CONTENTS

VEGETABLE CROPS CALENDAR

- Florida Pecan Field Day
- Tomato Institute Program

COMMERCIAL VEGETABLES

- Plant Nutrition Impacts on Vegetable Quality
- Tomato Varieties for Florida
- Phosphorus Availability and Response of Tomato to Phosphorous Fertilizer in Calcareous Soils

VEGETABLE GARDENING

- Florida's Largest Pumpkin

Note: Anyone is free to use the information in this newsletter. Whenever possible, please give credit to the authors. The purpose of trade names in this publication is solely for the purpose of providing information and does not necessarily constitute a recommendation of the product.
The use of fertilizers is an important component of commercial vegetable production. Fertilizers replace nutrients removed during harvest and allow growers to manage crop nutrition for maximum yield. Historically, most vegetable nutrition research focused on fertilizer rates, nutrient availability to the plant, nutrient effects on crop growth and yield, and nutrient movement within the soil. Fertilization practices can also have significant impacts on harvested fruit quality and quality retention during packinghouse operations and distribution. These include physiological disorders, disease susceptibility and compositional and textural changes. Only relatively recently has research into plant nutritional effects on vegetable quality been conducted in earnest and there is still much to be learned.

Although fruit quality usually increases as soil nutrient levels increase from deficient to optimum levels, nutrient levels that produce maximum yield may not always correspond to levels that result in the highest fruit quality. Further, although the addition of nutrients above optimum levels often does not reduce yields, they can have either negative or positive effects on aspects of quality that are not readily apparent. Plant nutritional factors are only one link in the overall process of producing high quality vegetables. Other critical factors such as variety selection and environmental conditions should not be overlooked. Although specific responses will vary from crop to crop, this article will briefly discuss some of the general affects that some fertilizer nutrients have on the postharvest quality of vegetables.

**Nitrogen:** Adequate nitrogen is essential for optimal plant growth and development and it is the mineral element used most by plants. Nitrogen is an important constituent of proteins and plays a critical role in a cell's biochemical machinery. Besides reduced yields, low nitrogen levels generally result in less protein content in harvested vegetables and inferior quality. Adequate nitrogen usually allows plants to grow, develop and produce maximum yields with at least the potential for a high-quality product with desired color, flavor, texture, and nutritional composition.

Excessive soil nitrogen can negatively impact quality in several ways. High nitrogen can result in compositional changes such as reduced ascorbic acid (vitamin C) content, lower sugar content, lower acidity and altered ratios of essential amino acids. In many vegetables, especially leafy green vegetables grown under low light, it can result in the accumulation of nitrates in the plant tissue to unhealthy levels. High nitrogen fertilization can lead to reduced volatile production and changes to the characteristic flavor of celery. In table beets, high nitrogen can lead to increased glutamine levels which results in off flavors in the processed beet puree. Other effects of excessive soil nitrogen include delayed maturity, increased weight loss during storage of sweetpotato and increased disorders such as hollow stem of broccoli and increased soft rot during storage of tomatoes.

**Phosphorous & Potassium:** Phosphorous (P) is an important component of plant DNA, cell membranes, and energy-yielding intermediates of photosynthesis and respiration. Potassium (K) plays and important role in osmotic (water potential) regulation of cells and in activating different enzymes in photosynthesis and respiration. As far as fruit quality goes, high P levels have been reported to increase sugar content, decrease acidity and alter color of vegetables. High K levels have often been associated with improving quality of vegetable crops. High K has been reported to increase vitamin C content, increase titratable acidity, and improve color. Greater rates of K fertilization have also been associated with decreased blotchy ripening of tomato.

