conflict, farming communities may become more accepting of elephants and thereby work together with wildlife authorities for their long-term conservation.

Effects of environmental pressures on patterns of gastrointestinal parasitism in black rhinoceros in Addo Elephant National Park, South Africa

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Once the most numerous of rhinoceros species, black rhinoceros (rhino; *Diceros bicornis*) is now critically endangered due to habitat degradation and poaching. Our understanding of natural patterns of parasitism in this species is limited. We examined gastrointestinal parasitism in the Main Camp and Nyathi black rhino populations of Addo Elephant National Park (AENP), South Africa, in relation to environmental factors and adrenocortical activity (via fecal glucocorticoid metabolite, FGM, analyses). A total of 119 fecal samples were collected from 25 individually identified rhinos. Fresh feces were stored in 10% formalin at ambient temperature until they were processed at Emory University using sodium nitrate floatation, fecal sedimentation, and immunofluorescent antibody (IFA) detection to isolate helminth eggs, larvae, and protozoal cysts. Parasites were identified on the basis of coloration, shape, contents and size; samples were scored for the presence/absence of pathogens. Fecal hormones were extracted in the field using a validated homogenization technique and analyzed at Lincoln Park Zoo for FGM concentrations using a corticosterone EIA (CJM006). A total of 21 parasite species, including five nematode and 16 protozoans, were detected. No pathogenic protozoa (i.e., *Cryptosporidium* sp. and *Giardia* sp.) were found in any of the feces examined. Parasitism did not vary ($P>0.05$) with sex or age category. However, rhinos residing in the section of AENP with low elephant density (Nyathi) had significantly higher prevalence and diversity of ciliates ($P<0.001$) and lower diversity of nematodes ($P<0.001$) than rhinos living among high elephant density (Main Camp). There was a negative relationship between total monthly precipitation and total nematodes ($r=-0.20$, $P= 0.03$) and average monthly temperature with total protozoans ($r=-0.22$, $P=0.02$). A positive relationship existed between FGM concentrations and total protozoans ($r=0.21$, $P=0.02$). The results of this study demonstrated patterns of infection that provided an index of black rhino population health directly related to habitat quality and usage. For AENP rhinos, parasite prevalence was most strongly affected by site, suggesting that ecological factors may be more relevant than physiological ones. A difference in the positive impacts of ciliates, which aid digestion and serve as a proxy for overall nutritional health, was observed between the two sections in AENP. These differences suggest that the rhinos in Nyathi had access to higher quality nutrition because of less competition with elephants and a greater range of forage options, thus facilitating a more diverse ciliate community. Higher nematode numbers coupled with lower prevalence and number of ciliate species per individual in Main Camp suggests lower diet quality caused by environmental and anthropogenic disturbances in that region of AENP. Due to limited range size and high fecundity, AENP rhinos face eventual overpopulation and increased exposure to anthropogenic activities that may increase parasite exposure and stress. Baseline measures of parasitism and stress prior to this process will allow quantification of habitat quality change through time, permitting proactive and adaptive approaches to mitigating evolving health risks while providing insights for conservation and management of these and similar endangered populations.