

The Blesbuck (*Damaliscus Albifrons*) and the Black-wildebeest (*Conochaetes Gnu*) as Carriers of Heartwater.

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THE writer (1933) published a preliminary report on the susceptibility of one of the South African antelopes to heartwater. This transmission work has been continued and the details of the experiments are mentioned below.

Besides the blesbuck the black-wildebeest was also found to be susceptible to heartwater.

The antelopes utilized in the transmission work must have been fully susceptible since they were obtained from areas where heartwater is not known to occur, namely the Highveld of the Transvaal and the Orange Free State.

EXPERIMENT No. 1 (4841).

Blesbuck 34958 was obtained from Theunissen, O.F.S., on the 11th June, 1932.

Object. To attempt transmission of heartwater from a sheep to a blesbuck and to note the reaction.

Method.—(a) Virulent heartwater blood was injected subcutaneously and intravenously into the blesbuck.

(b) Blood from this blesbuck was injected intravenously into sheep on the 8th, 12th, and 18th day.

Result.—Details of this experiment will be found in Table I.

The blesbuck did not show any symptoms that could be ascribed to heartwater, but died on the 25th day after inoculation. At autopsy it was found that the marked emaciation was due to a severe panverminosis.

The two sheep injected with blood on the 8th and 12th day did not show any reaction and following a subsequent immunity test both died from typical heartwater.

The third sheep injected on the 18th day reacted to heartwater and died.

BLESBUCK AND BLACK WILDEBEEST AS CARRIERS OF HEARTWATER.

TABLE I.

D.O.B. No. of animal.	Injected from.	Date.	Interval in days after injection of blesbuck.	Injected blood.	Result.
Blesbuck 34958...	Sh. 34407	28/10/32	—	10 c.c. s.c. 5 c.c. i.v.	Died on the 25th day after injection as result of panvermiosis. No symptoms of heartwater seen.
Sh. 34761.....	Bb. 34958	4/11/32	8	10 c.c. i.v.	Did not react. On immunity test animal died from heartwater.
Sh. 31580.....	Bb. 34958	8/11/32	12	10 c.c. i.v.	Did not react. On immunity test animal died from heartwater.
Sh. 34233.....	Bb. 34958	14/11/32	18	10 c.c. i.v.	Reacted to heartwater on the 8th day and died on the 15th day. <i>Rickettsia ruminantium</i> could be demonstrated in brain section. Subinoculation from this sheep into two susceptible ones further confirmed diagnosis of heartwater.

TABLE II.

D.O.B. No. of animal.	Injected from.	Date.	Interval in days after injection of blesbuck.	Injected blood.	Result.
Blesbuck 34961...	Sh. 35003 Sh. 35019 Sh. 35024 Bb. 34961	6/12/32	—	10 c.c. s.c. 5 c.c. i.v.	No symptoms of heartwater seen.
Sh. 35033.....	"	6/12/32	0	5 c.c. i.v.	No reaction. On immunity test animal died from heartwater.
Sh. 34212.....	"	17/12/32	11	5 c.c. i.v.	"
Sh. 35023.....	"	22/12/32	16	"	"
Sh. 35027.....	"	"	16	"	"
Sh. 34060.....	"	28/12/32	22	"	Reacted to heartwater on the 16th day and died.
Sh. 35541.....	"	"	22	"	No reaction. On immunity test animal died from heartwater.
Sh. 35821.....	"	31/12/32	25	"	"
Sh. 35829.....	"	"	25	"	"
Sh. 35035.....	"	4/1/33	29	"	"
Sh. 34792.....	"	"	29	"	"
Sh. 35807.....	"	16/1/33	41	"	Died on the 23rd day after injection. Cause of death not known. Subinoculation from this animal into susceptible heartwater sheep produced no heartwater reaction.
Sh. 35825.....	"	"	41	"	No reaction. On immunity test animal died from heartwater.

EXPERIMENT No. 2.

Blesbuck 34961 was obtained from Theunissen, O.F.S., on the 11th June, 1932.

Object.—To repeat the transmission of heartwater from sheep to a blesbuck and to note the reaction.

Method.—(a) Blood from this blesbuck was injected into a susceptible heartwater sheep in order to see whether this animal harboured any other disease that could be transmitted by blood subinoculation.

(b) Blood from three sheep reacting to heartwater was pooled and injected subcutaneously and intravenously into the blesbuck.

(c) Blood from this blesbuck was injected intravenously into sheep on the 11th, 16th, 22nd, 25th, 29th and 41st days.

Result.—Details of this experiment are given in Table II.

(a) The blesbuck did not harbour any disease that could be transmitted by blood subinoculation.

(b) The blesbuck did not react to heartwater and remained healthy.

(c) One of the sheep 35027 injected on the 16th day reacted to heartwater on the 16th and died on the 24th day after injection. None of the other sheep developed heartwater and when the immunity of these sheep was tested they all died from heartwater. One of the sheep 34792 injected on the 29th day died from causes other than heartwater, and blood from this animal when injected into two susceptible heartwater sheep did not produce a reaction.

EXPERIMENT No. 3.

Blesbuck 33606 was obtained from Standerton, Transvaal, on 16th March, 1932, and splenectomized by Dr. Quinlan of this Institute on the 12th April, 1932. This animal was found to be fully susceptible to *Anaplasma marginale*. After recovery from this infection it was utilized for the heartwater work.

Object.—To attempt transmission of heartwater from sheep to a splenectomized blesbuck and to note the reaction.

Method.—(a) Blood from this blesbuck was injected into two susceptible heartwater sheep in order to see whether this animal harboured any other disease that could be transmitted by blood subinoculation.

(b) Blood from two sheep reacting to heartwater was injected subcutaneously and intravenously into the blesbuck.