**Calcium:** Calcium is an important component of plant cell walls and is required to carry out normal functions of cell membranes. Since cell walls and membranes are rapidly synthesized at the growing points of a plant, they are the first to show deficiency symptoms. Unlike N, P or K, however, calcium is very immobile within a plant and cannot be transported from older tissues to
growing tissues during times of deficiencies. Therefore, the time of calcium availability to the plant can have important implications in the amount of calcium that winds up in a specific plant part. Calcium deficiencies can be common in vegetables, which results in a number of disorders such as blossom-end rot of tomato, pepper, and watermelon; brownheart of escarole; celery blackheart; and tipburn of lettuce, cauliflower and cabbage. Conversely, high calcium levels will reduce these disorders and have been associated with other positive effects such as increased vitamin C content, extended storage life, delayed ripening, increased firmness and reduced respiration and ethylene production.

Micronutrients: Specific effects of both micronutrient deficiencies and toxicities have also been described and are associated with specific crop disorders. For example, boron deficiencies can result in blackheart of beet, celery cracked stem, internal browning of turnip and brown curd and hollow stem of cauliflower. As more research is conducted on plant fertility effects on all aspects of vegetable quality (flavor, composition, texture, storability, etc.), growers will be equipped to make better management decisions to produce crops that best satisfy the needs of a particular consumer.

(Ritenour, Vegetarian 99-08)

TOMATO VARIETIES FOR FLORIDA

Variety selection, often made several months before planting, is one of the most important management decisions made by the grower. Failure to select the most suitable variety or varieties may lead to loss of yield or market acceptability.

The following characteristics should be considered in selection of tomato varieties for use in Florida.

Yield: The variety selected should have the potential to produce crops at least equivalent to varieties already grown. The average yield in Florida is currently about 1300 25-pound cartons per acre. The potential yield of varieties in use should be much higher than average.

Disease Resistance: Varieties selected for use in Florida must have resistance to Fusarium wilt race 1 and race 2; Verticillium wilt (race 1); gray leaf spot; and some tolerance to bacterial soft rot. Available resistance to other diseases may be important in certain situations.

Horticultural Quality: Plant habit, stem type and fruit size, shape, color, smoothness and resistance to defects should all be considered in variety selection.

Adaptability: Successful tomato varieties must perform well under the range of environmental conditions usually encountered in the district or on the individual farm.

Market Acceptability: The tomato produced must have characteristics acceptable to the packer, shipper, wholesaler, retailer and consumer. Included among these qualities are pack out, fruit shape, ripening ability, firmness, and flavor.

Current Variety Situation

Many tomato varieties are grown commercially in Florida, but only a few represent most of the acreage.

'Florida 47' was grown on about 23% of the acreage in Florida in the 1998-99 season - a notable increase from the approximately 15% of the acreage the previous season. Florida 47 was grown on about 36% of the acreage in southwest Florida and 17% of the east coast acreage.

'Agriset 761' had 14% of the statewide acreage, down from 22% the previous season. 'Agriset 761' remained popular on the east coast with 33% of the acreage and in southwest Florida with 17% of the acreage.

'Sanibel' and 'Solimar' each had about 11% of the state's acreage. 'Sanibel' was the predominant variety in Dade County with 65% of the acreage there. 'Solimar' was planted extensively on the east coast with 41% of the acreage while it accounted for about 12% of the west central Florida acreage.

Other varieties with significant acreage in the 1998-99 season were 'Solar Set' (8%), 'BHN 22' (5%), 'Sunbeam' (5%), other BHN varieties (4%) and 'Sunpride' (2%). 'Solar Set' and BHN were most popular in southwest and west central Florida. 'Sunbeam' and 'Sunpride' acreage was mostly in west central Florida. Many other varieties and advanced experimental hybrids were grown on less than 1% of the state's acreage.

Tomato Variety Trial Results

Summary results listing the five highest yielding and the five largest fruited varieties from trials conducted at the University of Florida's Gulf Coast Research and Education Center, Bradenton;
Indian River Research and Education Center, Fort Pierce; Tropical Research and Education Center, Homestead; North Florida Research and Education Center, Quincy; and Palm Beach County Cooperative Extension Service, Delray Beach for the Spring 1998 season are shown in Table 1. High total yields and large fruit were produced by 'BHN 22' and 'Equinox' at Bradenton, 'Sanibel' at Delray Beach, 'Equinox' at Fort Pierce, 'Sanibel' and 'Sunbeam' at Homestead, and 'Sunbeam' at Quincy. 'Equinox' produced high yields at three of the five locations. 'Sunbeam' produced large fruit at four of the five locations and as did 'Sanibel' at three locations. Not all entries were grown at each location.

