XYLEM ABERRATION, A TRANSMISSIBLE DISEASE OF STONE FRUITS[1]

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Introduction

Gumming of trunks and branches; distortion of shoots, leaves, and fruits: andpittingof the xylem were described (10) as associated symptoms occuring in sweet cherry, sour cherry, and apricot. Gumming and distortion were reported as transmissible. Experimental transmissionof pitting was not then reported and has been difficult to demonstrate with certainty. One selectedexample is presented here. Wood pitting is the most distinct and general symptom in this syndrome in various host plants, and the name "xylem aberration" is suggestedpendingfurther work on relationships to other named diseases.

Inoculations

Trees of the native chokecherry (Prunus virginiana L. var. demissa (Torr. & Grey) Torr.) were grown in an experimental plot. Two trees were inoculated in July, 1959. They were separated by an untreated tree. Each received two inoculations by budding. The inoculum was from an apricot seedling. In other work, similar inoculum produced severe twisted leaf in 'Bing' cherry, and also necrosis, distortion, and gumming of twigs, and fruit symptoms and severe wood pitting. It produced slight ring pox in 'Wenatchee' apricot, a slight reaction in 'Shiro-fugen' flowering cherry, and no effect in 'Italian' prune, 'Elberta' peach, and 'Montmorency' sour cherry. This virus selectionwas originally obtained from a 'Wenatchee' apricot naturally infected with ring pox, but not examined for wood pitting.

Results

Five years after inoculation, considerable swelling had occurred at all the four inoculation sites in the two inoculated chokecherry trees. No other such swellings were foundelsewhere in the inoculated trees or in the intermediate untreated tree or in six other untreated trees. Removalof the bark revealed almost continuous pitting in the wood at both inoculation sites in one tree and slight pitting at both inoculation sites in the other tree. Inside the swellings there was darkening of the wood and many small gum pockets, some of them radial, and some of them between growth rings. In both trees there was irregularity in the wood of five annual growth rings. Irregularity was slight in the ring of the year following inoculation and progressively more severe in rings of later years. The first tree also showed slight wood pitting up to three feet from the ground in a streak on one side, but the othertree showed no pittingat the base. Figure 1 shows the four swellings after stripping with some of the pits still filled with bark.

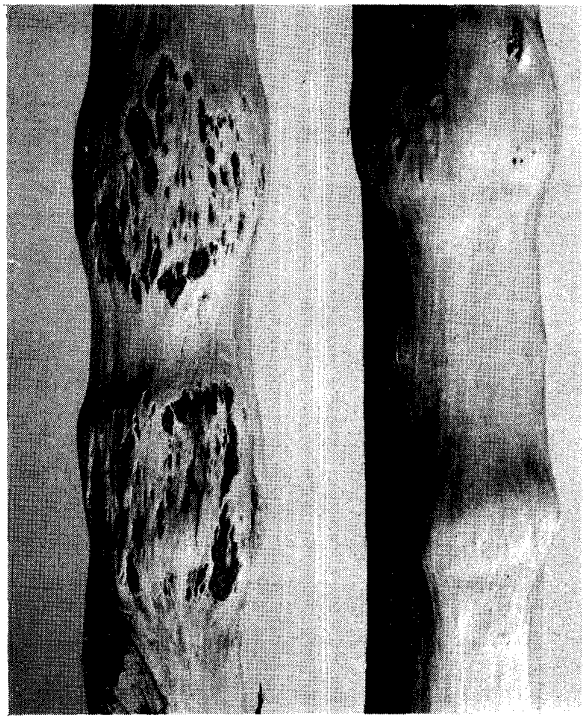

Figure 1. Swelling and wood pitting in chokecherry at the sites of inoculations.

Discussion

This paper presents only one example of the definite transmission of the wood-pitting symptom

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of the syndrome of xylem aberration. Leaf symptoms and gumming have long been known to be transmissible. Wood pitting was noticed in 1962, by Mr. J. May, in an injured cherry tree. It is now recognized as the most reliable and generally present symptom in the snydrome of xylem aberration in various hosts. The wood of many hundreds of stone-fruit trees has been examined after removal of the bark. Some of these trees had not been inoculated. Some had been used in studies of various virus diseases. Many had been used in the indexing of propagation materials and in the testing of wild plants of native species. Hundreds of trees showed wood pitting, apparently as a result of experimental inoculations but there was usually some slight uncertainty. Wood pitting was found in a few uninoculated trees and in a few inoculated trees where the virus of xylem aberration was not expected. These occurrences could have been due to insect transmission. They could have been caused by natural root grafting which has been demonstrated in these experimental plantings. They could have been due to transmission by nematodes. Xiphinema species were identified, by Dr. R. Stace-Smith, in soil from the plots but their significance here is not known. Wood pitting is usually most severe at the base of the tree and progressively less severe further up. Thus, inoculations by budding are made in the part of the tree which is least likely to show symptoms. Transmission of wood pitting is free from the usual uncertainties when severe pitting is localized at the sites of inoculations as reported here. Some apricot trees have shown pitting more severe at the sites of inoculations than in the adjacent branches. Proof of the transmissibility of the wood-pitting symptom of the syndrome of xylem aberration will increase the reliability of much other work.

Xylem aberration is considered to be different from twisted leaf (4, 5, 6, 7, 8, 9) and from ring pox of apricot (2, 3, 6, 7, 8, 93 with which it has sometimes occurred. Many selections of twisted leaf and ring pox have been transmitted without xylem aberration. In 'Bing' sweet cherry the leaf symptoms of twisted leaf and xylem aberration are difficult or impossible to differentiate. Leaf symptoms in the 'Sam' variety are likely to be those of xylem aberration and not of twisted leaf. Fruit symptoms reported as those of twisted leaf in sweet cherry (5) are not usually found in British Columbia, They appear to be part of the xylem aberration syndrome and not of twisted leaf as it occurs here. In British Columbia, the 'Wenatchee' apricot is best for the study of ring pox. In experimental work here, ring pox is not closely associated with xylem aberration as it is with twisted leaf.

Xylem aberration is considered to be different from virus gummosis of apricot (1) which has probably occurred here for many years.

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