AN UNUSUAL MANIFESTATION IN THE NATURAL CONTROL OF THE PEAR PSYLLA, Psylla pyricola FOERST[1]

J. MARSHALL[2]

Although it appeared in British Columbia over sixteen years ago[3], the pear psylla, *Psylla pyricola* Foerst., was not, generally speaking, a very serious pest until 1958. Natural control has been, in the main, reasonably adequate. But since we have done no work on the biology of the insect in British Columbia, natural control, in all its forms, has been a matter for speculation. We had, however, formed an impression that the semi-arid Okanagan Valley is not as favourable for the development of the insect as, for example, more humid New York State where the pear psylla has long been a serious pest[4].

In the Okanagan Valley, and in the neighbouring Similkameen Valley, the summer of 1958, long, hot and dry, was in marked contrast with the mid-continent type of summer under which the pear psylla thrives. Just before the hot weather began we undertook an orchard experiment on the chemical control of the pear psylla in the Similkameen Valley and, incidental to the experiment, compiled infestation records on non-sprayed check trees before and after several days of hot weather. The records are given in Table 1. We repeated the experiment in a second pear orchard at Penticton in the South Okanagan and the corresponding records are given in Table 2.

TABLE 1—**Similkameen Orchard.** Number of pear psyllids, 20 leaves per tree, on check plot before and after hot weather (96° - 98°F.)

	May 15		May 26	
Tree	Living	Dead	Living	Dead
1	21	0	0	6
2	14	6	0	6
3	18	5	0	11
4	38	5	0	29
5	22	6	0	10
Total	113	22	0	62

Unseasonably hot weather occurred May 24 to May 27 when the maximum temperatures at the Entomology Laboratory were 87° to 88° F. Since the laboratory is situated on the shore of Okanagan Lake, which has a moderating effect on the temperature, the maxima in the Similkameen orchard are estimated to have been about 96° to 98° F. and, in the Penticton orchard, perhaps 92° to 94° F. Temperature maxima for the previous two weeks were 5 to 10 degrees lower. During the hot period the relative humidity was frequently below 30 per cent.

Both tables show that the pear psylla suffered heavy mortality between the time of the first and second observations, i.e., during the period of hot, dry weather. The only predator that appeared to be attacking the psyllids was the anthocorid bug, *Anthocoris antevolens* White; but it was so rare that it is doubtful if, in the course of a few days, it could have had much effect on the numbers of psyllids. In all likelihood, then, the chief lethal factor was the weather.

In the first to third instars the delicate pear psylla nymph excretes copiously a water - white, syrupy honey-dew beneath the protective covering of which it feeds. The more strongly sclerotized four and fifth

[1] Contribution No. 6 from the Regional Research Station, Canada Department of Agriculture, Summerland, British Columbia.

[2] Entomologist.

[3] Marshall, J., and H. F. Olds. The pear psylla in British Columbia. Proc. Ent. Soc. British Columbia 43:1-3. 1947.

[4] Slingerland, M. V. The pear tree psylla. Cornell Univ. Agr. Exp. Sta. Bull. 44:151-186. 1892.

TABLE 2—**Penticton Orchard.** Number of pear psyllids, 20 leaves per tree, on check plot before and after hot weather (92° - 84°F.)

	May 23		May 27	
Tree	Living	Dead	Living	Dead
1	39	9	8	32
2	36	6	18	96
3	29	9	15	49
4	20	4	19	13
Total	124	28	60	190

instar nymphs move about freely without such protection.

Following the hot weather we noticed that many of the dead, fourth and fifth instar nymphs appeared somewhat desiccated. Although the evidence was circumstantial, presumably they had been killed by excessive evaporation. Not so the fate of the first to third instar nymphs; the manner of their demise was as obvious as it was curious. Their protective gobbet of honey-dew had solidified to the consistency and appearance of pasteurized white honey, and immovable in their transformed excretion, they had become victims of their own metabolic processes. (See Figures 1 and 2.) Bonnemaison and Missonnier[5] working with the very closely related *Psylla pyri* in France report that hot, dry weather is particularly injurious to the early instars of that species but they do not mention crystallization of honey-dew as a contributory condition.

Despite the hot, dry weather in 1958, many growers were convinced that, as in several previous seasons, pear psylla infestation was serious enough to necessitate spraying once or oftener with an organic phosphate, i.e., malathion, Diazinon or parathion. So it is odd that, although there was apparently as heavy a winter carry-over of psyllids in the non-sprayed Entomology Laboratory orchard as in the commercial ones and even although temperatures in that orchard were somewhat lower than in many others, it suffered no psyllid damage. I suspect that commercial spray practice, particularly where it involves the application of organic phosphates, may in the long run encourage, rather than discourage, psyllid infestation. But if the natural control of the pear psylla in the Okanagan and Similkameen valleys is largely the outcome of unfavourable weather rather than of biological control, why should the application of any anti-psyllid chemical eventually favour the insect? It is unlikely that the question will be answered until the life-history and ecology of the pear psylla are studied under arid or semi-arid conditions.