Summary results listing the five highest yielding and five largest fruited entries from trials at the University of Florida's Gulf Coast Research and Education Center, Bradenton; the Indian River Research and Education Center, Ft. Pierce; and the North Florida Research and Education Center, Quincy for the fall 1998 season are shown in Table 2. High total yields and large fruit size were produced by 'Florida 47' and 'Agriset 761' at Fort Pierce and XPH 10035, 'Agriset 761', 'Sanibel', and 'Florida 47' at Quincy. 'Agriset 761', 'Equinox' and 'Florida 47' produced high yields at two of three locations. 'Florida 47' and 'Sanibel' produced large fruit at all locations. Again, not all entries were included at all locations.

Overall, results of these trials indicate that no single variety dominates the industry as during the periods when 'Sunny' and 'Agriset 761' were preeminent. Furthermore, varieties appear to be more location and seasonal specific than in the past.

Table 1. Summary of University of Florida tomato variety trials. Spring 1998 (1).

<table>
<thead>
<tr>
<th>Location</th>
<th>Variety</th>
<th>Total Yield (ctn/acre)</th>
<th>Variety</th>
<th>Size (oz)</th>
<th>Large Fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradenton</td>
<td>Suncrest</td>
<td>2728</td>
<td>BHN 22</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equinox</td>
<td>2460</td>
<td>Sunbeam</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BHN 22</td>
<td>2313</td>
<td>4413W</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Florida 7786</td>
<td>2121</td>
<td>STM 5206</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floralina</td>
<td>2056</td>
<td>Equinox</td>
<td>6.1(^2)</td>
<td></td>
</tr>
<tr>
<td>Delray Beach</td>
<td>Sanibel</td>
<td>2979</td>
<td>Exp 10072 ESL</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suncrest</td>
<td>2705</td>
<td>STM 5206</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agriset 775</td>
<td>2680</td>
<td>Sanibel</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agriset 761</td>
<td>2643</td>
<td>RFT 3260</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunpak (EX 10069)</td>
<td>2632</td>
<td>Leading Lady</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Fort Pierce</td>
<td>Solimar</td>
<td>2873</td>
<td>Sunbeam</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Florida 7786</td>
<td>2803</td>
<td>Florida 7787</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Florida 7777</td>
<td>2709</td>
<td>Equinox</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equinox</td>
<td>2576</td>
<td>Agriset 761</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunbeam</td>
<td>2566(^3)</td>
<td>Solar Set</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Homestead</td>
<td>Sanibel</td>
<td>918</td>
<td>Sanibel</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equinox</td>
<td>908</td>
<td>Florida 91 (EX 10091)</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EX 10090</td>
<td>870</td>
<td>Sunbeam</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PX 647095</td>
<td>850</td>
<td>Florida 47</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunbeam</td>
<td>835(^5)</td>
<td>Florida 7791</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Quincy</td>
<td>Sun Leaper</td>
<td>2172</td>
<td>BHN 102</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BHN 444</td>
<td>2051</td>
<td>Sanibel</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunbeam</td>
<td>2006</td>
<td>Sunbeam</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SRT 6682</td>
<td>1826</td>
<td>Equinox</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SRT 6685</td>
<td>1818(^7)</td>
<td>Sunpak (EX 10069)</td>
<td>7.2 (^8)</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) 14 other entries had yields similar to Floralina.
\(^2\) 14 other entries had fruit weight similar to Equinox.
\(^3\) 3 other entries had yields similar to Sunbeam.
\(^4\) 2 other entries had yield similar to Sunbeam and Florida 7763.
\(^5\) 6 other entries had yields similar to Sunbeam.
\(^6\) 8 other entries had fruit weight similar to Solar Set and Florida 7763.
\(^7\) 8 other entries had fruit weight similar to Sunbeam, Florida 47, Florida 7791, and Florida 7792.
\(^8\) 18 other entries had yields similar to SRT 6685.
Seed Sources:
Agrisales: Agriset 761, Agriset 775, Equinox.
Asgrow: Sunpak (EX 10069), EX 10072 ESL, EX 10090, Florida 91 (EX 10091), Florida 47, Solar Set, Solimar, Sunbeam.
BHN: BHN 22, BHN 102, BHN 444.
Novartis: Suncrest, Sun Leaper, RFT 3260, 4413W
Petoseed: Floralina, Sanibel, PX 647095
Sakata: STM 5206.
Sunseeds: Leading Lady, SRT 6682, SRT 6885.
University of Florida: Florida 7763, Florida 7786, Florida 7787, Florida 7791, Florida 7792.

