
FURTHER NOTES ON THE TENT-CATERPILLAR AND ITS NATURAL CONTROL, 1919.

BY A. B. BAIRD.

The tent-caterpillar outbreak was again very severe in and around the Cities of Vancouver and Victoria, causing much damage to shade and fruit trees and making the streets and parks very unsightly. The web-building species (*Malacosoma pluvialis*) was predominant and spread over a much larger area than the forest tent (*M. disstria* var. *erosa*). The latter was confined chiefly to a part of the Uplands District in Victoria, and in Vancouver to a section between Seventh and Thirtieth Avenues and extending for some fifteen to twenty-five blocks east and west of Main Street. Occasional caterpillars and small colonies were found scattered all over the infested area, but only in the above-mentioned areas was it in the majority. The species are equally destructive and their life-histories, habits, and control are practically the same, the chief difference being that *T. pluvialis* hatches about a week earlier in spring. Owing to the very cold, backward spring the trees had nearly all leaved out before the larvæ issued, which is a rather unusual condition. The cold weather also reduced the work of insect parasites to a large extent.

As conditions in Vancouver and Victoria are quite different, it is necessary to discuss them separately.

In Vancouver overcrowding and diseases were the chief control factors noted, and together they were responsible for the death of large numbers of the larvæ. It is rather difficult to estimate the percentage thus destroyed, but judging from the abundance of egg-masses it was not sufficient to prevent another outbreak next year. Insect parasites were almost entirely absent. Apart from a few egg parasites which destroyed about 2 per cent. of the eggs and a species of tachinid fly which destroyed less than 1/10 of 1 per cent. of the pupæ, none were found, although several careful searches were made in the field covering most of the infested territory, and each week collections of 100 larvæ and pupæ were made from different sections, which were either dissected or reared through in trays in the insectary. If parasites were present they must have been exceedingly scarce and localized. Birds of various kinds devoured a small percentage and insect predators, such as ants and carabid beetles, no doubt also took a small percentage. None of these factors, however, have had any appreciable effect in reducing the outbreak, and there will be another outbreak to face this coming season if the eggs now on the trees hatch and yield the usual number of caterpillars.

In Victoria conditions were quite different. Insect parasites were very abundant in early June—sufficient under ordinary conditions to control the outbreak. The cold, windy weather, however, reduced their effectiveness, so they were almost a negligible quantity in the control. Millions of parasite-eggs failed to hatch in time to do their deadly work, and millions more were not deposited at all, or were deposited out of season. One tachinid fly deposited eggs on fully 50 per cent. of the caterpillars, but, so

far as we could tell from field observations and rearing hundreds of them in the insectary, less than 1 per cent. of these eggs hatched before being moulted off by the caterpillars. Another tachinid which deposits eggs on the leaves of the food-plants is only active on hot, sunny days, and deposited most of its eggs too late to be of value in the case of *M. pluvialis*. It was, however, useful in the control of the *erosa* outbreak in the Uplands; these caterpillars being ten days to two weeks later, and the parasitism there ran as high as 20 per cent. Two species of Hymenoptera were present in small numbers—*Campoplex (Ameloctonus) validus* and a species of *Rogas*. Both of these attack the very small caterpillars and are often useful parasites. Some other parasites were found attacking the pupæ, but these were also in negligible numbers. Overcrowding and diseases were very active and important factors, and were successful in reducing the outbreak in all parts of the city, with the exception of the Uplands, which was fairly free from disease.

To sum up, we see that, although the natural enemies of the tent-caterpillars have been successful in reducing the outbreak in Victoria, it is far from being under complete control, and it can increase so rapidly that it will be necessary to assist nature in every way during the coming summer in order to render these pests innocuous. In Vancouver much greater efforts will be necessary. Last year recommendations were made to the Councils of both cities with a view to assisting them in reducing the deprecations of the insects, but the results fell far short of being satisfactory owing to a lack of any co-ordinated campaign.

OBSERVATIONS ON THE USE OF POISON BAITS FOR THE CONTROL OF CUTWORMS IN 1918.

BY M. H. RUHMAN.

For some years a mixture of Paris green or white arsenic and bran has been advocated for use against cutworms. The usual recommendation was the application of the poisoned-bran bait round the base of young orchard trees, or its distribution along the rows of plants, or its being placed in small piles under shingles among the plants to be protected. In lectures on control and in most publications emphasis is placed on the fact that the Paris green or white arsenic is liable to cause injury to the plants or trees if the bait is placed in contact with them. Evidence to this effect came to the writer's notice in the spring of 1918 when called upon to investigate the cause of the complete destruction of two separate plantings of 2,000 tomato-plants and approximately 2 acres of beans. On examination it was immediately evident that the plants had been burned by some poison applied to prevent cutworm injury. On inquiry it was found that a bait had been prepared consisting of 2 lb. of white arsenic to 50 lb. of bran mixed with sufficient water to make a crumbly mass. The white arsenic was used