

A REVIEW OF TICK PARALYSIS IN CATTLE IN BRITISH COLUMBIA

With Notes on Several New Cases

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History

Until 1930, tick paralysis was not considered of great importance to cattle raising in British Columbia. Several isolated cases had occurred from time to time, but no outbreak involving much loss had occurred.

From the records of Hadwen ⁽³⁾, Bruce ⁽¹⁾ and Hearle ⁽⁴⁾ it appears that this disease, caused by the bite of the wood tick, **Dermacentor andersoni** Stiles, has occurred sporadically nearly all over the dry belt of British Columbia and north-western United States ⁽⁵⁾. The first case in which cattle died was reported to Dr. Bruce ⁽²⁾ in 1922 by T. A. Moilliet of Vavenby. In this case two head of young cattle died April 16, 1922. They had been imported the previous fall from Alberta.

In the North Thompson valley, ticks have been occasionally paralyzing people, dogs and sheep for over twenty years, and during the late 1920's there were a few more cases among cattle at Vavenby, B.C. In the worst recent case the cattle were imported from Alberta.

In the Nicola valley, cattle have been raised on a large scale since 1870, and by 1888 there was already much overgrazing. The large cattle owners had practically no trouble with ticks, although humans, dogs and a few sheep had occasionally died from tick paralysis in the district.

In April 1930, a "plague of ticks" occurred at Nicola, in yearling steers, in a herd of 900 head owned by the Douglas Lake Cattle Co. This was reported by Hearle ⁽⁴⁾ in the proceedings of the B. C. Entomological Society for 1933, and will be used here for comparison. This was the first severe outbreak among cattle recorded in the province. Over 11% of the herd was affected, with a mortality of 7%.

New Cases

In 1934, when one of the riders for Guichon Bros. at Quilchena, in the Nicola valley, was interviewed, he mentioned that several cases of tick paralysis had occurred that April in yearling heifers in a field (lot 207 and beyond) which runs from two to four miles from Quilchena up the south-west side of the creek. He had saved these animals by picking

off the ticks. Outside of this, there had been no trouble during all the years the field had been grazed.

On March 8, 9, and 11, 1935, 638 yearling steers were dehorned and, after staying in feed lots until April 2, were turned out on the field referred to in the above paragraph. The cattle were looked over on April 12 and appeared to be doing well. On April 17, however, a rider found 100 down with ticks, several dead and dying. At once all available men were summoned and set to clipping the animals' necks, removing ticks and applying carbolic acid to the bitten areas. The whole herd was rounded up, driven to the ranch and there treated. On the drive to the corral many staggered and fell and had to be brought in in wagons. The owner stated that at least 200 were affected badly enough to fall.

As the animals went through a chute, large numbers of ticks were removed and a mixture of one part creosote, two parts coal oil and one part raw linseed oil was rubbed along the neck and back to kill the remaining ticks and act as a repellent dressing. The herd was then moved to a different part of the range.

Most of the animals recovered within a few hours of de-ticking. Five head, including a two-year-old, were dead before treatment began (and from the ground near their bodies a good series of fed female ticks was recovered by the writer on April 26). Two animals had drowned in a small creek. Seven head which did not recover immediately on the range were brought in by wagon to the barn. By April 28, five of these remained unable to rise. One of these died on April 28, and an autopsy made by J. D. Gregson and the writer showed that pneumonia had probably been the cause of death. Mr. Gregson attempted cultures from the lung and spinal fluid, and injections into two guinea pigs and a white mouse, but they resulted in nothing of value. Blood samples taken from the four remaining sick cattle were tested by Dr. R. R. Parker of the Rocky Mountain Spotted Fever Laboratory at Hamilton, Montana, for both *Brucella abortus* Bang and *Bacterium tularense* McCoy & Chapin, but with negative results. Both of these diseases were involved in an outbreak of paralysis of cattle by *Dermacentor occidentalis* Neumann in California ⁽⁶⁾.

In 1934, it was learned from Mr. C. H. Ross, rancher, of Baynes Lake in the East Kootenay district, that he had had severe losses that spring. During April 1934, out of a herd of 91 he lost 16 head, ranging in age from six months to six years. The mortality occurred only among cattle imported that spring from Alberta. There had been a few animals affected in previous years and large numbers of ticks were involved, but no losses.

Also in April 1934, Guichon Bros. of Quilchena reported they had lost 12 cows in a field north of the east end of Nicola lake, but it is not known that ticks were the only factor responsible.

Comparison of Two Serious Outbreaks

The following tables give a synopsis of the variable and constant factors in the two principal outbreaks cited, those of Nicola, 1930, and Quilchena, 1935.