Table 2. Summary of University of Florida tomato variety trial results. Fall 1998 (1).

<table>
<thead>
<tr>
<th>Location</th>
<th>Variety</th>
<th>Total Yield (ctn/acre)</th>
<th>Variety</th>
<th>Large Fruit Size (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradenton</td>
<td>PS 647095</td>
<td>1184</td>
<td>SRT 6629</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>Florida 7807</td>
<td>1162</td>
<td>Florida 91 (EX 10091)</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td>Equinox</td>
<td>1135</td>
<td>Florida 47</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Sun Leaper</td>
<td>1115</td>
<td>Sanibel</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Floralina</td>
<td>1080</td>
<td>FT 6116</td>
<td>6.4^</td>
</tr>
<tr>
<td>Fort Pierce</td>
<td>Equinox</td>
<td>1120</td>
<td>Florida 47</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Florida 7815</td>
<td>1087</td>
<td>Sanibel</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Florida 47</td>
<td>1078</td>
<td>Agriset 761</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Solar Set</td>
<td>1071</td>
<td>Florida 7786</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Agriset 761</td>
<td>1052</td>
<td>Florida 7807</td>
<td>5.3^</td>
</tr>
<tr>
<td></td>
<td>XPH 10035</td>
<td>1589</td>
<td>XPH 10035</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>Agriset 761</td>
<td>1559</td>
<td>Sanibel</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Sanibel</td>
<td>1459</td>
<td>Florida 47</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Florida 47</td>
<td>1447</td>
<td>Florida 91 (EX 10091)</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>Captiva</td>
<td>1395</td>
<td>Agriset 761</td>
<td>5.7^</td>
</tr>
</tbody>
</table>

^13 other entries had yields similar to Floralina.
^15 other entries had fruit weight similar to FT 6116.
^4 other entries had yields similar to Solar Set.
^4 other entries had fruit weight similar to Florida 7786.
^15 other entries had yields similar to Captiva.
^8 other entries had fruit weight similar to Agriset 761.

Seed Sources:
Agrisales: Agriset 761, Equinox.
Asgrow: Florida 47, Solar Set, Florida 91 (EX 10091), XPH 10035.
Novartis: Sun Leaper, FT 6116
Petoseed: Captiva, Floralina, Sanibel, PX 647095.
Sunseeds: SRT 6629.
University of Florida: Florida 7763, Florida 7807, Florida 7815.

Tomato Varieties for Commercial Production

The varieties listed have performed well in University of Florida trials conducted in various locations.

Large Fruited Varieties

**Agriset 761.** Midseason, determinate, jointed hybrid. Fruit are deep globe and green shouldered. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, gray leaf spot. (Agrisales).

**BHN-444.** Early-midseason maturity. Fruit are globe shape and green shouldered. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), and Tomato Spotted Wilt Virus. For Trial. (BHN).

**Equinox.** An early determinate, heat-tolerant jointed hybrid. Fruit are flattened globe-shaped with uniform green shoulders. Smoother blossom scar than 'Solar Set' enhances cool-season production. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), and gray leaf spot. (Agrisales).

