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FRUIT AND NUT CROPS RESEARCH IN TEXAS, 1987

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SUBJECT TOPIC: Pecans Under Arid Conditions

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CROP(S): Pecan

ABSTRACT:

Objectives:

1. Evaluate the effect of self-pollination on nut quality of pecan.
2. Develop a biochemical assay to quantify cross-pollination in pecan nut samples.
3. Test the effect of various growth regulators to control vegetative growth of pecan.
4. Evaluate the effect of cluster size and leaf to fruit ratios on nut quality.

General Approach:

1. 'Western' has been planted with few or no pollinizers in the arid southwest. Controlled pollinations have been made to evaluate the paternal effects on nut quality.
2. Our laboratory has been equipped to screen for biochemical differences in pecan. A survey of enzyme systems is being conducted that may have potential to differentiate the pollen parent in a given nut sample.
3. Paclobutrazol and flurprimidol are chemicals that can suppress plant growth. Their efficacy to control pecan growth is being tested under greenhouse and field conditions when applied as a trunk drench.
4. Nuts will be collected from various cultivars and from nut clusters of various size. Nut quality in relation to position in the cluster and cluster size will be evaluated. Branches will be girdled and nut and leaf numbers will be altered to evaluate how leaf area influences final nut quality.

Findings:

1. Self-pollination of 'Western' significantly reduced nut quality. Cross-pollination increased nut weight a maximum of 20% and volume a maximum of 16%.
2. Two enzymes in pecan have been identified as biochemical markers. With these markers, cross-pollination under field conditions has been estimated and a model has been

developed that predicts maximum production when 25-33% of the orchard is planted to pollinizer cultivars.

3. Both paclobutrazol and flurprimidol at a very low dose dramatically suppresses pecan growth with little apparent effect on yield. Long-term effects on growth and yield are being evaluated.

4. Contrary to belief, large cluster size (6 nuts/cluster) does not reduce average nut weight. Position within the cluster can influence nut weight (more apical nuts are smaller). Two-four leaves adequately filled 'Mohawk', 'Western', and 'Sioux'. Leaf to fruit ratios did not affect photosynthesis. Girdling of branches reduced photosynthesis 70% but did not affect nut quality.

New Initiatives:

The effect of water stress on pecan physiology and biochemistry will be evaluated. Various rootstocks may be more resistant to stress.

Success of supplemental pollination by aircraft will be evaluated. Pollen will be flown on and electrophoretic markers will be used to detect pollination source.

The relationship between cultivar, fruiting condition, exogenous gibberellin treatments will be related to leaf senescence in the fall and biochemical changes. Delaying leaf senescence may extend the ability of the pecan to assimilate carbohydrates.