

I dare say you have read, and perhaps seen, the effects of the depredation of the Spruce Bud Worm. It has ravaged the forests of Douglas Fir and other conifers on different parts of the south end of Vancouver Island and also the islands of the Gulf lying adjacent to the east coast. This insect certainly owes its distribution and spread to climatic conditions. The prevailing winds are from the South around Victoria and the spread of the insect is from the south northward. From observations it seems to be disappearing from the neighborhood of Cowichan Bay, where it was very plentiful last year, but on the other hand it has increased its distance about four miles further north from Victoria along the line of the E. & N. Railway.

In this already too long paper I have purposely confined myself to some of the leaf-destroying insects, but I hope at some future meeting to have something to say about the aphides and others which infest our low rich alluvial lands of the Fraser Valley.

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## THE LIFE HISTORY OF IXODES ANGUSTUS (BANKS)

by

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This tick is found on a variety of animals, but in British Columbia occurs principally on squirrels (*Sciurus hudsonius douglasi* and *Sciurus hudsonius vancouverensis*.)

The life history, as given below, is the result of a series of experiments made in summer and winter at room temperature. The time given of 221 days for the complete life cycle is probably very nearly what occurs in nature. It would appear that the time required for *Ixodes angustus* to go through its life cycle is shorter than in many other varieties of *Ixodes*, as squirrels have nests, and it is in these that ecdysis occurs, the process being naturally hastened by the warmth of the animal.

The squirrels from which the ticks were taken, were shot at all times of the year and had about an equal number of ticks upon them. One point to note about squirrels is that they do not seem to wander far away from their abodes, and are often seen feeding day after day in the same spot; thus, any gorged ticks which dropped off them to moult would stand a good chance of getting onto the same animal again. Another interesting feature is the fact that males were seldom

found together with the females on the squirrels, nearly 200 females and nymphs were captured before a single male was encountered. This means that copulation between the sexes occurs almost wholly in the squirrels' nests or on the ground.

The same general life history should apply also to the ticks found on other nesting animals, such as coons, and perhaps skunks, but to those which move about a great deal, like the mink and martens, I do not think it would apply, nor for bears, which den up after the cold weather has started and would no doubt go into their dens free from ticks.

*Ixodes texanus* (Banks) was found twice on coons (*Procyon lotor*) captured in hollow trees, both times in the dead of winter; one of them up North when the thermometer was much below zero. The exact temperature was not ascertained, but the trees round about were cracking with the frost.

These observations are further confirmed by the fact that no ticks have been found on the hares (generally known as rabbits) of the lower mainland in the winter, whereas in the summer ticks are almost invariably found on these animals.

Though ticks are able to withstand low temperatures without being killed, they become torpid when cold, and in my experiments, would not attach themselves to animals unless they had been previously warmed. Once they are firmly attached they are protected by the hair, and are, of course, kept warm by the animal's heat.

In conclusion I desire to express my gratitude to Professor Nuttall, F.R.S., of Cambridge, for his help and encouragement in the study of these and other blood-sucking parasites, and to Mr. F. Kermode, Curator Provincial Museum, for giving me the scientific names of the various animals I have been working with.

*Ixodes angustus* (Banks).

Gorged, female—	Average of
Oviposition began at.....	16 days
Larvae hatched at.....	73 days
Larvae fed on rabbit—	
Average time of feeding.....	2.5 days
Ecdysis, larvae issue as nymphs.....	61 days
Nymphs fed on rabbit—	
Average time of feeding.....	2.5 days
Ecdysis, nymphs issue as adults.....	29 days
Adults attach and remain for.....	7 days
Allowance for hardening of skin after ecdysis and time in waiting for host, ten days at each stage.....	30 days
	221 days

Thus it is possible for *Ixodes angustus* to go through its various stages in seven months.