Response to Burrows

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RESPONSE TO LETTER TO THE EDITOR . . .

Response to Burrows

I write in response to Mr. Burrows' letter regarding the paper "Rabies in African Wild Dogs (*Lycaon pictus*) in the Serengeti Region, Tanzania" by Gascoyne et al. (1993a). The purpose of this paper was simply to report the confirmation of rabies as a cause of mortality in the endangered Serengeti wild dog population and to describe the subsequent implementation of a rabies vaccination program.

The vaccination program was a management response to the potentially devastating threat of rabies to the highly endangered Serengeti wild dog population. At the time the vaccination was carried out, the disease had caused deaths of wild dogs from two packs in the Serengeti-Mara population, the Mountain pack described by Gascoyne et al. (1993a) and the Aitong pack in the Masai Mara (Alexander et al., in press).

Mr. Burrows raises concerns over the efficacy of dart inoculation of vaccine. Rabies is known to be easily prevented in other species by a single dose of dead vaccine, however, efficacy of vaccine can only be confirmed by challenge experiments. In the trial vaccination on captive wild dogs at Frankfurt Zoo, Frankfurt, Germany, challenge experiments were not considered acceptable in an endangered species. Dart-inoculation of vaccine was considered feasible as this same darting method had been successfully used on several previous occasions to administer anesthetic agents. Post-vaccination blood samples were collected to evaluate the antibody response to vaccination; both paired serum samples showed an increase in rabies antibody level after vaccination.

Mr. Burrows appears to advocate rabies serological assessment of the population prior to vaccination. However, in the face of a rabies epizootic, this would be difficult to justify, given the logistical problems of obtaining samples and uncertainties over the interpretation of results. Vaccination of an animal with detectable rabies serum neutralizing antibodies should have simply boosted antibody levels after vaccination, as indeed appeared to occur for one of the individuals.

Between 1989 and 1991, Mr. Burrows was a member of the Serengeti wild dog project, with responsibility for collecting demographic and behavioral data. He was involved in the wild dog vaccination program, not only identifying individuals at the time, but also carrying out the dart-vaccination of the Salei pack pups and some aspects of post-vaccination monitoring.

Mr. Burrows criticizes the incompleteness of reporting of this case. As part of the vaccination team, he was originally a coauthor of this paper. He subsequently requested his name be removed and later declined acknowledgment, insisting that any data for which he had responsibility could not be reported.

In 1992, Mr. Burrows proposed that the stress of "handling" wild dogs (including darting with inactivated rabies vaccine) caused immune suppression and the emergence of rabies-associated mortality (Burrows, 1992). At the time Gascoyne et al. (1993a) was accepted for publication, this hypothesis had not been proposed in the scientific literature and hence was not discussed. Subsequently, the issues raised were widely debated (Creel, 1992; Macdonald et al., 1992) with the consensus of published scientific opinion considering the hypothesis highly unlikely for several reasons. Most importantly, there is no evidence that rabies caused deaths of any wild dogs in the Serengeti National Park after vaccination. Furthermore, an analysis of wild dog mortality rates of handled wild dogs in part of the Serengeti ecosystem and in other areas of Africa showed no evi-

dence of a link between handling and mortality. The Serengeti wild dog population has experienced wide fluctuations in the past, prior to the rabies vaccination, but the underlying causes have not been determined.

With respect to this hypothesis, Mr. Burrows refers to "selective extinction of the vaccinated study packs." I presume he means that there was no subsequent confirmed sighting (that is, by photographic identification) of any individual from vaccinated packs only. This is incorrect. In 1990, subsequent to the rabies vaccination, a new pack of seven wild dogs was confirmed in the Serengeti National Park. This group could not be located by the Serengeti wild dog project for fitting radio collars or for vaccination but was identified through tourist photographs. This group also disappeared during 1991.

Results of the serum neutralization test, carried out at the Central Veterinary Laboratory (CVL) United Kingdom, were expressed in this paper according to standard U.S. methods of calculations. For this calculation, addition of an equal volume of virus to the serum dilution was considered a further ½ dilution of serum, as is described in more detail elsewhere (Gascoyne et al., in press). Preliminary results, presented at a conference in Lusaka in June, 1992 (Gascoyne et al., 1993b), were based on serum dilutions being considered finite dilutions as is standard methodology at the CVL. Unfortunately, a clarifying change added at the proof stage to distinguish the two sets of results, did not appear in the published version of that paper.

The discussion regarding calculation of rabies titers and conversion to International Units raises important questions regarding standardization of rabies serological methods between laboratories. It is apparent that many issues need to be addressed regarding interpretation of rabies serological findings in wildlife populations. In this, as in other studies, the criteria used to define the threshold between seronegativity and seropositivity are poorly defined and serological data from negative control populations are rarely available. Confusion over this issue is not limited to rabies and interpretation of serology is problematic in many animal diseases and populations.

The results of pre-vaccination titers presented in Gascoyne et al. (1993a) came from 12 different animals. One additional sample could not be identified with certainty and hence was omitted from the results.

The case study presented in this paper highlights many of the logistic difficulties and ethical issues involved with disease investigation and vaccination of wildlife populations. Disease status of a wildlife population is difficult to ascertain as fresh material is rarely available for diagnostic evaluation, and monitoring the impact of disease or the effects of vaccination is logistically difficult (Plowright, 1988). These problems are accentuated in areas with high ambient temperature, large numbers of scavengers and low density study populations; the 1989 and 1990 Serengeti wild dog population density was approximately 1 dog/500 km^2 (Fuller et al., 1992).

This emergency vaccination in the face of disease, and the debate resulting from it, highlights the need for development of methodologies for wildlife disease investigation and the need for guidelines for disease management of endangered free-living species.

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