[5] Bonnemaison, L., and J. Missonnier. Le psylle du poirier (**psylla pyri** L.) Morphologie et biologie. Methodes de lutte. Ann Epiphyties 2:263-331. 1956.

Summary

1. In the semi-arid Okanagan Valley the pear psylla has not, as a rule, been as serious a pest as in more humid pear-growing areas.

2. Hot, dry weather proved injurious to the pear psylla. The freely moving fourth the fifth instar nymphs presumably were killed by desiccation; the first, second and third instar nymphs were killed by the solidification of the gobbet of honey-dew within the protection of which they feed.

3. Biological control agencies apparently are not so important in suppressing the insect as the weather.

Acknowledgment

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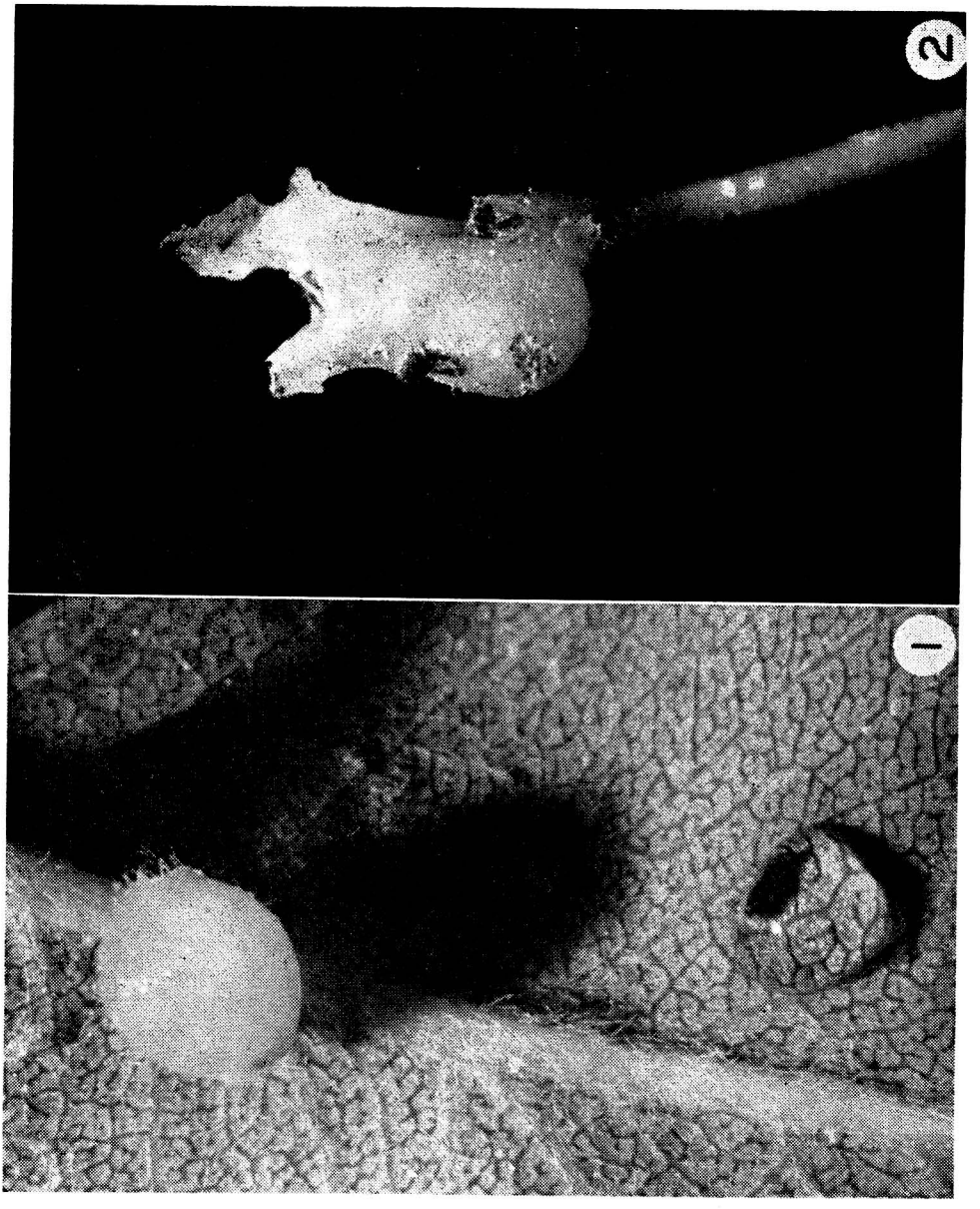

Fig. 1.—Solidified honey-dew (above) and live pear psylla nymph in liquid honey-dew (below).

Fig. 2.—Pear psyllids embalmed in their own crystallized honey-dew.