Factors in which there was little or no variation :

- Type of area:** Bunchgrass with yellow pine, Douglas fir, saskatoon, rose, chokecherry, willow, aspen, etc.
- Rodent tick hosts present:** Presence of rock bluffs, abounding in red squirrels, chipmunks, mice, packrats, coneys, groundhogs, blue grouse. Elevation 2200 feet to 3500 feet.
- Rodents increasing:** Apparently, but data uncertain.
- Length of time grazed:** Over 65 years.
- Previous trouble:** One or two cases in recent years.
- Breed of cattle:** Hereford.
- History of herd:** Local bred.
- Age:** Yearling.
- Sex:** Steers.
- Peak of tick activity:** April 17.

Factors showing some variations :

	1930	1935
Season:	One of the earliest springs, following light snowfall and very cold winter.	One of the latest springs following heavy snowfall and fairly cold winter.
Weather:	Many warm days and cold nights from April 1 to 20.	Warm from April 9 to 14, cold nights.
Exposure of field:	Western	Eastern
% number of cases to go down:	11.1%	31%
% mortality of those affected:	65%	13%
% affected by blowflies:	65%	½%
Number in herd:	900	638
Number affected sufficiently to go down:	100	200
Mortality:	65	26

Discussion

From the above account, as well as from other data available on tick paralysis in other animals and man, it is clear that one of the most variable factors is the power of ticks to paralyse. It is paralleled somewhat by the rise and fall of the virulence of bacteria or virus in disease epidemics.

There can be little doubt, however, that *D. andersoni* Stiles, the only tick involved in British Columbia, is increasing. This is brought about by two interdependent factors:

(1) Since the country was settled, domestic animals have probably more than compensated in abundance for any reduction in the larger game animals, especially as they may have less natural resistance to infestation than wild animals.

(2) Owing to the fact that it is a three-host tick and requires the blood of rodents in its first two stages, the increase of members of this order in a district is bound to be a very important factor in its increase. There is no doubt that this condition has been fulfilled in many of the districts where this tick is becoming such a serious pest. The Columbia ground squirrel (*Citellus columbianus columbianus* Ord) in the moister sections and the groundhog (*Marmota flaviventris avara* Bangs) in the drier parts of this tick's range are the two species which are most noticeably increasing. It is difficult, however, to get reliable data on any of the other species, even the snowshoe rabbit.

An interesting feature of the disease in cattle is the apparent inability of the animals to straighten the front legs, especially the right. After they can stand they are often unable to walk, except on the front knuckles, for over a week. Whatever poison is involved apparently shortens the cords of the limb as well as paralysing the nerve. Cattle usually fall on the right side with the head buckled under.

It is of interest that neither tularaemia nor Bang's disease was present in the Quilchena outbreak. No tests for these diseases were made in other B. C. outbreaks.

Immunity

Prior to 1930, it was noticed that usually it was imported stock which were most affected; especially in older stock, as in the cases at Baynes Lake and Vavenby, and at first sight the Nicola valley outbreak appears to discredit this. Still it must be remembered that these young cattle had sires which were pure-bred, and protected from ticks, that they were under one year old, and had just been weakened by dehorning. Most range calves are born during the latter part of the tick season, late May and June; thus they may be slightly tick infested during their first

month of life. This would not have been true during May 1934, however, since the writer found it impossible to collect any ticks on the Nicola range at that time. When these points are considered, it appears probable that there may be an acquired immunity to the disease in cattle. An hereditary immunity could hardly be involved, since there has not been time for this evolution to take place.

References

1. Bruce, E. A., "Tick Paralysis in British Columbia," Dept. Agric. Canada, Bul. No. 133, 1920.
2. Bruce, E. A., "Tick Paralysis," Jour. Amer. Vet. Med. Assoc., Vol. LXVIII., N.S. No. 21, No. 2, Nov. 1925.
3. Hadwen, S., "Insects affecting Livestock," Dept. Agric. Canada, Bul. No. 29 N.S., 1923.
4. Hearle, E., "Notes on a Serious Outbreak of Tick Paralysis in Cattle," Proc. B. C. Ent. Soc., March 1933.
5. McCornack, P. D., "Paralysis in Children due to the Bite of Wood Ticks," Jour. Amer. Med. Assoc., July 23, 1921.
6. Parker, R. R., Brooks, C. S. and Marsh, H., "The Occurrence of **Bacterium tularensis** in the Woodtick (**Dermacentor occidentalis**) in California," U. S. Pub. Health Rep., Vol. 44, No. 22, pp. 1299-1300, May 31, 1929.