

Bud Certification in Arizona

THIS IS A REPORT of progress for Arizona's program for citrus variety improvement and bud certification. Essentials of the program were described by Streets (3). The program receives the full cooperation of Dr. John B. Carpenter, Plant Pathologist, and other personnel stationed at the U.S.D.A. Date Field Station, Indio, California.

Because most of Arizona's old-line varieties are affected by one or more virus diseases, the introduction of new strains and varieties has been imperative. Rapid expansion and an obvious shift in varietal preference, especially in the Yuma area, has given added emphasis to the program.

Budwood Importations

Since 1955, 40 varieties of budwood have been partially indexed and introduced into Arizona by Dr. John B. Carpenter at the request of Arizona personnel. These include lemons, oranges, grapefruit, tangelos, mandarins, and limes of both nucellar and old lines of most commercially important varieties.

Budwood Distribution

Nineteen introductions have been released after a 2-year quarantine period. The remainder will be increased for later distribution to scion blocks. Scion nurseries of released varieties have been established at each of the experiment stations and with cooperative commercial nurseries.

Distribution of buds from the scion trees to other nurseries is controlled by the Arizona Citrus Institute in the Salt River Valley and by the Agricultural Research Council in Yuma. Records of scion trees and buds distributed from them are maintained by cooperators. The numbers of buds distributed to date total 129,502.

VARIETAL DEMAND.—In the Yuma area, where the greatest acreage expansion in the state has occurred, varietal choice by grower demand (1958-1960) shows that 4 varieties account for over $\frac{1}{2}$ (29,750) of the buds distributed: Frost Valencia orange—10,900 buds, Frost Marsh grapefruit—9,000 buds, Frost Washington Navel orange—5,350 buds, and Red Blush grapefruit (RCES #3)—4,500 buds.

During the same period, Valencia orange varieties have been most popular and account for 14,600, or nearly $\frac{1}{3}$ of the buds distributed. These include the Frost Valencia—10,900 buds, Campbell Valencia, old line—950 buds, Olinda Valencia—900 buds, and the Campbell Nucellar seedling—1,850 buds.

Recent interest in Valencias on the Yuma Mesa has made this variety predominant with a total of 6,177 acres. Previously, lemons were more numerous but now are in second place with a total of 5,790 acres. White grapefruit is third in importance with 1,343 acres.

The most popular imported varieties in the Salt River Valley have included Frost Washington Navel, Frost Valencia, old-line Campbell Valencia, and Red Blush grapefruit.

ACREAGE PLANTED WITH IMPORTED VARIETIES.—New acreage in the Salt River Valley calculated to be derived from the imported varieties and planted during 1959 and 1960 includes 565 acres, most of which are Frost Washington Navels.

In the Yuma area, where citrus acreage has more than doubled since 1957 (totaling now nearly 15,000 acres), approximately 1,932 acres were planted to imported varieties. There are 1,550 acres—Valencia (nearly all Frost), 152 acres—Frost Lisbon lemon, 130 acres—Frost Washington Navel, and 100 acres—miscellaneous varieties.

NOTES ON ADAPTATION OF NEW VARIETIES. Urgent demand for several of the new imports has resulted in the commitment of considerable acreage to varieties for which little is known regarding their adaptation under Arizona conditions. Growers and nurserymen alike realize that immediate wholesale use of certain of the new imports is somewhat dangerous because of possible failure of adaptation. Because of heavy

cutting of budwood for rapid increase of these imports there is also the possibility that a bud-sport of a variety may have been propagated inadvertently. For these reasons much interest is directed towards information regarding the performance of these varieties in their new environment.

