The Oviposition Habits of *Rhyncocephalus sackeni* Will.

(Diptera Nemestrinidae)

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At Riske Creek, in the Chilcotin, is a spot that can be duplicated almost anywhere over many miles of the elevated, rolling tablelands that constitute the Range country of the Cariboo. The spot in question is the bottom of a long, very shallow valley, through whose lowest point extends a long, narrow strip of alkaline, sedge-covered soil, flooded in spots each spring, by the overflow from a swamp-meadow a short distance up the valley.

Straight down the centre of this valley runs a line of weather-beaten telephone poles approximately seventy yards apart, passing through an egg-bed of the grasshopper **Camnula pellucida** Scud. on which I was making observations in the summer of 1929.

On the 16th of June, 1929, a fine clear day, my afternoon work took me past one of these poles and on happening to glance up, I noticed a light-coloured fly of a species new to me, which somewhat resembled a Bombyliid or Bee Fly, sitting low down on the wood. Out came a cyanide bottle, the fly was stalked and the bottle clapped over it. To my astonishment the fly took no notice of my movements or of the bottle—in fact, it remained perfectly still, and then I saw that it was laying eggs and continued to lay eggs until it was overcome by the cyanide and dropped into the bottle.

A survey of the pole revealed more flies, all laying eggs, and so unusual was their concentration while doing this that it seemed worthwhile to make a few notes on the matter. In brief:—

Flies were laying eggs on 3 poles only, of the total line down the half-mile-long valley.

As many as thirty flies were assembled on a pole at once.

The lowest fly was 8″ or 9″ from the ground and the highest was estimated to be 15 feet up.

Flies were on the poles for the sole purpose of laying eggs, not for sunning themselves or resting.

All the flies examined had abdomens enormously distended with eggs which they were inserting into cracks in the wood.

The flies resembled light-coloured Bee flies with banded abdomens and the positions adopted were very much those of the cattle Warble fly **Hypoderma lineatum** de Villers sitting on the ground and ovipositing on the flank of a cow lying on the ground.

These flies have long, shiny, pointed ovipositors much like those of the warble flies, although unlike the latter, composed of two closely-apposed portions, and with them greatly extended, they reached right down into cracks in the dry wood to lay their eggs.

Egg-laying could be noted by the contraction movements of the abdomen and the pushing movement of the ovipositor.

In the case of one fly observed, the shortest time taken to lay an egg was 8 seconds, the longest 14 seconds, the average time being 12 seconds, over a period of several minutes.

Individuals were not timed for the whole length of their stay on the egg-laying task, but the positions of several were noted and the pole was revisited during the afternoon at intervals of grasshopper work. Several remained over half an hour; one, for nearly an hour, in one position.

It seemed a good idea to photograph them as nearly natural size as possible. I had only my Goertz Tenax plate camera in the field, and no tripod, and since the use of the double-extension bellows necessary for a natural-size photograph requires great steadiness, some means had to be adopted to ensure this. So with the axe from my equipment in the Ford car, I cut a stake from some dry trees lying on the valley floor some distance away, pointed it to a sharp, flat wedge and proceeded to pound the point into a crack where a fly was laying eggs, about 3 inches below the insect, using the back of the axe for a hammer. The whole pole fairly shook with the blows—but the fly kept on laying eggs. I repeated this job three times on the same pole and got the three photographs shown herewith, taken about 8 inches away from the four flies shown, with the fully extended camera lying balanced on the tent pegs I had driven into the telephone pole. In the area shown in photograph 1 with two flies, were 8 insects within a space of a foot.

I do not know for how many days the flies had been laying eggs on these poles before I found them. I visited them the next day 17th June and made some further observations and at the same hour each day, for the next few days. One of the days was cold and no flies appeared. On the fifth day only two or three were out; on suc eeding days no more were found on any of the three poles.

On several days I was able to note the arrival and departure of these flies. The flight is exceedingly rapid; an approaching fly cannot be noted until about a yard from the post, when it circles about once or twice and settles, or settles directly, and immediately proceeds to search for a crack in the wood, either by walking along with ovipositor trailing, or by alternate short walks and buzzings on the surface for a few inches. As soon as a crack is found the fly inserts her ovipositor and seems to test the wood in some way. She may either start laying eggs at once or may test several inches of crack before ovipositing, and when started on the job, she keeps on depositing exceedingly minute, thin-oval, pale yellow eggs, filling up the crack to about one-tenth of the surface, when she moves on a step and proceeds to fill up a new spot. The eggs are lightly glued to one another so that wind does not

blow them out of the cracks; there is no covering, so that an egg-mass can be readily seen with the naked eye. Enormous numbers may be deposited in one crack.

