vegetation and fire-experts, were brought to the Crater for short or serial investigations. The outcomes of these investigations as they relate to the cause of death are presented.

The introduction of more rhinos into the Serengeti Ecosystem is believed necessary for the long-term survival of black rhinos in Tanzania. Currently it is not clear if the Babesia/Theileria parasite that finally killed three rhinos was introduced to the Crater via the translocated animals from South Africa. Currently it is believed that this parasite - isolated from the rhinos in the Crater - is a new parasite. A similar parasite has been identified in the South African population, but further investigation is needed to

determine whether the parasite also occurs naturally in East Africa and was just not studied before. Whatever the outcome, animals for possible future translocations must be screened more thoroughly for diseases in the population of origin. Further information is also required on the prevalence of diseases in the crater population in order to evaluate the impact of any future translocation.

As this disease outbreak was caused by multiple factors, it is necessary to reduce most man-made influences in this list of causes and establish thorough protocols for health monitoring for wildlife in the Ngorongoro Crater and the Serengeti Ecosystem.