



ANAPLASMOSIS TRANSMISSION BY DERMACENTOR VENUSTUS* MALE TICKS

C. E. Sanborn, *Stillwater, Oklahoma*

*In cooperation with the Bureau of Animal Industry,
United States Department of Agriculture.*

In a cooperative experiment which was begun in 1928 by Dr. George W. Stiles (of the U. S. B. A. I.) and Dr. Lewis H. Moe and the author (of the Oklahoma A. and M. College and Experiment Station) on the transmission and control of anaplasmosis in cattle, both horse flies (Tabanids) and ticks have been proven as carriers of the disease. Other frequent means of transmission have been recently published by Dr. Stiles under the subject of "Mechanical Transmission of Anaplasmosis by Unclean Instruments."***

The discovery of ticks as disease vectors was first published in 1893.*** Female tick fever ticks were proven to transmit disease hereditarily indi-

*Public Health and Bureau of Animal Industry classify as *Dermacentor andersoni*.

**George W. Stiles, Jr., *N. Am. Vet.* Vol. 17, No. 6, June 1936.

***Smith, T., and Kilborne, F. L. 1893. Texas fever. (*U. S. Dept. Agri., Bur. Animal Ind., Bul. 1, pp. 301, pls. 10, figs. 7.*)

rectly through their progeny of the first generation. Since that time at least 15 species of ticks have been found experimentally to transmit anaplasmosis. It is generally assumed that male ticks do not engorge on blood. Furthermore, they have not been definitely known as vectors of disease.

Mosquitoes of known species transmit malaria and yellow fever in man. Only the females of the species transmit diseases; certainly not the males, because the mouth parts of the latter are not properly adapted as piercing and blood sucking organs.

The same is true of male Tabanids of the four species of horse flies with which we have transmitted anaplasmosis. However, with ticks, the procedure is different. Both sexes of ticks have piercing and blood sucking mouth parts; and all species of males engorge and become sacciform in the larval and nymphal stages, just as the females do in all stages.

In some species of ticks only the females feed in the adult stage, in others both sexes feed, and in others neither sex engorges. It appears that those species in which both sexes of ticks feed in the adult stage the males should be equal to the females in virulency as disease carriers. They really have the habit of traveling more rapidly and farther, and make more punctures than the females. As individual adults, they might well be considered as more likely agents for disseminating diseases than the females.

The following experiments were conducted in conjunction with the regular anaplasmosis project and were not begun with the intention of incriminating male ticks any more than female ticks. However, the data obtained seems to warrant specific mention.

The ticks used by the writer were male *Dermacentor venustus* Banks, obtained July 19, 1935 at Norwood, Wyoming on the Lone Tree Ranch from a cow which had died from the effects of a disease diagnosed as anaplasmosis. These with engorged and unengorged females of the same species were collected by and received from Dr. George W. Stiles, Jr. under his case number 33889. Whether the above cow was the first one infested by these males is unknown. However, this is the first case in which they were definitely known, under natural conditions, to be associated with an animal dying of anaplasmosis.

EXPERIMENT NO. 174, JERSEY COW, THREE YEARS OLD

On July 25, 1935, the writer placed three unengorged females and four males from dying case No. 33889 on cow number 174. About four weeks later, from August 21 to 26, 1935, this cow's temperature ranged from 101.7° to 106.4° F. and showed definite clinical symptoms of anaplasmosis. On August 30, this cow was used as a typical case for anaplasmosis for a clinical demonstration at the A. V. M. A. meeting at Oklahoma City and from there was later disposed of to a packing plant for rendering vat purposes. On August 24 the four male ticks were removed and transferred to cow number 178.

EXPERIMENT NO. 178, JERSEY COW, SIX YEARS OLD

On August 27, 1935, the writer placed the four male *Dermacentor venustus* ticks removed August 24 from cow number 174 on cow number 178. These were the same ticks from Dr. Stiles' case number 33889. On September 29 cow number 178 showed 25 per cent anaplasma infestation in her blood cells. Her temperature ranged from 97° to 102° F. from September 27 to October 1. This cow died at 5:30 p. m., October 1, 1935, in process of abortion precipitated by anaplasmosis. The four male *D. venustus* were removed at 4:30 p. m. on that date.

EXPERIMENT NO. 155, JERSEY COW, FOUR YEARS OLD

On October 2, 1935, the four male *D. venustus* ticks from cow number 178 were placed on cow number 155. These were the same ticks collected July 19 by Dr. Stiles from Wyoming cow, dead of anaplasmosis, and from experimental cows numbered 174 and 178 respectively. *Anaplasma* began to appear in blood smears from cow number 155 October 17, and increased until they became quite numerous October 21. Her temperature ranged from 100° to 105° F. from October 22 to November 20. This cow showed typical anaplasmosis symptoms and recovered. On October 10, only two of the four male *D. venustus* ticks were recovered.

SUMMARY

1. Male *Dermacentor venustus* ticks were experimentally proven to transmit anaplasmosis to two different cows, numbered 178 and 155. They were also associated with females as known vectors of anaplasmosis in cow number 174 and Dr. Stiles' case number 33889.

2. One male tick lived in a state of activity from July 19 through the following winter and up to February 11, 1936. Its age was unknown at the beginning of the experiment but it doubtless hibernated during the previous winter and hatched from eggs of the preceeding summer. Therefore, its known age was six months and eight days plus an unknown developmental period and hibernating period of approximately one year, making a total of about eighteen months.

