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# CERTIFICATION PROGRAM FOR MAINTENANCE OF VIRUS-FREE PROPAGATION SOURCES OF CITRUS IN CALIFORNIA

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The registration of citrus trees inspected and found to be free of psorosis symptoms was started in 1937 by the California Department of Agriculture according to a plan outlined by the late Dr. H. S. Fawcett of the University of California Citrus Experiment Station at Riverside. The program is still in effect, though it has been revised slightly from time to time.

Nurserymen and others may apply to the Department for inspection and registration of trees they select as desirable budwood or seed sources. The trees are inspected during spring growth flushes in at least two successive years immediately prior to registration. If questionable symptoms are found, the tree may be tested by indexing to determine whether or not it is infected with psorosis. The staff of the Department of Plant Pathology at the Citrus Experiment Station has done this indexing for the Bureau of Nursery Service. A tree found to be free of the disease is registered and given a number; a certificate of registration is issued to the applicant, and an identifying tag is hung on the tree.

A citrus tree of unknown parentage must be ten years of age or older before it is eligible for registration. Psorosis symptoms do not always show in young trees. Young trees propagated from registered parents and planted as a scion orchard may be entered in the program before they are six years of age. The limit of six years was set to aid in maintaining the identity of trees with their parent budwood sources.

Psorosis has been found to be one of the leading causes of the death or decline of citrus orchard trees. The only known means of spread of this disease in California is by bud transmission, root grafting, or occasionally through seed. No vectors of the disease are known to be present here. Because the principal means of spread is by budwood from infected trees, a program of parent-tree registration can be very effective in the production of nursery stock free from the disease. Certification of nursery stock grown from registered sources has never been included as part of California's program. Certification through the use of official tags would assure growers that nursery stock was from registered psorosis-free sources. This would be possible by inspections at the time the budwood was cut and the nursery trees were propagated to be sure that the identity was maintained in the nursery row until the stock was sold.

Since 1937, when registration began, 2,023 citrus trees have been registered. Unless renewed by the applicant, registrations expire in five years. The number of trees retained in the registry has decreased steadily in recent years until only 182 remain.

California law (Section 120.5 of the Agricultural Code) provides authority for the Director of Agriculture to establish regulations governing registration and certification

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programs. The law provides that such programs shall be self-supporting from fees paid by participants to cover the cost of inspection and testing. The programs are not compulsory but are optional for applicants who may wish the services.

For some time it has been recognized that the psorosis registration program has met only part of the needs of California nurserymen and farmers. It covers only one disease and does not provide for the official certification of nursery stock. The Department was asked by citrus industry committees and the University of California to participate in developing a program that would cover a broader field of citrus diseases and other pests. Tentative plans were made in 1957 to get such a program under way.

The University of California is to develop desirable clones of different citrus varieties by selection and indexing. These will be planted in University variety improvement blocks. It is planned to establish regulations to maintain the identity and pest freedom of this stock from the time it is released by the University to nurserymen, through the propagation of nursery stock from these sources, until it is sold to farmers.

It is planned that each tree which has passed the University tests and is planted in the University variety planting will be assigned a registration number by the Department of Agriculture. Nurserymen will grow their own trees for their mother block planting from these registered sources. A nurseryman may wish to establish his own mother block or may wish to join with other nurserymen in establishing a cooperative mother block. Trees in nursery mother block plantings will also be given a registration number. These trees will serve as sources of propagating material for nursery stock to be grown for certification. It will be the responsibility of the Department to maintain the identity of propagating material and nursery stock until it is sold as certified. This will assure growers that they are receiving trees true to varietal type and free of known viruses that can be excluded. It will also be the Department's responsibility to make such inspections and to do such testing as may be necessary to ensure maintenance of the original cleanliness of the material while in the nurserymen's hands.

University staff members will develop inspection and testing procedures needed for trees to be eligible for the variety improvement plantings. Their guidance will be sought in drafting regulations to set up inspection and testing procedures which may be necessary to assure that the same degree of disease cleanliness is maintained in the nursery mother block and in nursery stock planted for certification. The procedures followed by the University, as well as those followed by the Department, will probably be included in the regulations. If no symptoms of serious virus diseases are found, by established procedures, stock will be eligible for registration and certification.

Such a program will require close cooperation of the University, the Department of Agriculture, participating nurserymen, and farmers, all working toward better quality and cleaner nursery stock.

It is not planned to establish regulations governing the operation of the proposed program for several years. If the University's plans materialize, it will be four years before the first budwood can be released from foundation plantings to nurserymen. At that time regulations will be needed to guide the nurserymen's operations. In the interim it is hoped that additional knowledge will be gained through research work by plant pathologists to aid in solving some of the present unknowns. Better inspection and testing methods may be developed. It will take at least two additional years after a nurseryman obtains budwood from a University variety planting before he has budwood from his own mother block for propagation of trees. It may be that only registration of nursery mother block trees will be desired by the industry and not the certification of nursery stock grown from these registered sources. It may not be feasible to include certification of freedom from viruses that are present in California citrus and are being spread by insects or possibly by other natural means. Tristeza, which is such a disease, could be avoided in areas where it is not known to be present,

but in areas where it occurs and is being spread by aphids it would be difficult to avoid infection except by costly isolation or by growing stock in a screenhouse.

A flexible program that could be adjusted to meet new finds or new research techniques would be desirable. However, flexibility does not always fit into regulatory work. In other registration and certification programs that are being operated by the Department for strawberries, cherries, and grapes, the problem of incorporating new procedures or a better method of detecting a particular virus disease is complicated by the fact that nurserymen have considerable investment in mother block plantings which we had told them, and they had believed, were clean. As new and better methods of detecting the diseases became known it was found that we had missed some by the procedures we had used. It then becomes a question of discontinuing the program, or continuing it on the basis that it is the best stock available, recognizing that some virus diseases are present. As clean stock is found it can replace that previously entered in a program, but this is more difficult and takes a longer time for a long-lived crop such as fruit trees than for strawberries, for example.

Other states have run into the same problems and have directed their programs along different lines. Some continue to certify the best stock that is available; others discontinue certification of any stock in which a virus disease has been found by a new procedure. It is certain that we cannot wait until we know all about virus diseases and the means of detecting them before setting up certification programs, nor do we wish to ignore new research developments. It seems best to make a start, which is probably already long overdue, using the knowledge and best methods available, and then to adjust a program to take advantage of new discoveries as soon as it is possible to do so.