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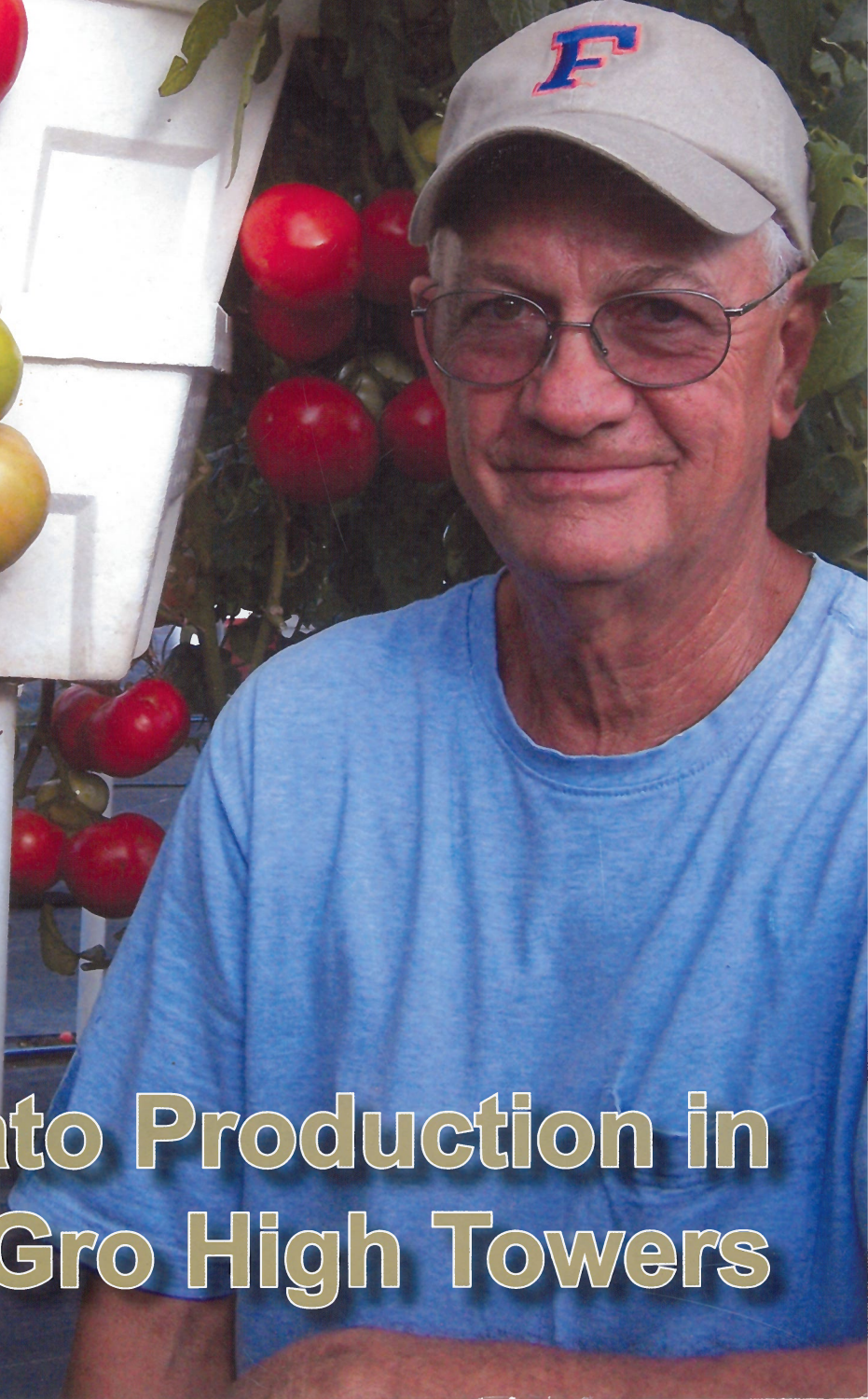
THE **Tomato**

