

**THE DISCOVERY OF AN IXOVOTOXIN IN
DERMACENTOR ANDERSONI EGGS**

(Acarina: Ixodidae)

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Recent investigations in Yugoslavia on the tick paralysis, or so-called "Shimteera" disease of that country, have shown that the eggs of certain *Hyalomma*, *Boophilus*, and *Rhipicephalus* ticks all contain a powerful toxin. This poison, which has been named "ixovotoxin" is thermolabile, is not destroyed by 0.2% HCl, 0.1% NaOH or saline, and is not digested by pepsin or trypsin. When inoculated into guinea pigs, a paralysis results which is similar to the symptoms produced by the ticks when engorging on an animal. A suspension of 0.1 grams of the eggs of these ticks, administered subcutaneously in the neck of a guinea pig, resulted in the death of the animal on the fourth or fifth day.

This winter (1939-40), while conducting studies on the developing eggs of *Dermacentor andersoni* Stiles at the Dominion Livestock Insect Laboratory, Kamloops, British Columbia, it was found that a series of ten-day-old chick embryos was killed overnight by inoculations of 0.15 cc. of tick egg emulsion. This inoculation consisted of the sterile filtrate of three-quarters of the egg mass from one laying tick, ground in 3 cc. of saline. The results were suggestive of the ixovotoxin mentioned above, and an experiment was performed with the few remaining tick eggs to try and confirm the presence of a toxin by injection into a guinea pig.

A 650 gram guinea pig was selected for the experiment. 0.540 grams of tick eggs (about one week prior to hatching, from a laboratory-fed *D. andersoni*) were ground with 5 cc. of 0.75% saline. The emulsion was then filtered through a Seitz disc and collected under aseptic conditions. Three cc. of the filtrate, which proved to be sterile, were injected subcutaneously into the dorsal part of the guinea pig's neck at 5 p.m., December 11th. The following morning the pig showed signs of weakness and loss of appetite. Temperature recordings for the ensuing eleven days were as follows:

December 12	-----	105.0	December 18	-----	102.2
December 13	-----	103.4	December 19	-----	102.6
December 14	-----	103.4	December 20	-----	102.4
December 15	-----	103.3	December 21	-----	102.4
December 16	-----	103.0	December 22	-----	102.0
December 17	-----	102.8			To normal.

By the end of a fortnight the guinea pig had completely recovered. The possibility that a strain of *Rickettsia dermatroxenus*, the causative agent of Rocky Mountain spotted fever, was responsible for the rise in temperature was ruled out by a subsequent test that showed that the pig was not immune to this disease. The reaction to the injection of the egg extract is interesting in that it suggests that a potent toxin also exists in the eggs of the common paralysis tick of North America. Detailed tests of the potency

and stability of the ixovotoxin must wait until a larger supply of tick eggs is available.

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References

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FURTHER RECORDS OF SIPHONAPTERA FOR BRITISH COLUMBIA

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British Columbia is a very large province, containing a number of well-defined faunal regions which as yet have been inadequately explored with respect to their Siphonaptera. Recent studies have brought to light a number of new or confirmative records, which form the basis of this paper. In the majority of cases, determinations have been made or confirmed by various specialists. Without doubt, further collections from some of the more northerly regions will reveal many interesting forms not hitherto recorded, with every probability that a number of them will be new to science. In view of the fact that bubonic plague is now known to be established in Canada, the study of fleas assumes great importance, and it is hoped that within a few years it will be possible to present a fairly complete picture of the distribution of Siphonaptera in this country.

The present list brings the total of species and varieties of fleas to eighty-six, which is probably still far short of the actual number present in this province. A few species are included on the basis of collections from Waterton Lakes National Park, Alberta, but as the fleas were obtained within a mile or so of the British Columbia border, and the host animals are indigenous to this province, the fleas may be assumed to occur here also.

Fam. PULICIDAE Stephens 1829.

- (1) *Cediopsylla inaequalis inaequalis* (Baker) 1895.

From brush rabbit, *Sylvilagus* sp., collected at Waterton Lakes Park, Alta., June 23, 1938 (G. P. Holland). Determined by Glen M. Kohls.

Fam. VERMIPSYLLIDAE Wagner 1889

- (2) *Trichopsylla* (= *Arctopsylla*) *ursi* (Rothschild) 1902.

Formerly recorded west of Calgary, not far from B.C. Our specimens were taken from grizzly bear, *Ursus horribilis* spp., at Wigwam, B.C.,