ADVANCE OF THE SATIN MOTH, *STILPNOTIA SALICIS* (L.), INTO THE INTERIOR OF BRITISH COLUMBIA[1]

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The most easterly record for the satin moth, *Stilpnotia salicis* (L.), in British Columbia was marked in the summer of 1955, when larvae were found on poplar trees at Kinsmen Beach in Vernon. First reports of this pest of poplars came from New Westminster in 1920, and in 1921 from Vancouver, where it is believed to have first entered the Province from Europe in 1918. Subsequently it has spread steadily northeastward into the Interior as far as Vernon.

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* "Records of occurrence" refers to feeding larvae.

In its advance, apparently two main routes were taken from the original point of entry at Vancouver (Fig. 1). One route followed the Canadian Pacific and Canadian National Railways through Kamloops, with the following records of occurrence*: New Westminster 1920; Mission 1926; Chilliwack 1926; Keefers 1933; south of Lytton 1933; Lytton 1945; Spences Bridge 1946 (?); Ashcroft 1949; Savona 1949; Kamloops 1950; Bestwick 1951; North Arm Okanagan Lake 1954 ;and Vernon 1955. The other route followed the Pacific Great Eastern Railway with the following

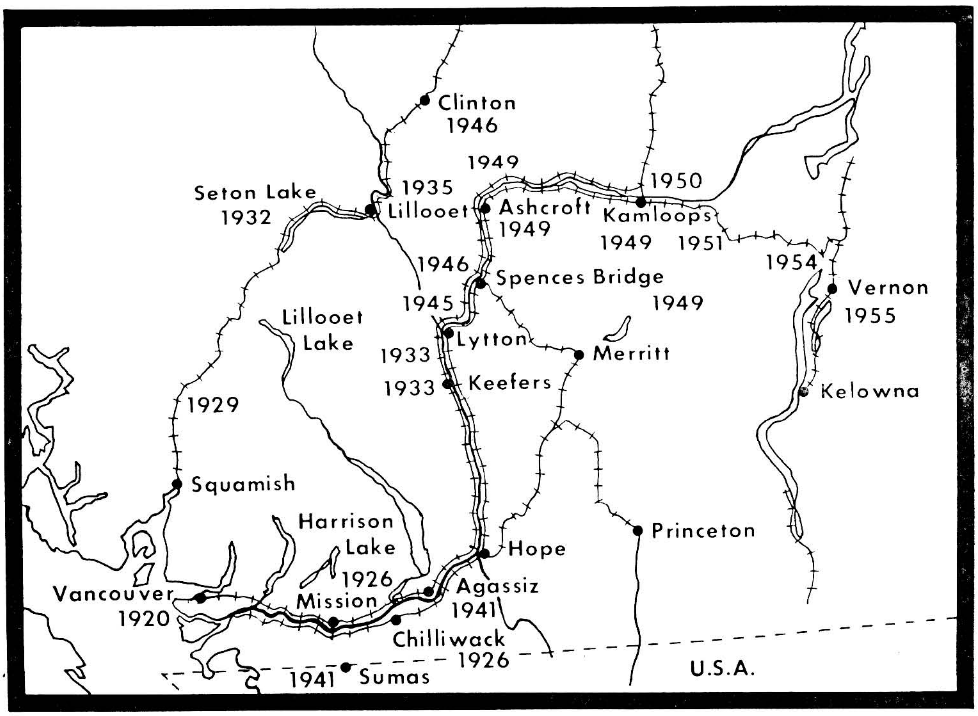

Fig. 1.—Advance of the satin moth, *Stilpnotia salicis* (L.), into the interior of British Columbia, 1920-1955

records: Squamish Valley 1929; Seton Lake 1932; Lillooet 1935; and Clinton 1946.

Theories have been advanced to account for the mode of the satin moth's distribution, a popular one being that the insect was probably carried into the interior of the Province by means of trains. As early as 1935 adult satin moths were found in freight cars at Kamloops, and at other times egg masses have been found on box cars. Records of infestations through the years have, in general, come from localities along the major railways previously mentioned. Records of insect occurrence, however, often depend upon the accessibility of the areas in which the insects are likely to occur, so that possibly records along the railways might have been reported more frequently because of ease of detection. Other means of transport must not be overlooked as automobiles entering the Okanagan have been known to carry adults of the satin moth. The adults are not very discriminating as to where they deposit their eggs, which have been found on houses, glass, and on many other sites and objects. Eggs deposited on a movable object might be transported in unusual ways, but nevertheless effectively.

In some cases infestations have occurred miles from any roads or railways and might be attributed to moth flight or aerial dispersal of the larvae. It has been noted that the adult moths can fly over considerable distances under favourable conditions.

