

## The Susceptibility of the Springbuck (*Antidorcas marsupialis*) to Heartwater.

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THE susceptibility of antelopes to heartwater has been discussed by several authors. (Webb (1898) reported that bushbuck (*Tragelaphus scriptus*) were dying from heartwater at Southey's Poort along the Fish River in the Cape Province. Spreull (1922) stated that it was known that springbuck (*Antidorcas marsupialis*) suffer and die from heartwater in South Africa. Brassey Edwards (1929) expressed the opinion that antelopes may play a rôle in spreading the disease. These reports, however, cannot be regarded as being of greater significance than expressions of opinion since the accuracy of the diagnoses was not supported by microscopical demonstration of the *Rickettsia* or by confirmatory biological tests.

The first conclusive experiments on the association of game with heartwater were carried out at Onderstepoort (Neitz, 1933 and 1935). From those experiments it was concluded that the blesbuck (*Damaliscus albifrons*), though susceptible, shows none of the classical symptoms of the disease, and after a period of incubation of not less than 12 days the blood is infective for sheep. The period the blood remains infective could not be determined with any degree of accuracy owing to the small number of animals available for the work. It is interesting to note that in the case of splenectomized blesbuck death occurred on the 21st day after infection; at necropsy the pathological anatomical lesions of heartwater were evident and *Rickettsia* indistinguishable from *R. ruminantium* were present in intima preparations of the jugular vein. Similarly it was shown that a black wildebeest (*Conochastes gnu*) showed no symptoms of disease after artificial infection with virulent sheep blood; no virus could be demonstrated by subinoculation into susceptible sheep on the 6th day after infection, but was present on the 13th, 23rd and 30th day and had disappeared by the 44th day. These observations were rounded off by the report (Neitz, 1937) that heartwater had been transmitted to and from the blesbuck by the bont tick, *Amblyomma hebraeum*.

The results of these experiments prompted an investigation into the incidence of heartwater among antelopes under natural conditions. In field work of this nature it must be borne in mind that it is not easy to pick out sick antelopes in a herd, and carcasses when found are usually either decomposed or partially devoured by wild carnivora thus making them unsuitable for biological examination. However, on the Roodekuil Estate of the African and European Investment Co., Ltd., there is running a small number of



springbuck which represent the sole survivors of the huge herds from which the district known as the Springbuck Flats obtained its name. The superintendent of the estate, Mr. T. Grierson, who has a sound knowledge of heartwater as a result of many years' association with the disease in close collaboration with some of this Institute's field experimental work, happened to find a dead springbuck in a good state of preservation. He carried out a post-mortem examination and, being struck by the typical heartwater pathological lesions, prepared intima smears from the jugular veins which were forwarded together with brain specimens in 10 per cent. formalin for examination. A number of colonies of *Rickettsiae* indistinguishable from *R. ruminantium* were found in the intima smears, while in the sections of the hippocampus a single unmistakable colony was found after a prolonged search. Further enquiries elicited the information that several more carcasses of springbuck all in a state of decomposition had been found on the estate.

It was then decided to attempt transmission experiments. Two springbuck which appeared to be in poor condition, and a blesbuck which had some difficulty in keeping up with the herd were shot. Blood was collected in citrate, and emulsions of kidney and brain in saline were prepared for intravenous injection into susceptible sheep. All injections had been completed within 4 hours of the buck being shot. The results were entirely negative. In addition histological examination of section of kidney and hippocampus together with intima smears from the jugular veins failed to reveal the presence of any *Rickettsiae*. A single partially engorged *Amblyomma hebraeum* female was collected from one of the springbuck; injection of a saline emulsion of this tick failed to produce heartwater in a susceptible sheep.

In August, and again in November, 1943, a dead springbuck was found in the veld on the estate. In both cases numerous colonies of *Rickettsia* were found in intima preparations of the jugular veins.

#### DISCUSSION.

From the observations recorded the question naturally arises whether the conclusion that the springbuck died of heartwater is permissible. A definite opinion can only be expressed after far more extensive investigation under carefully controlled experimental conditions, but at least such a conclusion is not entirely unwarranted. In this connection it should be borne in mind that the estate is securely fenced, is divided into a number of camps and that intensive dipping for the eradication of ticks and the elimination of tick-borne diseases has been carried out systematically and conscientiously for many years. These measures have reduced the incidence of heartwater in cattle to a considerable extent but have failed to eliminate the disease. The decrease in the number of ticks and particularly the heartwater-infected ticks may have resulted in a decrease in the naturally acquired immunity in the springbuck with the result that, in the future, there may be an increase in the death rate actually from heartwater in the herd. But from a practical point of view the now proved association of heartwater with game indicates very clearly that any attempt to eradicate the disease from an area from which game has not been eliminated is doomed to failure. This statement must not be construed as a desire to eradicate the game but emphasizes the oft repeated contention that it is quite impossible to eradicate the tick-borne diseases of domestic animals from an area where game and their movements are not as vigorously controlled as all other animals.

SUMMARY.

1. Observations on the association of heartwater with springbuck are recorded.
2. The significance of this association is discussed briefly.

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