(c) Blood from this blesbuck was injected intravenously into susceptible heartwater sheep on the 12th, 15th and 20th day.

Result.—Details of the subinoculations will be found in Table III.

(a) The two sheep injected did not react.

TABLE III.

D.O.B. No. of animal.	Injected from.	Date.	Interval in days after injection of Blesbuck.	Injected blood.	Result.
Sh. 35022	Bb. 33606	24 1 33		10 c.c. i.v.	No reaction observed.
Sh. 35032	"	"		"	No reaction observed.
Blesbuck 33606	Sh. 34177	26 1 33		20 c.c. i.v.	Died on the 21st day after injection, showing heartwater lesions at autopsy. Rickettsia ruminantium could be demonstrated in the intima shears from the jugular vein.
	Sh. 35033	"		10 c.c. i.v.	
Sh. 34425	Bb. 33606	7 2 33	12	10 c.c. i.v.	Reacted to heartwater on the 10th day and died on the 16th day.
Sh. 35025	"	"	12	"	Reacted to heartwater on the 10th day and died on the 25th day.
Sh. 34329	"	10 2 33	15	10 c.c. i.v.	Reacted to heartwater on the 9th day and died on the 14th day.
Sh. 34994	"	"	15	"	Reacted to heartwater on the 9th day and died on the 12th day.
Sh. 24078	"	15 2 33	20	"	Reacted to heartwater on the 7th day and died on the 10th day.
Sh. 35811	"	"	20	"	Reacted to heartwater on the 6th day and died on the 12th day.

TABLE IV.

D.O.B. No. of animal.	Injected from.	Date.	Interval in days after injection of black-wildebeest.	Injected blood.	Reaction.
3193 Black-wildebeest	37778	22 8 33		10 c.c. i.v.	No reaction observed.
	37272		20 c.c. s.c.		
	37385		"		
Sh. 37332	B.W. 5193	28 8 33	6	10 c.c. i.v.	Did not react to heartwater.
		"	6	"	Did not react to heartwater.
		4 9 33	13	"	Did not react to heartwater.
		"	13	"	Reacted to heartwater on the 18th day, and died on the 20th day.
		14 9 33	23	"	Reacted to heartwater on the 9th day and died on the 13th day.
Sh. 37805	"	"	23	"	Reacted to heartwater on the 13th day and died on the 17th day.
Sh. 37995	"	"	"	"	Intima smears from the jugular vein showed numerous Rickettsia ruminantium.
Sh. 36937	"	21 9 33	30	"	Did not react to heartwater.
Sh. 37986	"	"	30	"	Reacted to heartwater on the 12th day and died on the 15th day.
Sh. 31988	"	5 10 33	44	"	Rickettsia ruminantium could be demonstrated in sections prepared from the hippocampus.
					Sh. 35009

(b) The blesbuck died on the 21st day after injection, showing heartwater lesions at autopsy. *Rickettsia ruminantium* could be demonstrated in the intima smears prepared from the jugular veins.

(c) All the sheep subinoculated on the 12th, 15th and 20th day reacted to heartwater and died.

EXPERIMENT No. 4 (5126).

Black-wildebeest 5193 was obtained from the farm Spesbona, Geneva Station, Orange Free State, and arrived at Onderstepoort on 25th June, 1932.

Object.—To attempt transmission of heartwater from sheep to a black-wildebeest and to note the reaction.

Method. (a) Blood from three sheep reacting to heartwater was pooled, and injected subcutaneously and intravenously into the black-wildebeest.

(b) Blood from this black-wildebeest was injected intravenously into susceptible heartwater sheep on the 6th, 13th, 23rd, 30th and 44th day.

Result. Details of this experiment will be found in Table IV.

(a) The black-wildebeest did not show any symptoms and remained healthy.

(b) No reactions were produced in the sheep inoculated on the 6th and 44th days. Of the two sheep inoculated on the 13th day one reacted and died, of the two sheep inoculated on the 23rd day both reacted and died, and of the two injected on the 30th day one reacted and died from heartwater.

CONCLUSIONS.

(1) The transmission of heartwater to three blesbuck and a black-wildebeest is discussed.

(2) The virulence of the heartwater "virus" did not change by passage through the antelopes.

(3) The antelopes did not show any clinical symptoms that could be ascribed to heartwater. In case of the splenectomized blesbuck, however, heartwater lesions were observed at autopsy, and *Rickettsia ruminantium* was demonstrated in the intima smears prepared from the jugular vein.

(4) Heartwater "virus" could be demonstrated by blood subinoculations into susceptible sheep on the 16th and 18th day in two of the blesbuck, from the 12th to the 20th day in the splenectomized blesbuck and from the 13th to the 30th day in case of the black-wildebeest.

(5) The fact that heartwater "virus" could be demonstrated in the blood of one animal for 9 days and in another for 18 days gives one good reason to believe that antelopes can act as reservoirs for heartwater and that the possibility exists for ticks to infect themselves by feeding on these animals.

LITERATURE.

- ALEXANDER, R. A. (1931). Heartwater. The Present State of our Knowledge of the Disease. *17th Rep. Dir. Vet. Serv. and Ag. Indust. Union of South Africa*, pp. 89-150.
- KNUTH, P., AND DU TOIT, P. J. (1921). *Tropenkrankheiten der Haustiere*. Vol. 6.
- NETZ, W. O. (1933). The Blesbuck (*Damaliscus albifrons*) as a Carrier of Heartwater and Bluetongue. *Jl. South African Vet. Med. Assoc.*, Vol. 4, No. 1, pp. 26-28.
- WEBB, J. (1898). *Agricultural Journal of Cape of Good Hope*, Vol. 13, pp. 594-595.