

FRUIT AND NUT CROPS RESEARCH IN TEXAS, 1987

Page	Participating Scientists	Crops	Location of Research Station, and Cooperative Research Sites
3, 5	David H. Byrne	Peach	College Station
3, 5	Terry Bacon	Plums	
7	J. Dan Hanna	Apricots	
9	Calvin G. Lyons	Grapes	
10	T. Glynn Littleton	Pecans	
10	G. R. McEachern		
10, 20, 46	Gerald Johnson		
12	J. Benton Story		
46	Berry Thompson		
15	R. D. Mardard	Pecan	
17	L. Austin Stockton	Grapes	
17		Apples	
19, 20, 21, 23	John A. Lipe	Peach	Fredericksburg
19, 20	Duery Menzies	Pecan	

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SUBJECT TOPIC: Preharvest Cultural Research and Developmental Physiology of Fruits

INVESTIGATOR(S): Kim D. Patten - TAES, Overton

CROP(S):

1. Blueberries
2. Peaches
3. Other miscellaneous fruits - Apples, plums, pears, raspberries, grapes, blackberries, strawberries, etc.

ABSTRACT:

Objectives:

1. Develop cultural practices to maximize production and quality of fruit crops in East Texas.
2. Develop an understanding of the growth and development of the rabbiteye blueberry and the pre- and postharvest physiology of the blueberry fruit.
3. Evaluate the adaptability of new fruit species and cultivars, and develop new blueberry releases for East Texas.

General Approach:

1. Evaluate irrigation practices, water use, and water quality tolerance of rabbiteye blueberries.
2. Develop establishment practices, and soil and plant nutrition programs for blueberries and peaches.
3. Evaluate practices to minimize blueberry quality loss during mechanical harvesting.
4. Develop an understanding of the factors affecting fruit set, ripening and quality of blueberries. Improve fruit ripening uniformity.
5. Develop postharvest fruit handling and storage practices for blueberries and peaches to maximize fruit quality and shelf life.
6. Evaluate raspberry, apple, peach, plum, blackberry, grape, feijoa, Asian pear, mayhaw, strawberry, and blueberry cultivars for East Texas. Develop, evaluate and release new early ripening blueberry lines for Texas.

Findings:

1. Lysimeter work with blueberry plants indicate that large one year old plants used up to 2.0 liters of water per day. After 4 years of growth, blueberries irrigated with low volume spray emitters (LVSE) were larger than drip irrigated blueberries. Mulching improved plant size of plants irrigated by drip and increased yield across all irrigation treatments. Horizontal and vertical root growth increased with LVSE and mulching compared to drip or no mulching. When irrigated with sodic water, mulching reduced soil EC under blueberry plants compared to no mulching. Deficit irrigation of mature blueberry plants did not reduce yield in the subsequent year. 'Brightwell' appears to be more salt tolerant than other blueberry cultivars.
2. Ammonium thiosulfate (2-1/2%) was an effective blossom thinner of Morris plum. Leaf analysis survey for blueberries in Texas indicated consistent deficiencies of P and Mg. In a N-source study of blueberries, sulfur-coated urea followed by NH_4SO_4 were the best treatments, while NH_4SO_4 due to its effect on soil pH was the poorest. In a N x P rate study of blueberries, high P increased growth and leaf chlorophyll at high N rates but not at low N rates.
3. During a two-year study, the time of day during harvest did not consistently affect blueberry fruit quality and shelf life or mechanically harvested blueberries. However, during the hotter hours of the day, harvester efficiency markedly declined.
4. Variation in fruit ripening time and fruit quality of blueberries corresponded with variability of bloom time of individual flowers. Fruit from previous season's fall growth had the shortest time from bloom to ripening and highest fruit quality compared to fruit from spring growth. Preharvest Ethephon sprays condensed the time from first to last ripening of 'Climax' blueberries from two weeks to three days. Fruit maturity increased logarithmically with percent full sun at the location of the fruit on the bush ($R^2 = 0.6$). However, no relationship was found between leaf area of the shoot from where the fruit were picked and fruit maturity or quality.
5. Certain film wraps of blueberries appear to have potential, especially with the use of within package enclosures, e.g. KMnO_4 or SO_2 emitters. No success was obtained with film wrap of peaches.
6. Multiple plots of different fruit species and cultivars were established. Mulching dramatically improved the

yield of ten raspberry cultivars. However, only Dorman Red was commercially suitable for Texas. One hundred and nine advanced selections of blueberries have been made and are being further evaluated. Five advanced selections of early ripening blueberries have been released from other states. Overton data on the performance of these new cultivars looks very favorable.

New Initiatives:

1. A more detailed evaluation of soil-water-plant management systems for blueberries has begun. The objective is to develop an orchestrated system that will ameliorate the harmful effects of salts to blueberry plants. The experiment protocol includes irrigation rate, irrigation systems, and soil and water modifications.
2. A study on the physiology of blueberry root system is in the initial planning stages. The objectives of this research is to evaluate the effects of different stress (pH extremes, water extremes and salt toxicity) on the functionality of the roots. Solution culture systems will be used. Root functionality will be evaluated on the basis of uptake kinetics.
3. Fertigation studies on peaches and blueberries have begun. The objective is to evaluate both rates and N sources.