The present virus and pathogen free certification program can be divided into two basic areas of operation. The first area is that of preparing the propagating material. This would include the selection of clones, the indexing, certification and maintenance of virus-and pathogen-free propagating material in mother blocks by the Foundation Plant Materials Service or individual nurseries. The second area would be that of increasing the propagating material from the mother block in economic volume to supply growers and consumer. As presently operated this second phase also includes evaluating the newly released virus-and pathogen-free propagating material for such factors as trueness to variety, yield, mutations, and any other undesirable or desirable characteristic which might have developed through the various phases of the certification program.

There is no question as to the advantages of the certified virus and pathogen free propagating material as it effects nursery stands and the economics of a commercial nursery operation. However, there is a definite lack of information pertaining to yield, and/or quality of fruit produced from certified versus uncertified plantings. Also, how long will certified trees (orchard or ornamental) remain virus-or pathogen-free? We could expect one answer for an 80 or 160 acre fruit planting and another for 4 or 5 plants in an ornamental planting.

One additional question is, who is to do the evaluation? Will the grower have to plant a 40 or 80 acre block of grapes, or almonds, or peaches, only to find out that his neighbor's orchard far out-produces his or has better color, crisper fruit or any one of many subtle fruit characteristics lumped under the term "quality". These are only possibilities, some of which have occured from time to time. Therefore, what is a good practical approach to the evaluation of virus-and pathogen-free propagating materials which takes from two to four years to get into production and then needs one or two years for evaluation?

MODERATOR LUVISI: Our first panel member is John Wynne who graduated from the University of Alaska and started operation of the Dave Wilson Nursery in 1950 and still operates that nursery. John is very active in certification programs and will speak to you on the "Certification Program for Stone Fruits."

CERTIFICATION PROGRAM FOR STONE FRUITS

JOHN R. WYNNE
Dave Wilson Nursery
Hughson, California

In the spring of 1955 it was suggested to us by staff members of the California Department of Agriculture and the U. S. Department of Agriculture in Sacramento that some of the problems encountered in the successful propagation of de-

ciduous nursery stock were due to virus-infected scions and/or rootstocks. We were very interested in their findings, and their proposal to conduct tests with them at our growing grounds. In the first year of cooperating with these men we were impressed by preliminary evidence that viruses were an important factor affecting good bud stands and in producing vigorous and uniform nursery stock.

In the early stages of developing the Certification and Registration Program, Department of Agriculture members visually inspected bud sources in selected grower orchards. Visual inspections culled out the bud-source trees most severely infected with ringspot or other viruses.

At the time, bud lots were mingled on a variety basis, and no effort was made to ascertain the advantages of using buds from certain individual trees. The improvement in bud-stand percentages and uniform growth of trees was nevertheless apparent.

At the urging of the cooperating agencies we began identifying bud lots from individual source trees, and it was soon evident that it would be vital to California's fruit industry to produce orchard stock from tested and proven bud sources. Individual trees, apparently "clean", produced superior plants from a production point of view. (I will use the word "clean" throughout to indicate stock that is as near pathogen-free or virus-free as we can detect.)

At one point during the cooperative test period we evaluated "orchard-run" buds as against "visually-clean" buds of the same variety of peaches and almonds. We determined that our overall bud-stand percentage averaged 12% higher, and the sizes in the nursery row were all up-graded at least one grade as measured by caliper by use of the visually-clean buds; this result in itself made the program an eventual economic necessity.

The initial shock of uniting virus-infected buds and seedlings in the nursery is often overcome by the plant, and by the end of the summer acceptable nursery stock is produced. To my knowledge, no follow-up work has been done to compare production from "clean" peach or almond trees as against those afflicted with minor viruses. We know that many of our highly-productive orchards of peaches and almonds are 100% infected with some kind of virus. I know of one case of a high-producing Paloro peach orchard that was 35 years old in which subsequent Shiro-fugen indexing ran 100% positive results.

The history of improvement in the production of sweet cherry nursery stock is a different story. Without a doubt, before work began in the Registration and Certification Program we were not producing cherry trees on an economic basis, and the orchardist who planted them was even worse off. Nurseries were getting bud stands as low as 25% and producing poor quality stock. Orchardists who planted such stock often were getting short-lived or poor-producing plants. Today,

we grow uniformily vigorous cherry trees with comparative ease, and these same trees produce well for the grower.