The spread of the satin moth in British Columbia was not a gradual and continuous movement, but occurred in spurts and jumps in a very irregular fashion as regards time between "moves" and distance covered during each move. The spasmodic movement eastward is also reflected by the limited number of parasite species and the number of individuals obtained in parasite studies in the interior of British Columbia during recent years.

The advance of the satin moth has also been governed by the availability of host tree species. Glendenning (1932) observed that the insect at first registered some incompatibility towards black cottonwood. Later records show that it will feed on all poplars in British Columbia including at least the commoner introduced species, although in mixed stands it seems to attack some species in preference to others. In the Interior, trembling aspen is apparently the favoured host.

The satin moth in its advance into the interior of British Columbia has exhibited ability to adapt itself to new conditions of climate and to new hosts. Likewise, in addition to its own means of locomotion, it has made use of artificial means of transport, such as ships in entering the continent, with trains and automobiles aiding its dispersal within the Province. This insect is now a well established and successful pest in the interior of British Columbia and is capable of further spread in the future.

References

Burgess, A. F. 1921. The satin moth: an introduced enemy of poplars and willows. U.S.D.A. Circular 167.

Glendenning, R. 1924. (revised 1932). The satin moth in British Columbia. Dept. of Agric., Pamphlet No. 50 (N.S.).

A note on *Tribolium destructor* Utten. (Coleoptera: Tenebrionidae)

In September 1954, an agent from an importing firm brought me a small quantity of tea leaves which had been returned to the firm with the complaint that it was infested by insects. The agent gave me two black beetles 1/6 inch long, two beetle pupae and three larvae in a few spoonfulls of tea. I used the tea leaves for a brew and cultured out the insects in pulverized Purina fox-chow pellets. This medium apparently suits these insects, which have since developed in thousands.

Mr. Peter Zuk of the Stored Product Insect Laboratory, Vancouver, identified the beetles as *Tribolium destructor* Utten. In our collections was one of two specimens I had taken in Vancouver in 1951 that were identified in 1954 by Dr. D. W. Boddy of Seattle as *Aphanotus brevicornis* Lec. A series sent to Mr. Gordon Stace-Smith was pronounced to be *A. brevicornis*. This is apparently a relatively rare beetle because Mr. Stace-Smith, Mr. H. B. Leech of the California Academy of Sciences and the Systematic Unit at Ottawa, were all glad to have a series. Mr. W. Brown of the Systematic Unit requested a living colony because the National Collection had no specimens of this species. After studying it, Mr. Brown reported that the insect is not *Aphanotus brevicornis* Lec., but is *Tribolium destructor* Utten. even as Mr. Zuk had identified it at first.

The original stock that the agent received and later gave me, probably developed in cereals, from which the larvae migrated to nearby tea leaves for pupation; they certainly do not feed on tea leaves.

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CHEMICAL CONTROL OF ROOT MAGGOTS IN EARLY CABBAGE[1]

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Eight large-scale experiments on chemical control of root maggots in early cabbage were conducted from the Victoria laboratory during the years 1947-1953 and 1955. The phase of the investigation relating to methods of evaluating damage and control has already been reported (King, Forbes, and Noble, in preparation).

Before 1920, controls recommended in North America were limited to cultural or mechanical methods (Goff, 1892; Slingerland, 1894; Schoene, 1916; Gibson and Treherne, 1916). Use of a tarred felt paper pad around the stem of each transplant, though effective, was very laborious and not commercially practical. Chemical control, in the usual sense, did not exist until Brittain (1920) published experimental evidence of the effectiveness and practical value of corrosive sublimate, previously reported (*e.g.*, Slingerland, 1894) to have been employed for many years by some commercial growers in Great Britain as a trade secret. Brittain's results were soon confirmed by other workers, and the effectiveness of calomel was demonstrated by Glasgow (1929) and others. Both of these chemicals were expensive and the labor cost was also high since repeated applications were necessary. Although these two chemicals continued for many years to be valuable standard remedies against root maggots, thorough re-investigation of the problem became imperative when, with the advent of the chlorinated hydrocarbons, there was promise of developing more economical controls (Carlson *et al.*, 1947). The materials first tried gave disappointing results (Dills *et al.*, 1944), but others later proved more effective (Eide & Stitt, 1950; Semenov 1950; and others). It was at the early stage of this development that the present study was begun.

The methods used to evaluate control measures have not always been discussed, especially in the earlier literature. Important exceptions include Brittain (1920), Wright (1953), and King *et al.* (in preparation). The latter concluded: (1) that yield on an area basis provides the best summation of the effects of attack and of chemical treatment, environmental factors being considered; (2) that yields from different experiments are best compared when each is expressed as a percentage of the yield of the highest-yielding treatment of its own

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