**Florida 47.** A late midseason, determinate, jointed hybrid. Uniform green, globe-shaped fruit. Resistant: Fusarium wilt (race 1 and 2), Verticillium
wilt (race 1), Alternaria stem canker, and gray leaf spot. (Asgrow).


Solar Set. An early, green-shouldered, jointed hybrid. Determinate. Fruit set under high temperatures (92°F day/72° night) is superior to most other commercial cultivars. Resistant: Fusarium wilt (race 1 and 2), Verticillium wilt (race 1), Alternaria stem canker, and gray leaf spot. (Asgrow).


Sunbeam. Early midseason, deep-globe shaped uniform green fruit are produced on determinate vines. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), gray leaf spot, Alternaria stem canker. (Asgrow).

Sun Leaper. A determinate, early midseason, heat-tolerant hybrid. Fruit are uniform green and flattened-globe to deep-oblate shaped. Resistant: Verticillium wilt (race 1) and Fusarium wilt (race 1 and 2). (Novartis).

Sunpride. A midseason, tall determinate hybrid producing deep globe to oblate-shaped, uniform green fruit on a jointed pedicel. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, and gray leaf spot. (Asgrow).

Plum Type Varieties

Marina. Medium to large vined determinate hybrid. Rectangular, blocky, fruit may be harvested mature green or red. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, nematodes, gray leaf spot, and bacterial speck. (Sakata).

Plum Dandy. Medium to large determinate plants. Rectangular, blocky, defect-free fruit for freshmarket production. When grown in hot, wet conditions, it does not set fruit well and is susceptible to bacterial spot. For winter and spring production in Florida. Resistant: Verticillium wilt, Fusarium wilt (race 1), early blight, and rain checking. (Harris Moran).

Spectrum 882. Blocky, uniform-green shoulder fruit are produced on medium-large determinate plants. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), root-knot nematode, bacterial speck (race 0), Alternaria stem canker, and gray leaf spot. (Petoseed).

Supra. Determinate hybrid rectangular, blocky, shaped fruit with uniform green shoulder. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), nematodes, and bacterial speck. (Novartis).

Veronica. Tall determinate hybrid. Smooth plum type fruit are uniform ripening. Good performance in all production seasons. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, nematodes, gray leaf spot, and bacterial speck. (Sakata).

Cherry Type Varieties

Mountain Belle. Vigorous, determinate type plants. Fruit are round to slightly ovate with uniform green shoulders borne on jointless pedicels. Resistant: Fusarium wilt (race 1), Verticillium wilt (race 1). For trial. (Novartis).

Cherry Grande. Large, globe-shaped, cherry-type fruit are produced on medium-size determinate plants. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1), Alternaria stem blight, and gray leaf spot. (Petoseed).

Reference


Tomato variety evaluations were conducted in 1998 by the following University of Florida faculty:

H. H. Bryan Tropical Research & Education Center - Homestead
T. K. Howe Gulf Coast Research & Education Center - Bradenton
S. M. Olson North Florida Research & Education Center - Quincy
J. W. Scott Gulf Coast Research & Education Center - Bradenton
PHOSPHORUS AVAILABILITY AND RESPONSE OF TOMATO TO PHOSPHOROUS FERTILIZER IN CALCAREOUS SOILS

Calcareous soils that contain a large amount of calcium carbonate (usually from 1-100% CaCO₃ equivalent) are common in Florida because various types of limestone underlie all of the peninsula. Calcium carbonate can occur in the surface soils naturally or as a result of land preparation (rock plowing, bedding, etc.). Soils also can be calcareous through over liming or long-term irrigation with calcium carbonate enriched ground water. Calcareous soils induce an array of nutritional problems for crops and phosphorus (P) is one of them. Application of P fertilizer is important for vegetable production on calcareous soils. However, most growers apply too much P fertilizer for their crops. Over-fertilization leads to unnecessarily high production costs, may decrease yield and quality and poses a risk to the environment. In order to understand P chemistry and to make fertilizer recommendation for calcareous soils in south Florida, several laboratory and field experiments have been conducted during 1997-1999.

