

NOTES ON TICKS AND INSECT PARASITES OF
GAME ANIMALS IN BRITISH COLUMBIA.

By E. R. Buckell

Dominion Entomological Laboratory, Vernon, B.C.

The Dominion Entomological Branch maintains a research laboratory at Kamloops for the special study of insects affecting man and domestic and wild animals.

The late Mr. Eric Hearle, who was in charge of this laboratory, made special studies of ticks, biting flies, warble and bot flies, lice and fleas; particular attention being paid to the part these ticks and insects play in spreading disease among man and animal; a subject upon which a great deal has yet to be learned, and one of very great importance to those interested in the welfare not only of man but also of domestic and game animals.

It is well known how insect-borne diseases may wipe out both man and animal over vast areas in such countries as Africa, and it is strongly suspected that here in Canada biting insects play a greater role than has hitherto been supposed.

During the past few years the studies being carried on in Canada and the United States have brought to light a lot of extremely interesting and valuable information in regard to the part biting insects and ticks play in spreading disease; especially such diseases as tularaemia and Rocky Mountain spotted fever.

Mr. Eric Hearle kindly supplied me with the information contained in this report concerning the ticks and insects which I actually found, and also concerning those that I might have been expected to find, on the game animals shot; and I am much indebted to Mr. Hearle for the information supplied.

It is desirable to get all the data we can on the parasites affecting wild animals, since so little is known of these and their relation to the increase or decrease of game. There seems to be little doubt that grouse, for instance, are in some seasons very seriously affected with ticks, *Haemaphysalis leporis palustris* Packard, and that these carry certain diseases at present very meagrely understood but which certainly have a marked effect on the abundance of these birds.

In the same way, it is believed that the throat maggots *Cephenomyia* spp. affecting deer and elk have been responsible in some years for a very marked reduction in these animals. Very serious infestations for instance, have been reported from Colorado and elsewhere in the United States and deer and elk have been noted with large numbers of these maggots in various parts of British Columbia.

At the present time we know very little about the actual economic effect of most of these pests, and it is only by systematic collecting that such data can be secured and that any possible control can be evolved.

Then there is another feature, and that is the fact that wild deer sometimes harbour parasites that seriously affect domestic animals and are one of the main means of distributing these parasites over large areas. It has been found for instance that liver fluke is very abundant in deer in parts of Vancouver Island—apparently the same species of fluke that affects sheep and cattle. All these are important factors and indicate that we certainly should know more of the parasites affecting game in British Columbia.

In this connection the recent publications of Dr. A. E. Cameron, University of Edinburgh, Scotland, and his associates, on the parasites affecting red deer in Scotland, are of interest. They have got together quite a mass of valuable information in this study and doubtless this information will be of great benefit to those interested in deer stalking in Scotland. It seems that somewhat similar information would be of value to us in British Columbia.

Having obtained permission from the Dominion Entomologist, Ottawa, to make a short trip for the purpose of collecting parasites from game animals for Mr. Hearle, I spent the last week in May, 1932, with a small party of bear hunters in the Shuswap mountains, near the headwaters of the Anstey, Seymour, and Eagle Rivers, having previously obtained a permit to shoot game animals at any time from the British Columbia Game Board.

The trip was not as successful as I had hoped it would be, on account of the unusually late spring and the great depth of the remaining snow. The result was that we had an exceedingly hard trip and it was fortunate that, although many mishaps occurred, none of the party or any of the pack horses were injured.

Game Animals Shot and Ticks and Insects Secured:

(1) **One large male Mountain Goat (*Oreamnos americanus*).
columbiae Hollister.**

The main reason for wishing to secure a goat was to obtain a large number of specimens of the so-called Wood-tick (*Dermacentor andersoni*, Stiles,) for shipment to the tick-parasite laboratory at Hamilton, Montana.

Some years ago I was able, in company with Mr. Hearle, to visit this laboratory in Montana and to learn the exceedingly interesting work being undertaken there. In conversation with Dr. Cooley at this laboratory, he asked me to try and get him some wood-ticks from goats in B. C., as he wished to examine them and compare them with those taken among the goat rocks in Montana.

At this time the Game Department of the Province of British Columbia was differently organized and I knew nothing about the possibility of obtaining a special permit to kill a goat in the spring. However, while out bear hunting I had the opportunity of coming close to a number of goats, and shot one small goat in the hope of obtaining the desired ticks.

On examining the goat I found it to be a most disgusting sight, being literally a crawling mass of wood-ticks. They were on all parts of the body and many were already well engorged.

I cannot understand how any animal could exist with so many of these ticks feeding upon it, especially as this tick often produces paralysis on man and animal. I cannot but feel that the mountain goat must be immune from the injurious symptoms produced in other animals.

During the succeeding years, while spring bear hunting, I kept my eyes open as regards the tick situation, when in the goat-rocks of the mountains. I was truly astonished at the number of wood-ticks present in the goat-rocks once the real warm weather of spring had started. I found them crawling on me all day if the sun was out, and I have no doubt that the goats I saw in the vicinity were covered with them. No more goats were shot as I very much dislike to shoot such animals in the spring unless something of real scientific value can be obtained by so doing.

