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FRUIT AND NUT CROPS RESEARCH IN TEXAS, 1987

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SUBJECT TOPIC: Citrus and Subtropical Fruits

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CROP(S):
1. Citrus
2. Low-chill prunus (peaches, nectarine, plums)
3. Avocado

ABSTRACT:

Objectives:

1. Test and evaluate rootstocks to improve fruit yield, fruit quality and fruit size of oranges and grapefruit.

2. Select rootstocks that have disease and pest tolerance and impart tree hardiness, longevity, stock/scion compatibility, yield stability and adaptability to soils in the Lower Rio Grande Valley.

3. Evaluate low-chilling (less than 250 chill units) subtropical peach cultivars suitable for commercial use in the Lower Rio Grande Valley.

4. Evaluate avocado cultivars for South Texas with suitable commercial market quality and capable of surviving temperatures to -5°.

General Approach:

1. Promote the use of more productive citrus rootstocks by the Texas citrus industry in establishing new plantings following the 1983 Christmas freeze. The use of Swingle citrumelo and Carrizo citrange on suitable soils are primary.

2. Establish plantings of navel and 'Marrs' orange, 'Henderson', 'Ray Ruby' and 'Rio Red' grapefruit using standard and new hybrid rootstocks.

3. Three citrus plantings damaged during the 1983 freeze are being rehabilitated to correlate damage with recovery and productivity as compared to replanting new trees.

4. Evaluate the foremost insulative cold-protection trunk wraps for young citrus trees, including those with liquid-filled heat reservoirs, and investigate their effects on tree growth and development when allowed to remain on the tree during periods of warm temperatures (365 days/year).

5. Evaluation is continuing of new low-chilling subtropical peach cultivars for release of suitable selections to be used by the developing peach industry in the Lower Rio Grande Valley.

6. Establish test plantings of cold-hardy avocado cultivars capable of surviving temperatures to -5° for use in South Texas.

Findings:

1. Several citrus nurseries have been provided seed of Swingle citrumelo rootstock and are growing trees for planting new orchards. Growers are establishing orchards for evaluation using these new rootstocks in cooperation with the citrus rootstock project.

2. Test plantings using several clones of navel orange, 'Marrs' orange, 'Henderson', 'Ray Ruby' and 'Rio Red' grapefruit on new hybrid rootstocks have been field established since the 1983 freeze.

3. Recovery of trees damaged in the 1983 freeze appears to be correlated to trunk disease. Fruit production from nucellar selections is not as early to being as is fruiting of old-budlines.

4. The study to evaluate tree growth and development effects of permanent insulative cold-protective wraps on young citrus trees year-round show the standard polyurethane wrap being used by the citrus industry offers limited cold protection. Other insulators being tested with heat-retaining liquid reservoirs capable of releasing latent heat, and when used with low-volume irrigation offer more protection from cold.

5. Two low-chilling peach cultivars have been released jointly with the University of Florida. The original crosses were made in the Florida breeding program. 'FlordaGrande' was released in 1984 and 'TropicSweet' in 1986. Both ripen in early to mid-May. 'TropicSweet' is the first freestone peach on the market most seasons.

6. Avocado budwood of about 30 cultivars with expected capability of surviving temperatures to -5° have been obtained and nursery trees propagated. In fall 1986, many of these cultivars were established in a field planting, the remainder to be planted in 1987.

New Initiatives:

The citrus project is initiating research to increase plant growth rates by using carbon dioxide enriched environments. The objective is to determine the optimum enrichment level and then use this knowledge to reduce the nursery production time of citrus by growing seedlings and budlings in CO_2 enriched environments.

Low concentrations of atmospheric CO_2, the raw material for photosynthesis, is one of the most limiting factors in the growth of terrestrial plants. Numerous studies conducted in CO_2-enriched greenhouses have improved plant quality, increased size, shortened time to maturity and decreased water losses among a wide variety of crops. Results are particularly striking in tree seedlings. The most profound effect of CO_2 enrichment will most likely come from increased water-use efficiency and a reduction in the water requirement.

Specially-designed chambers for controlled conditions, and systems for precise CO_2 measurements are being constructed inside a greenhouse. Citrus rootstock seedlings of various cultivars will be grown under standard nursery environmental conditions, with the exception of different CO_2 enrichment levels.

Findings will be of value to all greenhouse-grown horticulture crops.