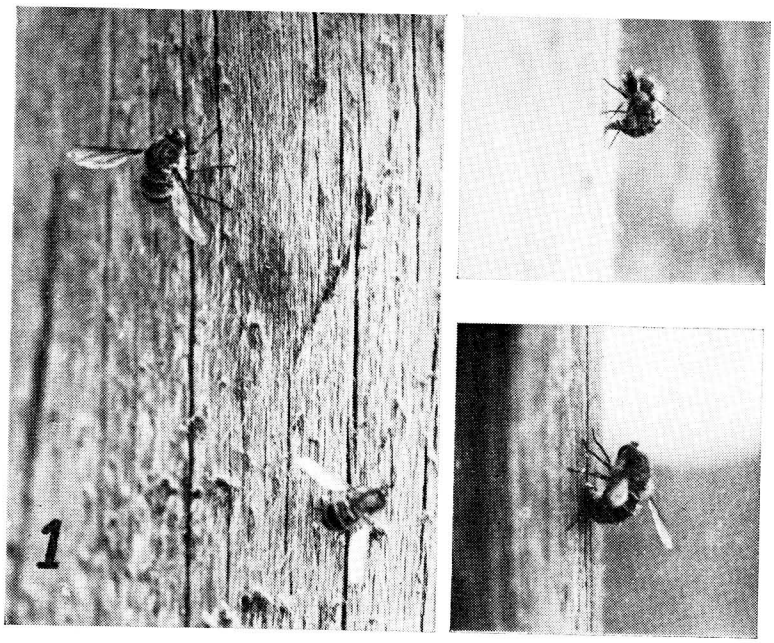
I captured a fly alive and dropped her without food or water into a one-inch diameter shell vial, with a deep narrow cut in the cork to simulate a crack in the telephone pole. As soon as the fly found she could not escape, she located the cut in the cork and proceeded to lay eggs within a few minutes of being captured. She filled up all the lower part of the crack the first day, became a bit feeble the next day although still trying to lay, and was dead on the second morning after capture. I was not able to observe the vial every day following but on happening to pick it up about three weeks afterwards, I found that the inside of the vial was covered with tiny yellow larvae about one-half millimetre in length, all dead, most of them on the cork but some sticking out from the glass at right angles as if standing on their heads or tails.

While engaged in egg-laying, flies may be picked off by hand. If rubbed off a post, all drop straight down, the more heavily gravid ones falling to the ground where they buzz a second and then fly off at great speed, the lighter ones falling a few feet and then taking wing before reaching the ground. If poked gently a few times while egg-laying, they may either take wing immediately or may crawl buzzingly around the pole before flying off. They go so fast that it is impossible to follow their course. They were never met with anywhere else but on these three telephone poles although a sharp look-out was kept for them wherever I went on the range.

The year following, 1930, I visited the area on June 29th and found about forty flies in all on the same three poles, and nowhere else. On the third day afterwards there was only one and no more appeared on succeeding days.

Specimens of the flies were sent to the National Museum at Ottawa and from there to Mr. H. Curran of the Natural History Museum in New York. Mr. Walley of the National Museum very kindly sent me the identifications from Mr. Curran: the fly is **Rhyncocephalus sackeni** Williston of the family **Nemestrinidae** or Net-winged flies, of which only six species have been taken in North America and only eight in Europe. According to Imms, "they are inhabitants of hot, arid regions where there is a minmum of rainfall. They mainly frequent flowers, hovering over them while imbibing nectar." Of the species in question, Williston, in his Manual of North American Diptera, says "But little is known of the larvae. The females of **Hirmoneura** have been observed laying their eggs deeply within the burrows of **Anthaxia,** a wood-boring insect, in the pine rails of fences. The eggs were found in clusters and the young larvae hatched from them differed very singularly from those of a more mature growth . . . on the thirteenth segment there were two pairs of similar setae, the hooks of which, however, pointed forwards, thus enabling the larva to attach itself firmly and to raise itself erect These young larvae emerged in great numbers from the burrows from which they were hatched and, placing themselves erect, were blown away by the wind. Here for a time they have not been followed, but it is probable that they attach themselves by the aid of the ventral hooks

to the bodies of large-sized beetles, by which they are carried into the ground when the females enter to deposit their eggs . . . Females of **R. sackeni** have been observed by Bruner apparently depositing eggs in the stems of **Eriogonum alatum."** The egg-laying habits I have just recorded for **R. sackeni** seem identical with those recorded by Williston for the genus **Hirmoneura,** as do those of the recently hatched larvae. Moreover, the flies I took do not possess the long mouth-parts and the type of wing-venation stated in Williston's key as belonging to flies of the genus **Rhyncocephalus.** I can offer no suggestions as to the habits of the larvae of the flies I found ovipositing: there were no borers in the telephone poles and no timber nearby beyond the rails of a fence encircling a swamp-meadow some distance away. The poles opposite the fence rails had no flies ovipositing in them. The only insects occurring in great numbers all around were grasshoppers and although a large number of these was opened for parasites, the only maggots found were those of **Tachinid** and **Sarcophagid** flies.



Females of RHYNCOCEPHALUS SACKENI Will. ovipositing in telephone poles. Natural size.