Only a few of the new imports are old enough to have reached fruiting stage. At Yuma, Frost Washington Navel on Rough Lemon stock is growing and fruiting well as 4-year-old trees. These are the first bearing trees of this variety in Arizona. Other imports of the same age showing good growth but only moderate to light fruiting are Frost Marsh grapefruit, Frost Eureka lemon, Frost Lisbon, and Warren strain Washington Navel orange. Red Blush grapefruit (RCES #3) has shown good growth at Yuma but is not fruiting well at 5 years of age. In the Salt River Valley this variety, at 4 years, is showing only moderately vigorous growth and no fruit of any consequence.

Nucellar varieties are not being recommended for the Yuma area without reservation because of the probability of overly vegetative growth under Arizona climatic and cultural conditions. Because our predominant rootstock is rough lemon the possibility of poor quality fruit also must be considered.

Virus Indexing Program

A citrus virus indexing program for establishing variety foundation plantings and selection of the best available varieties for Arizona has been initiated at the Yuma Station. Short-term tests for tristeza and psorosis are being conducted in a screenhouse covered with 32 x 32 mesh plastic screening. Long-term tests for xyloporosis (cachexia), exocortis, and stubborn disease are being made in an indexing field plot. Recent acquisition of 2 small plastic-covered greenhouses will allow continuance of the program during the winter months, especially for the short-term tests.

Indicator seedlings being used are basically the same as those in similar programs in other areas. The varieties and the virus diseases for which they are used are as follows:

SCREENHOUSE TESTS

Koethen sweet orange.....	Psorosis, vein enation
Mexican lime.....	Tristeza, vein enation
Sour orange.....	Seedling yellows

FIELD PLOT TESTS

Palestine sweet lime.....	Xyloporosis
Orlando tangelo.....	Cachexia
Rangpur lime.....	Rangpur lime disease
Morton or Carrizo citrange.....	Exocortis

Each of the index candidates is being propagated on rough lemon in the screenhouse for eventual transferral to a foundation block when short-term tests are completed. Navel orange candidates on sour orange rootstock surviving the screenhouse tests will be transferred to a field planting for the stubborn test.

Fifty-nine entries are now being indexed in this program. This figure includes 27 of the imports made under the budwood improvement program and 32 local entries. Of the local entries, 23 are being tested because of obvious difficulties suspected as being virus-caused. The remaining 9 are either presently popular bud-source trees or have served in this capacity in past years during the expansion of the citrus industry in Arizona.

Meyer Lemon Eradication

Meyer lemon is not grown commercially in Arizona but it was estimated that there were 1,500 trees, mostly in dooryard plantings, in the state in 1957. Although these trees appear exceptionally healthy, indexing tests by Carpenter (1) showed that, as in other states, the Meyer lemon harbors the tristeza virus. Consistently, tristeza symptoms have been absent in susceptible citrus varieties on sour orange root growing adjacent to scattered Meyer lemon trees in commercial groves and in similar trees in home plantings. In some cases the exposure had been as long as 15 to 20 years. Carpenter (2) indexed buds from 29 trees of 9 varieties of citrus growing adjacent to Meyer lemon trees infected with tristeza. All these were negative for tristeza, indicating lack of natural spread from Meyer lemon in Arizona.

However, since 95 per cent of our citrus trees older than 10 years are on sour orange rootstock, there is danger that the appearance of an efficient vector or rebudding of Meyer lemon to a susceptible variety might cause a local outbreak of tristeza. In recognition of this danger we have been attempting, through the Arizona Commission of Agriculture and Horticulture, to secure voluntary removal of all Meyer lemon trees existing in the state.

To date, 192 trees have been removed in Yuma County and replaced

with trees of other varieties donated by the citrus nurseries. In Maricopa County (Salt River Valley), approximately 805 trees were removed with payment to the owners of \$4 to \$20 per tree, depending upon size and condition. In Pima County, 41 trees were destroyed without compensation. All nurseries and commercial groves have been cleared of Meyer lemon trees. Legislation and appropriation to complete the eradication are being requested. When all the virus-infected trees are eliminated it is planned to introduce one or more of the virus-free strains of Meyer lemon, as this hardy variety is of great value for home plantings.

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