

## OCCURRENCE OF AND ATTEMPTS TO ERADICATE GRAPE PHYLLOXERA (HOMOPTERA: PHYLLOXERIDAE) IN BRITISH COLUMBIA<sup>1</sup>

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### ABSTRACT

The chronological occurrence, survey methods, and eradication programs of the grape phylloxera, *Phylloxera vitifoliae* (Fitch), in British Columbia are described.

The insect was first found in the Okanagan Valley in 1961. Though an eradication program at that time was apparently successful, the insect reappeared in 1971. It is now well established in the area. The pest was accidentally introduced on imported vines.

The grape phylloxera, *Phylloxera vitifoliae* (Fitch), was first found in British Columbia in the Okanagan Valley in September, 1961. In that month a grape grower on the West Bench of the Penticton area reported leaf galls on vines that had been planted in the spring of 1961. The insects causing the galls were tentatively identified by Morgan and later confirmed by A. B. Stevenson, Research Station, Agriculture Canada, Vineland Station, Ontario.

Following the discovery, C. L. Neilson, J. Smith and J. C. Arrand of the British Columbia Department of Agriculture, conducted a survey and an eradication program in the autumn and spring of 1961-62. They found that the grape phylloxera had originated in a shipment from Ontario of 3000 vines of Seibel-10878. These vines had been planted in 6 places totalling over 4 acres; 5 of the plantings were on the West Bench in the Penticton area and 1 at Kaleden. Leaf galls were found at Kaleden and in only 1 of the plantings in Penticton. A total of about 12 vines were infested.

Since the areas of infestation were relatively small, eradication appeared feasible. In November, 1961, all the vines in the plantings at Penticton and Kaleden were removed from the soil, dipped in a solution of nicotine and oil, and heeled in for the winter. In April, 1962, the soils in the vineyards at Penticton were thoroughly worked with a rotary tiller; fumigated with a chisel-type, tractor-drawn fumigator that applied 240 to 300 lb of ethylene dibromide per acre; sprayed with ronnel emulsion at 4 lb active ingredient per acre; and then sprinkled with water. The vineyard at Kaleden was similarly treated, but

because of the rocky soil and the steep terrain the ethylene dibromide and ronnel were applied by hand equipment. In May, the soils were rotary tilled again and the vines were replanted. At Penticton a slight odor of ethylene dibromide was still present during the planting operation. At Kaleden the planting holes had such a strong odor of ethylene dibromide that they were left open for up to 6 days before the vines were replanted. Approximately 23% of the replanted vines died. The phytotoxicity was caused mainly by the dip treatment, especially the oil. The high concentrations of ethylene dibromide which were still in the soil when the vines were replanted at Kaleden may have increased the injury. No phylloxera was ever reported again in these vineyards.

During the winter of 1961-62, Ontario nurserymen were advised to dip rooted cuttings destined for British Columbia. Either this treatment was not effective or it was not thoroughly done because when a survey was made in the summer of 1962 of vines imported that spring, Arrand found leaf galls on 1 vine in each of the following areas: 2 vineyards at Westbank (Seibel-5279), 1 vineyard at Summerland (Seibel-5279), 1 vineyard at Naramata (variety unknown), and 1 vineyard at Cawston (Seibel-10878). There were no root galls on the vines. The infested vines were removed and burned and the soil was fumigated and sprayed.

It is of interest to note here that between 1952 and 1961, 65 shipments containing 64,100 vines were imported into British Columbia from the United States. Eight of these shipments were infested with the grape phylloxera and were fumigated. Unfortunately, inspection or dipping of vine nursery stock from Ontario was not required until 1962 and fumigation not until 1967. The number of vines imported into British Columbia from Ontario between 1952 and 1961 is not known.

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However, it is known that in 1960, about 10,000 2-year-old rootstocks of Seibel-10878 were imported from Ontario and planted in virgin soil by about 25 growers from Westbank south to the International Boundary. Arrand surveyed all these plantings in the autumn of 1961, but did not find any other infestations of leaf galls other than those mentioned above.

