

## HISTORY OF THE USE OF BEE REPELLENTS IN ORCHARD SPRAYS IN THE OKANAGAN VALLEY OF BRITISH COLUMBIA

W. H. TURNBULL

Inspector of Apiaries, Vernon, B.C.

The Okanagan Valley of central southern British Columbia is essentially a fruit-growing area; with abundance of native honey plants, orchard blossom and leguminous cover crops, it is well adapted to bee-keeping. There are some 24,535 acres of bearing orchard and 3,786 colonies of honey bees in the valley. In the past, apiarists have suffered from loss of field bees, and from poisoned brood, the result of bees imbibing insecticidal poisons applied as orchard sprays.

This paper records the first experiments with bee repellents to be carried out in the Okanagan. Chemicals were added to standard sprays in an attempt to make the liquids unattractive to honey bees. The present work has been done from the viewpoint of the bee-keeper; the farmer is not greatly interested in the fate of the bees unless it can be proven that they are a major factor in orchard pollination.

Brittain (1933:157) concluded that as far as the apple orchards of the Annapolis Valley of Nova Scotia are concerned, both native and hive bees are important, and that colonies of hive bees should be placed in orchards in case seasonal conditions are unfavorable to native solitary bees; also that "Experimental evidence regarding the value of bees for pollination purposes under controlled conditions demonstrates clearly the necessity of bees combined with a supply of suitable pollen for all varieties. Even the most self-fruitful varieties require bees in order to ensure adequate pollination."

Root (1919:338) has the following to say for the danger of using poison in orchard sprays. "The poisonous spray applied to the tree falls on the flowers of the cover crop, and the bees visiting there are destroyed in immense numbers . . . The spraying of the cover crop presents a new and serious problem . . . Unless protection can be afforded bee-keepers they will be compelled to move their bees away from orchards when the owners allow spraying to

be done at a time when it may fall on cover crops which are in bloom."

In the winter of 1942, the American Bee Journal carried a report on the work being done by the Massachusetts Department of Conservation in adding bee repellents to orchard sprays. A pint of oil of creosote to 100 gallons of spray was used; 375,000 gallons of spray were applied in a certain area, and a footnote says that "beekeepers in the area covered reported no loss of bees from poison spray when the oil of creosote was used."

This paper was brought to the attention of A. W. Finlay, Provincial Apiarist, who immediately wrote to Massachusetts for a detailed report. In the meantime a beekeeper in Vernon drew the attention of the Minister of Agriculture, Hon. K. C. MacDonald, to the article in question and he in turn instructed Morrice Middleton, District Horticulturist at Vernon, to investigate the matter thoroughly.

Upon my arrival in Vernon in the spring of 1942 with full information from Finlay, I found the Department of Horticulture all ready to co-operate on a practical test. H. H. Evans and W. Baverstock had a supply of oil of creosote ready and had conducted some experiments with different "spreaders" in order to have it evenly distributed in the sprays. We then had to find an orchard far enough from others to remove any chance of the bees getting poison from sprays that had not been mixed with repellent. We finally chose one five miles northwest of Armstrong.

Fred Bettschen of Vernon offered to supply the bees for the test. We moved 10 colonies into the orchard, and Evans and Baverstock then applied complete cover sprays of two 400 gallon tanks of standard strength arsenate of lead at the same time and at the same intervals that sprays were applied in the orchards around Vernon. The bees were examined by the writer and a committee appointed by the British Columbia Honey Producers' As-

sociation, both before and after every spray was applied. No loss of bees or poisoned brood was found in any examination, and at the close of the season Bettschen harvested 2,160 pounds of honey from the 10 colonies, and the bees had ample winter stores. In an apiary several miles distant, within flying distance of an orchard sprayed without repellents being added, the loss was very heavy, almost all the field bees being poisoned.

We then found out that Evans and Baverstock had only used oil of creosote in one tank of spray each time. In the other tank used they had substituted crude carbolic acid at the rate of two ounces to each 100 gallons of spray. This information gave us two repellents that apparently could be used with perfect safety and equally good results insofar as bees were concerned.

In 1943 the repellents were tested on a larger scale in an orchard where there was a good cover crop of alfalfa, sweet clover, alsike clover and several native honey plants. As in the 1942 tests, complete cover sprays of arsenate of lead, containing one pint oil of creosote to 100 gallons, were used. A second orchard, adjacent to this, was under test with the same number of sprays, but in this case the repellent was crude carbolic acid. A close check up of the thirty colonies of bees in the orchard failed to show any loss of bees.

The formula with oil of creosote was given to several orchardists who were also beekeepers, to be tried out under the usual

growers' conditions. In every case a burning of foliage was reported, ranging from slight to severe. This seems to have been caused by the incomplete mixing of the creosote. No loss of bees was reported in any case.

In 1944 the officials conducting the tests decided to abandon the oil of creosote as being unsafe for use by growers and to continue with the more stable crude carbolic acid as a repellent. The orchard used was the one in which the creosote was tested the previous year. Four complete sprays were put on using carbolic acid two ounces to 100 gallons. The atmosphere varied from very moist to very dry during these tests. The cover crop was a heavy one and was in full bloom during at least two of the applied sprays.

The fourth spray varied from the others in that four ounces of crude carbolic acid were used in place of the usual two, to determine if there would be any burning of foliage. No burning whatever was noted.

Another test was carried out by a grower at Peachland, who was supplied with crude carbolic acid and it was applied in sprays by his own men under grower conditions. He had four colonies of bees on the edge of the 48 acres of orchard which were sprayed and the colonies were examined after each spraying. No loss whatever was noted and the bees built up to swarming strength during the time the four cover sprays were being applied.

Several other unofficial tests were carried on by orchardists and in every case "no loss of bees" was reported.

#### LITERATURE CITED

- Anon.** 1942. Massachusetts Association obtains use of repellents in sprays. *Amer. Bee Jour.* 82 (3) :114.
- Brittain, W. H., et al.** 1933. Apple pollination studies in the Annapolis Valley, N.S., Canada. 1928-1932. Dominion Canada, Dept. Agric., Bul. No. 162 (N.S.), 198 p., 73 figs., 41 tables.
- Root, A. I. and E. R. Root.** 1919. *The ABC and XYZ of bee culture.* A. I. Root Co., Medina, Ohio.

BRITISH COLUMBIA AND ALBERTA RECORDS IN E. C. LERCH'S "A LIST OF HOMOPTERA FROM ONTARIO." Lerch's paper (*Bull. Brooklyn Ent. Soc.*, 28 (2): 76-78. April 1, 1933) lists a number of Homoptera said to have been collected by J. F. Brimley of Wellington, Ont. Actually it includes four species received by Brimley from collectors in Western Canada: *Ceresa basalis* Walker from Malakwa, B.C. (not "Malorwa"!); *Campylenchia latipes* Say, *Bythoscopus robustus* Uhler?, and *Oncometopia lateralis* Fabr., from Medicine Hat, Alta.

The Medicine Hat specimens were collected by the late F. S. Carr. The Malakwa example was taken in 1923 by J. H. Aubrey who at that time lived there and was associated with the Forest Service. Like Brimley, H. M. Speechly of Winnipeg and the late Norman Criddle of Treesbank, Man., Aubrey was a member of the British Empire Naturalist Association. Most of the insects he took were sent to Brimley, but his collection of Coleoptera, left behind when he went to the antipodes, came into my hands in 1931.—Hugh B. Leech.