A two-year field experiment was conducted in a commercial vegetable field on a typical Krome very gravelly loam soil in Miami-Dade County during 1997-1998. Dry fertilizer was applied in 2 bands along the top of the bed at three rates of P (37, 63, 100% of the grower rate, equivalent to 96, 163, 260 lb P₂O₅/Ac) in 1997 growing season and at four rates of P (0, 25, 50, and 100% of the grower rate, equivalent to 0, 70, 140, and 280 lb P₂O₅/Ac) in 1998 growing season as triple superphosphate with 6 replications. All of treatments received same amounts of N and K as dry and liquid fertilizers. "Sunbeam" tomato plants were transplanted in a single row in the center of each bed with 20 inches between plants. Tomatoes were harvested three times at mature-green stage. Total number, total weight and color of fruit from each plot were recorded. Soil and leaf samples were also analyzed for P. The results showed that phosphorous fertilization increased AB-DTPA extractable P in the soil but did not affect the concentration of leaf P, yield and quality of tomato with the exception that the quantity of red fruit at the time of first harvest, 1997 was increased slightly (Table 1).

Lamberts, O'Hair, Hochmuth, Hanlon and Bryan (Research Report, 1999) also reported no response of bean, Malanga, potato, and sweet corn to P fertilizer during three years experiments on calcareous soils in Miami-Dade County.

Table 1. Effects of P fertilizers on fruit yield and quality of tomato in 1997 and 1998.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fertilizer rate (lb P₂O₅/Ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997</td>
</tr>
<tr>
<td></td>
<td>96</td>
</tr>
<tr>
<td>Early yield (cartons/Ac)</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>54ᵇᵃ</td>
</tr>
<tr>
<td>Green</td>
<td>541</td>
</tr>
<tr>
<td>Total yield (cartons/Ac)</td>
<td></td>
</tr>
<tr>
<td>Large fruit</td>
<td>406</td>
</tr>
<tr>
<td>Marketable</td>
<td>1474</td>
</tr>
<tr>
<td>Cull yield</td>
<td>210</td>
</tr>
<tr>
<td>Average fruit size (lb)</td>
<td>0.37</td>
</tr>
</tbody>
</table>

*Each mean represents the average of 6 observations. Values followed by different letters are significantly different from each other at p<0.05 according to Duncan’s Multiple Range Test.

Phosphorous removal via the harvested fruit usually accounts for less than 38 lb. P₂O₅ for 1000 cartons of tomato. A large portion of the applied P remains in the soil. It is important to know availability of remaining P in calcareous soils. In 1998, surface soil samples (0-6 inch depth) were collected from 6 typical vegetable fields in south Miami-Dade County. Soil samples were extracted sequentially with water, AB-DEPA, and the mixture of nitric acid and hydrochloric acid to determine water soluble, plant available and residual P in soils. Average concentrations of water soluble P in soil samples collected from various vegetable fields were 1.2 ppm and ranged from 0.87 to 1.69 ppm (Fig. 1). Water soluble P is available to the crop, however, this type of P is also subject to leaching out of the root zone through excessive irrigation or heavy rainfall. Concentrations of AB-DTPA extractable P in these soils were 0.37 to 0.35 ppm.
soils ranged from 46.4 to 94.8 ppm with a mean concentration of 70.9 ppm. AB-DTPA extractable P is plant available and highly correlated to the uptake rate by the crop grown calcareous soils. Acid extractable P in soils represents the P residue in soils that is not directly available to plants. About 95% of total P in 6 soil samples were in residual form. Concentrations of residual P ranged from 1123.8 to 1877 ppm with a mean concentration of 1404.4 ppm. Concentrated acids have to be used to extract this type of P from soil. The level of residual P increases with increasing age of cultivation of soils. Thus phosphorous fertilizer applied to soils will transform from water soluble to AB-DTPA extractable P and eventually a portion of this P becomes residual form. However, these chemical reactions are reversible. Depletion of extractable soil P usually causes the dissolution of residual P. Therefore, both extractable and residual P in the soil should be considered when making fertilizer recommendations.

