

CURRENT STATUS OF THE TROPICAL CATTLE
FEVER TICK BOOPHILUS MICROPLUS AND TEXAS WILDLIFE

K. L. Kuttler

The tropical cattle fever tick, Boophilus microplus, is one of 2 Boophilus ticks found in the western hemisphere and is widespread throughout Central and South America, including the Carribean islands. Boophilus microplus is also found in Australia, Asia, and Africa, but is generally limited to the tropics.

The second tick of this genus is Boophilus annulatus, or the Texas fever tick, which also occurs in the tropics, but is more common in subtropical climates. This tick was found in Texas and the southeastern U.S. in the early 1900's and was responsible for Texas Fever or piroplasmosis.

The Boophilus ticks complete their parasitic stage on 1 animal in about 21-24 days under optimum conditions. These ticks are commonly found on cattle, deer, horses, sheep, and goats. They may be found less commonly on dogs, pigs, rabbits, etc. The B. annulatus tick is somewhat more resistant to climatic factors and in 1890 was found as far north as Oklahoma, Arkansas, Tennessee, and the southern part of Virginia. Boophilus microplus, on the other hand, was limited to the southern tip of Texas and southern Florida. In Texas, annulatus has been the principle problem and is the tick most studied.

There have been periodic outbreaks along the border with Mexico of B. annulatus which in the past have been eradicated by conventional means of dipping all cattle in the quarantined zone every 2 weeks for a 5 to 9 month period, or until such time as the ticks are eradicated.

In 1968 an outbreak in Dimmit county was observed in which deer were infected. This outbreak was presumably controlled by cattle dipping. Boophilus annulatus ticks recovered from deer in this outbreak were taken to the USDA laboratory in Nuevo Laredo, and there placed on deer where they have undergone 13 generations.

These ticks develop to about 2/3 the normal size on deer, but are capable of undergoing a complete life cycle. When placed on calves, these ticks are capable of regaining their full vitality.

The primary concern associated with B. annulatus ticks is related to their ability to transmit disease. They act as a biological host for piroplasmosis and anaplasmosis. It was this disease aspect that led to the tick eradication programs of the 1920's and 30's, which in turn eliminated piroplasmosis from the U.S. Unfortunately there were other vectors for anaplasmosis, but the Boophilus ticks were the only vectors capable of transmitting piroplasmosis.

Last year a large area around Alice, Texas was quarantined because cattle were found infected with B. microplus. As might be expected, deer have also been found infested in this area. Dr. Bill Kiel (King Ranch biologist) has observed infested deer on a number of occasions. Boophilus microplus has not previously been reported to have survived this far north in Texas. There have probably been instances when microplus ticks have been carried even farther north, but their presence was temporary. It might be that a similar situation will exist with regards to the current microplus outbreak. Dr. Manning Price, entomologist at Texas A&M, believes, however, that based on Australian data it is possible for B. microplus to survive where it is and even extend north and eastward around the gulf coast. We know it was well established in Florida at one time. The exact geographic limitations of B. microplus are not currently known.

The question might be asked how can the tick be eradicated in cattle when is present on deer. A direct answer to this question is not possible at this time, but past experience has shown that eradication can be accomplished by cattle dipping. As previously mentioned, B. annulatus was eradicated in Dimmit county where deer were known to be infected. It was known that during

the eradication campaign in the 20's and 30's that deer were infested but ticks were nevertheless eradicated. In Texas, the tick was principally B. annulatus. In Florida, both annulatus and microplus were present. The microplus was much more difficult to eradicate, and this was not accomplished until relatively recent times. There are some authorities who even now question the eradication of B. microplus ticks in Florida.

Boophilus microplus ticks while more susceptible to adverse climatic factors are more versatile than annulatus with respect to the variety of animals it can attach to and successfully feed on. It has been shown by Park and others to feed, survive, and undergo a normal life cycle on deer. It is well adapted to this host. It has also been found on a number of other animals including man, but normally does not occur in any great numbers on these animals.

Kistner and Hayes working with microplus on the Virgin Islands observed this tick and arrived at several useful conclusions.

- 1.) B. microplus can maintain itself on white-tailed deer in the absence of cattle. Two deer were found infested with B. microplus where contact with domestic livestock had not occurred for 20 years.
- 2.) B. microplus was not, however, found on 5 deer trapped in an area where they were mixing with cattle and where the cattle were being dipped regularly.

This second finding had been previously reported by Travis in the 40's, in Florida, who reported finding microplus ticks on deer trapped in swamps where cattle were not present. No microplus ticks were seen on deer examined in forest areas where they co-mingled with cattle being dipped regularly.

Past evidence suggests that Kistner's conclusions are correct, and that ticks can be eradicated from an area cohabited by both deer and cattle by

regular and prolonged cattle dipping.

Regular dipping of all cattle in the present quarantine area is currently underway. The size of the area involved, the terrain, the ratio of cattle to deer, and the known ability of the tick to survive on deer may alter previously held concepts on tick eradication. It is probable in light of previous experience that a longer quarantine and dipping period will be required to eradicate the microplus tick when compared to annulatus, unless we get some help from climatic conditions. It is even possible that the current procedures will not work, but they did work before and the most reasonable approach at this time appears to be vigorous application of tried and tested techniques for the elimination of this ecto-parasite.

Recent work has been done relative to the infection of deer with babesiosis or piroplasmosis.

Known infected B. microplus ticks were placed simultaneously on susceptible calves and deer. The calves in every instance developed piroplasmosis. The deer failed to develop evidence of illness. Thinking that the deer may have developed a chronic or non-apparent infection, their blood was inoculated into calves at weekly intervals for 4 to 6 weeks in an attempt to pick up the infection. All of the trials were negative in that infection failed to occur. We then took the ticks which developed normally on deer, allowed them to oviposit, and then placed the resulting larvae on splenectomized calves which failed at this point to develop piroplasmosis. This led us to the conclusion that the ticks, while infected when placed on deer, eliminated the infection by undergoing one life cycle on deer. It is probable that the same thing would occur when ticks were placed on other non-bovine animals. Babesia buxtoni and B. argentina occur naturally only in cattle. This is probably the reason that recent tick outbreaks in Texas have not been accompanied by piroplasmosis. Should these non-infected ticks have occasion to engorge on

an infected cow, the resulting larvae would be infected and could then theoretically transmit Texas fever. It is estimated that approximately 700,000 cattle are imported from Mexico each year. Not all of these cattle are Babesia carriers but a fairly large percentage probably are. The opportunity exists in the U.S. for a Babesia outbreak when the ticks and infected cattle come in contact.