RAPID TRANSMISSION TECHNIQUES FOR STONE-FRUIT VIRUSES

THE nature of the virus diseases of woody plants, including the stone fruits, is such that without the insect vector transmission can ordinarily be effected experimentally only by grafting. The chief obstructions to progress have been: (1) the apparently long incubation periods that obtain when ordinary transmission techniques are employed, (2) the lack of adequate details on how these viruses move in their respective hosts, (3) the almost complete lack of knowledge on the identity of the insect vectors, and (4) the lack of adequate attention to the possibility of developing new transmission and indexing techniques.

In studies on yellow-red virosis in peach[1] it was found that when a simple pruning technique was employed the incubation period was reduced from approximately a year to one month. The present modified technique involves: (1) the insertion of diseased buds about midway on the stems of rapidly growing peach seedlings[2] when between 12 and 24 inches tall and (2) cutting off the stem one node above the diseased bud from 0 to 7 days afterwards to stimulate a new spurt of growth.

This rapid transmission technique has since been tested for shortening the transmission periods of a number of other stone-fruit virus diseases which go to the peach, with equally successful results. Distinctive symptoms of such peach virus diseases as rosette, rosette-mosaic and mosaic have been induced on peach seedlings within a month from budding. A new yellows disease of the sour cherry has also been found to index readily on peach seedlings by producing the distinctive symptom of rosette within three weeks from budding. Similar rapid transmissions have been obtained with still other stone-fruit virus diseases.

Other less efficient ways of shortening incubation periods were by defoliation, girdling and fertilization. A promising variation, especially useful with older plants, involved placing the diseased bud on one side of the stem between two rapidly growing young shoots, the remaining shoots having been previously removed.

Dormant stone fruits including cherries, plums and peaches may respond quickly to another technique involving the grafting of diseased scions onto heavily pruned healthy plants just as growth starts. This modification in technique has been successfully employed in shortening incubation periods of several viruses in cherries and plums. Besides whip, approach, wedge and cleft grafts, chip buds consisting of bark and sapwood have been successfully employed at times when the bark will not slip. The whip grafting technique resulted in the transmission of a disease with the production of ring-spot symptoms on sour cherry (*Prunus cerasus* L.) in the extremely short period of 14 days from grafting.

The principle of the rapid transmission technique is the stimulation in a growing plant by pruning of a new spurt of growth which attracts the virus with the prompt appearance of symptoms. The response seems to best be explained by the idea that a virus moves bodily through a plant in the food translocation stream. Contact periods for effecting passage of viruses from diseased buds into the stem require only the few days necessary for the formation of a callus bridge between scion and stock. Ordinarily they pass into the stem and move downward to the lower stem and roots in the food stream and only return to the upper part of the plant during a period of rapid growth such as occurs after passage through another dormant period. Pruning stimulates the lateral dormant buds to activity and changes temporarily the course of the translocation stream from downward to upward until the new growth can support itself. The immediate inflow of plant foods carrying the virus gives the minimal incubation period. The new spurt of growth from the lateral buds which has been induced by pruning can be likened to the stimulation at will of next season's growth.

The principle of the pruning technique would seem to be almost universally applicable in the study of the virus diseases of woody plants.

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[1] E. M. Hildebrand, *Contrib. Boyce Thompson Inst.*, 11: 485–496, 1941.

[2] Peach seedlings were found ideal for greenhouse studies. Batches of peach pits (southern, wild), after storage in moist peat at 5° C. (40° F.) for 10 weeks to break dormancy, were germinated in sand, transplanted to soil in 4 or 5 inch pots and ready to use at about 18 weeks from starting the dormant treatment. New batches of pits can be started at will any season of the year.

BOOKS RECEIVED

KAHN, FRITZ. *Our Sex Life.* Second edition, revised. Translated from the German by George Rosen. Illustrated. Pp. vii + 459. Alfred A. Knopf. $5.75.

When Peoples Meet. ALAIN LOCKE and BERNHARD J. STERN, editors. Pp. x + 754. Progressive Education Association. $3.50 ($2.50, PEA members).

BRIDGMAN, P. W. *The Nature of Thermodynamics.* Pp. xii + 229. Harvard University Press.

The Philosophy of Alfred North Whitehead. PAUL ARTHUR SCHILPP, editor. Volume III, The Library of Living Philosophers. Pp. xx+ 745. Northwestern University. $4.00.

MCLEAN, R. C. and W. R. IVEMEY COOK. *Plant Science Formulae.* Pp. vi + 203. Macmillan. $1.50.

Housing for Health. Papers Presented under the Auspices of the Committee on the Hygiene of Housing of the American Public Health Association. Pp. 221. The Science Press Printing Company. $1.00.

THOMAS, CHARLES ALLEN and OTHERS. *Anhydrous Aluminum Chloride in Organic Chemistry.* Number 87 in American Chemical Society Monograph Series. Pp. xiii + 972. Reinhold. $15.00.