Early in the spring of 1932 I was informed by Mr. Hearle that the Hamilton tick laboratory in Montana would very much like to secure many hundreds of adult wood-ticks from the goat-rocks of British Columbia and I therefore asked that I be supplied with a permit allowing me to shoot game animals for scientific purposes.

Mr. Hearle informs me that one of the reasons we are particularly anxious to secure ticks from fairly high elevations and particularly from haunts of the Mountain goat, is that the authorities in Montana seem to think that there is a possibility that the very large ticks occurring at high elevations in the vicinity of goat-rocks may be slightly different to the ordinary *Dermacentor andersoni* Stiles, of the low valleys. There is a theory that these over-sized goat-rock ticks may have something to do with the added virulence of Rocky Mountain spotted fever which is found on the west side of the Bitterroot Valley in Montana. Apparently, except for the larger size, these ticks are morphologically the same as the common valley *andersoni*, but there may be physiological differences which render them particularly suitable hosts for "stepping up" the disease.

At any rate, it is a well known fact that Rocky Mountain spotted fever is about 75 to 80% fatal to human beings on the west side of the Bitterroot Valley, where mountain goats occur, and only from 4 to 5% fatal on the east side of the same valley where no goats occur.

For the above reasons we are naturally very anxious to secure all the data we can on the presence of the larger ticks in the various high goat ranges in British Columbia, as far as this is possible.

If large quantities of wood-ticks could be obtained, the Hamilton laboratory could crush them and inject the fluid into rabbits and tell us if the organism causing spotted fever is present in our B. C. ticks. There seems little doubt that it does occur, as they have definitely determined its distribution in the United States up to our border line.

Should the spotted fever ever appear in our tick infested valleys such as the Okanagan, in the virulent form found in the Bitterroot Valley, the consequences would be very serious, and we should be well advised to make every effort to ascertain all we can as to the prevalence of wood-ticks in the province and also whether the spotted fever organism is present in these ticks.

Another point in regard to the importance of tick studies in British Columbia is that they have found in Montana that the British Columbia strain of **Bacterium tularensis**, McCoy, the organism causing tularaemia, and which Mr. Hearle secured from a snowshoe rabbit at Vavenby in the North Thompson Valley, is more virulent than any other strain that has been experimented with from various parts of the United States. Guinea pigs will often live for over a week or even a fortnight with some of these strains, whereas the British Columbia strain usually kills them within two or three days. The fact that our particular strain of tularaemia is so virulent, and that the only human case so far located in Western Canada was a very serious one, indicates the necessity for doing all the work we can on studies of the various carriers of tularaemia.

On May 25, 1932, after a rather hazardous climb, a large male goat was secured. I was rather afraid that I might not get the desired number of ticks as the spring was very backward and I had not found any ticks on my person during the previous day's hunting.

On carefully examining this goat I was extremely disappointed to find that I was too early and that no wood-ticks had as yet come out from their winter hibernating quarters and got onto the goat.

Having killed the poor old fellow I practically plucked him of his wool from head to tail, in an effort to find something, some lice or fleas, that would justify my taking his life, but I could find nothing at all.

I felt rather badly about this, as I particularly admire the goat and disliked taking his life even in the name of science. However, Mr. Hearle informs me that the goat appears to be particularly free from parasites other than the wood-tick, and that he can find no records from goats in the lists of sucking and biting lice for North American animals.

However, even negative results are often knowledge gained, and I will know better another time when to expect good results in the matter of collecting wood-ticks from goats.

(2) **One large male Mountain Caribou (*Rangifer montanus*, Seton-Thompson.)**

On May 26, 1932, having found out that any further quest for wood-ticks would be a failure owing to the cold, late spring, I turned my attention to caribou.

During the day some thirty caribou of all ages were seen and I selected a bull from a group of five.

I hoped to obtain a caribou hide showing the holes caused by the grubs of the caribou warble fly (*Oedemagena terandi* Linn) which is usually found in great numbers in the backs of caribou in the spring.

I understand from Mr. Hearle that this warble fly has mainly been recorded from the Blue River district and that the grubs reach full growth by April or early May.

The caribou was carefully skinned but I found no trace of grubs beneath the skin nor of any visible exit holes in the skin. I felt that perhaps I was too late to find grubs and that the exit holes might show up after tanning and so packed the skin home. Unfortunately, before I could get anything done to it, it was entirely destroyed by pack rats.

After taking the skin to camp it was carefully examined but appeared to be absolutely free from lice or parasites of any kind. Mr. Hearle informs me that caribou may be infested with lice, but that he has been unable to find any reference to the Latin names of those infesting this animal, or whether it is infested by both biting and sucking lice.

As often happens when hunting, the animal was shot far from camp, late in the day, and nothing more than the skinning could be done that day. On the following day I returned to the carcass determined to find something of interest and was very relieved to find that, unlike the unfortunate goat, the caribou was not to disappoint me entirely.