Now that we had our direction, we set about to find a means of getting an adequate and dependable source of "clean" budwood.

Because of the cost of maintaining an orchard of trees solely for the production of budwood, it seemed only reasonable to supply certain growers with nursery trees produced from selected buds, with the agreement that budwood could be cut from the orchard trees. Many of the trees furnished growers were propagated from budwood obtained from "mother" trees maintained at the University of California at Davis. This program was a great improvement over the previously-existing method of collecting budwood, and it resulted in generally better stock.

It soon became apparent that bud-source trees in grower orchards did not remain "clean," and in a few years such trees outgrew their usefulness as bud-source trees. Therefore, sources needed to be constantly replaced which entailed much record keeping. Often when an orchard changed owners the differing cultural methods of the various owners resulted in growth and production problems.

Some effort was made to use previous year's stock in the nursery row as budwood sources, but such a plan is inherently unreliable in that the budwood used is from trees that have not fruited or that might contain latent genetic defects. It is readily seen that such a plan of nursery-row bud selection can multiply a problem many thousands of times very rapidly. We continue to use nursery-row increase blocks for much of our cherry budwood, but the chances of problems are less in this instance in that we return to our proven source trees every year for our increase buds, and the number of cherry trees produced is relatively small compared to other kinds of fruit or nut trees.

In the intervening years of improving our "clean" budwood program, the California Department of Agriculture, Bureau of Nursery Service formulated the present Registration and Certification Program for Stone Fruits in conjunction with Foundation Plant Material Service established by the University of California at Davis.

With the advent in recent years of an abnormally rapid spread of viruses it seemed prudent to establish independent and comparatively isolated budwood and seed orchards. Having gone to the extent of spending considerable funds to establish an independent orchard for budwood and rootstocks, we have adopted the Registration and Certification Program in order to enhance our efforts with some official recognition.

Evaluating the program of obtaining "clean" budwood and rootstocks on a purely economic basis, we had no other choice but to proceed as fast as was economically feasible. By embracing the Certification and Registration Program we now

have a means of recovering some of the costs of such a program by adding a charge for registered or certified material. It would not have been good business to charge extra for our clean stock without some official recognition that the combined best efforts of the nursery and government agencies were involved in producing such stock.

At this time in the program we face the major problem of producing enough certified nursery stock to fill the demand. The Department of Agriculture and the Farm Advisors of Agricultural Extension Service of the University of California have done a good job selling the merits of clean nursery stock to conscientious orchardists. At the same time, as far as the stone fruit industry is concerned, only a small number of the commercial varieties in demand by orchardists can be supplied as certified nursery stock. Because they have not become available through Foundation Plant Materials Service, many varieties are not included in the program. So now we have a demand for many varieties of peaches, apricots, almonds, nectarines, plums, and other fruits that will not be available as certified stock for 3 to 5 years. It will take that long to eradicate virus, produce fruit, and secure adequate budwood sources for these varieties.

It is both frustrating and embarrassing to sell something we can't deliver. In spite of the fact that we cannot meet the demand for many varieties, it is gratifying to know that the program is being enthusiastically accepted by progressive growers; we look forward to the day when all the commercial nursery stock sold will bear the label "Certified Nursery stock."

MODERATOR LUVISI: John, that pretty well covers the situation for stone fruit. Thank you. Our next speaker is Mr. Roger Jensen who graduated from Fresno State College with a degree in business administration. He has 23 years of farming experience, ten years as a nurseryman. I would like to call on Mr. Jensen to come up and give us a discussion of the "Certification Program for Citrus". Roger.

CERTIFICATION PROGRAM FOR CITRUS

ROGER B. JENSEN
S & J Nursery
Fresno, California

Initially, I want to thank the International Plant Propagator's Society for this invitation to participate in your annual meeting. Being a non-scientific degreed nurseryman, I feel rather inadequate addressing you.

The California Citrus Certification Program was initiated more than 10 years ago and not a single certified citrus tree has been dug and sold by a commercial nurseryman to date. No apologies need be given for this fact in my opinion;