Phosphorus fertilizers applied in calcareous soils are fixed through adsorption and precipitation. In 1999, we conducted a P sorption and desorption experiment with 24 soil samples collected from natural lands, vegetable fields and tropical fruit groves. Adsorption was dominated reaction at low P concentrations and P precipitated with calcium carbonate at high P concentrations (Fig. 2). Maximum sorption capacity for natural pine land soils ranged from 4200 to 5600 ppm while Krome very gravelly soils from vegetable fields only sorbed 690-1700 ppm. It indicates that soils from vegetable fields were saturated with P and excessive P applied as fertilizer often precipitate and become less available to crops. Desorption rate from vegetable soils are higher than that from natural soils because of high initial soil P in these soils (Fig. 3).

In summary, large amounts of P are accumulated in most of cultivated calcareous soils from fertilizer application. No P fertilizer application is necessary for calcareous soils with high available P levels. Grower should conduct pre-fertilizer soil analysis to determine supplemental P fertilizer rates.
Vegetable Gardening

Florida's Largest Pumpkin

Florida is not known for its pumpkins, except maybe calabazas. A lot are sold around Halloween, but these are trucked in from other states. The summer months just prior to Halloween are just too hot and humid for prime pumpkin growing, resulting in lots of fruit rots on the vines.

A good local retail produce store could sell from 5000 to 6000 pounds of the round, orange type in the week leading up to Halloween. But that is only about 300 pumpkins at an average size of 20 pounds each. Put another way, that would only amount to about 10 of the largest pumpkins ever grown in our state.

Nationwide, we have been far outdone in the search for the great pumpkin. The world record is now over 1000 lbs, and our Florida record is a mere half that. When I started keeping records on Florida's largest vegetables in 1989, our first entry in the pumpkin category was a puny 200 pounder grown at Keystone Heights.

In just ten years we have seen our state record more than double, thanks to the efforts of gardener Tim Canniff of Bradenton. In 1996, Tim set a new record of 459 pounds. Every year since, Tim has been planting seeds saved from this big Atlantic Giant, trying to reach the 500 pound mark. Well, 1999 was almost his year.

Without giving away too many of Tim's secrets, here are a few. First, this year he obtained seed from an Atlantic Giant of 937 pounds grown up north. Then he made sure to plant them precisely on Valentine's Day, February 14, 1999.

A month later, the big vines spreading over his tiny 450 sq ft garden were blooming, so on March 7, he self-pollinated the big female blossoms from the male blossoms.

By mid-May, the giant orange blob had reached a girth of over 100 inches. He tried to keep the vines disease-free and growing by spraying a fungicide, and found that it helped. By June, the pumpkin had reached gigantic proportions, and he could wait no longer.

On June 5, 1999, Tim cut his 120 inch round gargantuan and weighed it in at a whopping 494.5 pounds! While you did not quite reach your personal goal, Tim, we'll give you 500! Congratulations, and thanks for offering to share seeds from your orange monster with anyone wanting to try to break your record. Come on gardeners, take up Tim's challenge in the new millennium.

(Stephens, Vegetarian 99-08)

To: Bill Mahan
850-653-2261
From: Jim Stephens
352-892-2134 x 289

Prepared by Extension Vegetable Crops Specialists

Dr. D. J. Cantliffe
Chairman
Dr. D. N. Maynard
Professor
Dr. W. M. Stall
Professor
Dr. T. E. Crocker
Professor
Dr. S. M. Olson
Professor
Mr. J. M. Stephens
Professor
Dr. G. J. Hochmuth
Professor
Dr. S. A. Sargent
Professor
Dr. C. S. Vavrina
Assoc. Professor