With the eradication of the above-mentioned infestations and implementation of plant inspection regulations for all vines entering British Columbia, no other infestations were sought or reported for 9 years. However, an ominous report was made Sept. 27, 1971 — a grower discovered galled leaves in a vineyard of Foch grapes at Westbank. The insects in the galls were identified by Arrand and Morgan as the grape phylloxera and confirmed by Stevenson. This 3-acre vineyard planted in 1967 was extensively infested. An adjoining 3-acre block planted in 1970 had 2 infested vines. A survey for leaf galls was launched by the British Columbia and Canada Departments of Agriculture to determine the extent of the infestation in all major vineyards which had imported leaf-susceptible varieties since 1962. About 805 acres were examined and 2 new infestations were discovered. One was in another vineyard at Westbank; again there were only 2 infested vines in 5 acres of Foch grapes planted in 1968. The other was at Oliver where 1.5 acres were infested in a 3-acre block of Seibel-10878 planted in 1965. Though only about 70% of the vines in the heavily infested vineyards had leaf galls, nearly all were infested on the roots. An interplant, Seibel-9110, in the Oliver vineyard also had insects on the roots but no leaf galls. No insects were found on the roots of the vines with leaf galls in the lightly infested vineyards. Most of the above vines had been bought in Ontario.

A number of quarantine measures were implemented in an effort to confine the infestations such as fumigating the harvested grapes, spraying the vines after harvest, washing equipment before moving it to non-infested vineyards, and having pickers wear coveralls when working in infested areas.

Leaf galls are not always a reliable index of the presence of the grape phylloxera because the insect lives only on the roots of many *labrusca*-type grapes. A root survey in the outbreak of 1961-62 probably would have revealed a more extensive infestation than was indicated by leaf galls. Recognizing this weakness, a root survey was conducted in November and December, 1971, in vineyards of the Okanagan and Similkameen valleys. Due to the shortage of help and impending

freeze-up, growers were instructed in how to sample their own vineyards. Provincial personnel then microscopically searched roots with swellings for the presence of the grape phylloxera. The number of samples examined represented about 2000 acres of grapes. Insects were found on the roots in 65 acres in 9 vineyards: 1 in Vernon, 6 in Kelowna, 1 in Westbank, and 1 in Oliver. The Westbank and Oliver infestations had already been revealed by the presence of leaf galls. The varieties and the number of acres affected by root infestations were: Bath, 2; Campbell Early, 8; Concord, 9; Diamond, 11; Foch, 3; Patricia, 3; Romulus, 4; Sheridan, 8; and Seibel-10878, 17. Most of the vines had been imported from Ontario; a few were from New York. Some of the vines had been planted in the 1920's and 1930's. How they became infested is not known, but it is more than likely they were already infested when they were imported. Phylloxera had been intercepted as early as 1927 on vines imported from New York.

Numerous samples of roots from other vineyards had elongated swellings and necrotic areas but no phylloxera was present to confirm that the damage was caused by this insect. Stevenson diagnosed these as "very probable" phylloxera damage. Unfortunately, samples with this type of damage were not recorded. They did suggest, however, that the grape phylloxera was probably more widespread than the 9 vineyards.

Hopes of eradicating the grape phylloxera from British Columbia were abandoned. The extent of the infestations indicated that such a program would be impractical and uneconomical.

No surveys were conducted in 1972 and no new infestations were reported. However, cursory inspections revealed that root galls were plentiful, but there were practically no leaf galls in the infested vineyards from Kelowna south. At Vernon, where only root galls were seen in 1971, a heavy infestation of leaf galls developed on several acres of Foch grapes.

The information in this note was gleaned mostly from correspondence and unpublished reports of the British Columbia and Canada Departments of Agriculture and from the Canadian Insect Pest Review (compiled by C. Graham MacNay and published by the Canada Department of Agriculture, Ottawa, Ontario) for 1961 (vol. 39, pages 209, 229, 285, and 309) and 1962 (vol. 40, pages 173 and 199).