In examining the throat and gullet I found a large number of large dipterous maggots, attached by hooked jaws to the membrane.

These proved to be the larvae of the caribou nostril fly, *Cephenomyia nasalis* (C. trompe), which were of particular interest since they appear to represent the most southern record for this species, as far as we know. Mr. Hearle informs me that he had previous indications that this fly occurred on caribou in the Blue River district.

These flies belong to the same genus (*Cephenomyia*) as the nostril fly found in the red deer of Scotland, and some of the grubs collected have been sent to Dr. Cameron in Edinburgh at his request.

I was rather disappointed in not being able to find any external parasites on the caribou, and as he appeared to be so completely free

from them, I did not feel justified in examining further specimens at that time although I was well aware that it need not necessarily follow that others in the vicinity would be free also, as often an old and weak member of a herd will be more heavily infested than his younger and more robust companions.

(3) **One Mule Deer (*Odocoileus hemionus hemionus* Rafinesque).**

On May 22nd, 1932, I was fortunate in securing a small Mule Deer, these not being at all common in this particular location.

The deer was skinned and the hide examined for parasites in camp. It proved to have a large number of biting lice (***Mallophaga***) on it.

These lice were determined for me by Mr. Hearle as ***Trichodectes tibialis*** Piaget. They were small, flat, brown lice, and were found singly, clinging head downward, to the base of the new growing hairs of the summer coat. As these lice seemed to be absolutely immobile, this was a very wise precaution on their part, as they would certainly have been shed on the winter hairs if attached to them. I never saw the least movement in any of the specimens collected and they died when placed in alcohol in position on the hairs.

The only other parasite found on the deer was one nymph tick, taken in its ear. Mr. Hearle informs me that this is probably a nymph of the winter tick (***Dermacentor albipictus*** Packard), so plentiful upon range horses during the winter months. He further states that one would have expected to find on this deer a fair infestation of engorged adult females of the winter tick which sometimes remain on the host fairly late in the season at high elevations. Normally it is gone in the valleys before the end of May.

However, it should have been followed by the paralysis tick ***Dermacentor andersoni*** Stiles, adults of which should have been active in May or June at this elevation, but owing to the late season had not yet appeared from hibernation. Mr. Hearle further informs me that I might also have found specimens of the deer louse fly, ***Lipoptera depressa***, Say. "This is very common on deer, but most of our records, of course, have been in the fall, which is natural since the specimens have been obtained in the hunting season. I have not very much information as to its life history and as to when it is most abundant on deer, but imagine that some specimens would be found on the animals at almost any time of the year. Larvae of throat maggots, ***Cephenomyia*** spp. (Possibly ***C. trompe***) might also have been found."

(4) **Bears: Grizzly—(*Ursus horribilis*).**

Black—(*Euarctos americanus*).

During the collecting trip of 1932, I, personally, did not shoot a bear, although several chances at both grizzly and black occurred. I was able, however, to examine the skins of two black bears, and during the past few years I have shot and examined several grizzly and black bears.

Mr. Hearle informs me that I might have found the wood tick and also fleas upon bears, but that bear fleas are rare and very difficult to secure.

In all my examinations of bear skins I have never found anything in the way of parasites upon them, except an odd wood-tick. This, to me, seems a very curious thing, as I have shot grizzlies on slides frequented by goats and at a time of year when wood-ticks were very plentiful and could be found crawling on one's clothes while sitting on the slide where the bears were feeding. I am inclined to think that the bear is not favoured as a host for the adult wood-ticks, and in general, is very free from external parasites.

(5) **Rodents and other small mammals :**

During the trip of 1932 I did not have time to examine anything except the large game animals mentioned above, but the examination of some of the smaller mammals would certainly be worth while.

The wood-ticks only occur on large animals in the adult stage (early spring) and spend their immature stages upon small rodents. This district is particularly well stocked with chipmunks, Columbia ground squirrels (**Citellus columbianus columbianus** Ord) and Hoary marmots (**Marmota** spp.) I have also, on two occasions, secured a specimen of the British Columbia woodchuck (**Marmota monax petrensis** Howell) the only specimens I have ever seen. These were caught under the floor of the shack we stayed in.

Other small animals seen were Wolverine (**Gulo luscus** Linnaeus), Fisher (**Martes pennanti** Ervleben) and Coyote (**Canis latrans** Say).

The collection and study of the parasites attacking our game in British Columbia seems to be something very much worth while, as this is a phase of entomology that has never been given a great deal of attention.

Personally, my work in the Vernon Office on fruit, vegetable and range insects, does not allow me to do much collecting of animal parasites.

I am, however, extremely interested in the study of our game animals and never lose an opportunity to get back into the mountains.

Having now become more familiar with the kind of parasites I may expect to find, the times of the year in which they occur, etc., I feel that I could, on any future trip, make more use of my time and shall certainly welcome any chance to be of help in expanding our knowledge of the parasites attacking game animals in British Columbia.