June 2008

MAGAZINE

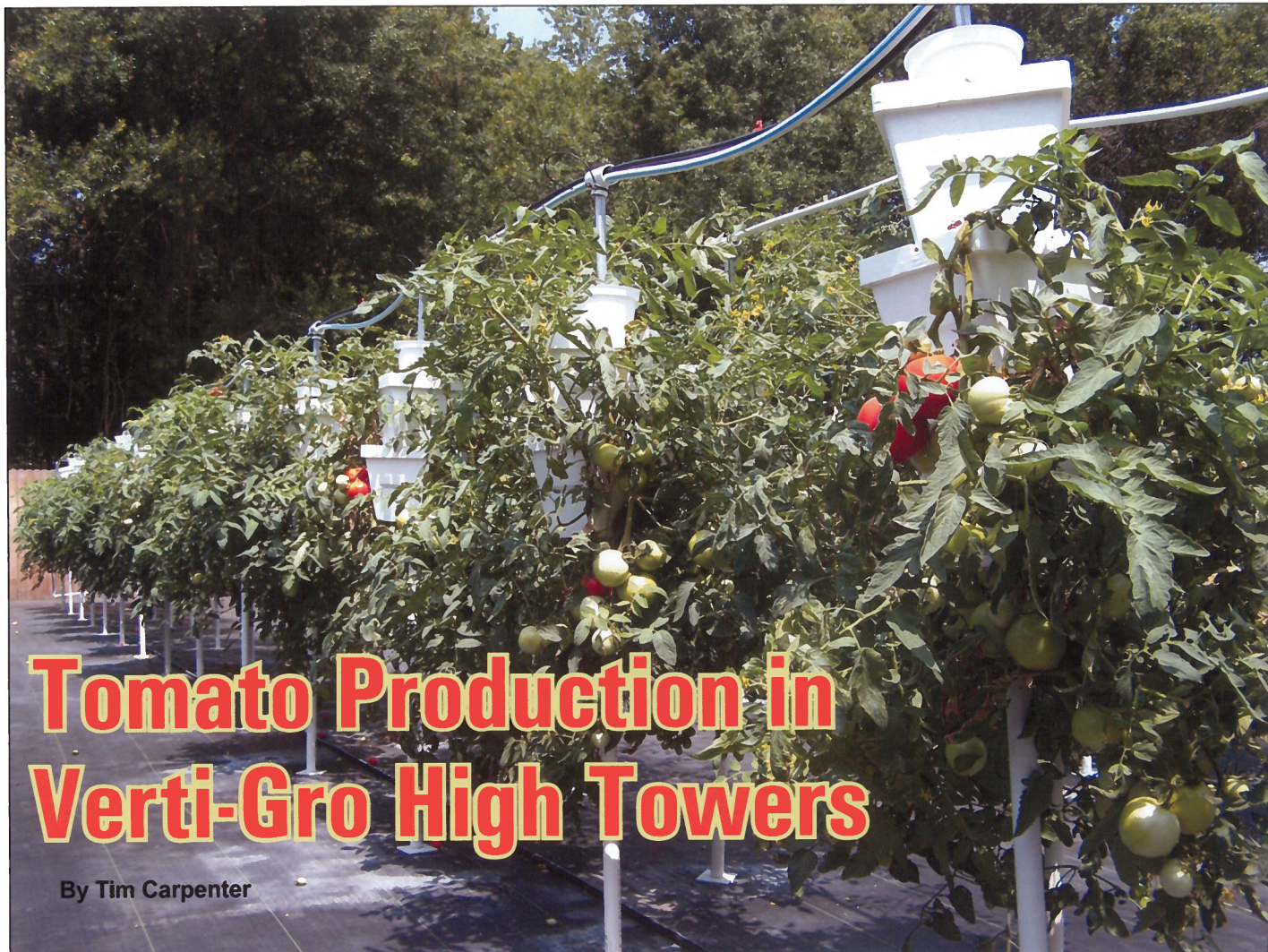
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Tomato Production in Verti-Gro High Towers

THE TOMATO MAGAZINE
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Tomato Production in Verti-Gro High Towers

By Tim Carpenter

Tomatoes are the number one vegetable crop in the U.S. and many other countries. However, growing tomatoes in cold climates with expensive greenhouses, high heating costs and high cooling costs is eventually going to be a challenge. The overhead and production costs are just too high. Shipping costs are going to continue to rise and have a direct and major impact on all produce as well as other foods. Growing tomatoes outdoors in low-cost hydroponic or organic towers is one way to produce high quality tomatoes without the high investment cost.

Growing determinate (bush or stake) tomatoes outdoors under shade and some protected covers is absolutely feasible in Florida and in some parts of Georgia and South Carolina. Shade houses are about \$1.00 per square foot or \$40,000 per acre as compared to greenhouses at a cost of \$200,000 or more per acre. This is a significant breakthrough on growing large and grape tomatoes hydroponically and also

economically. A grower in Vero Beach, Fla., is finishing a 6-month crop of tomatoes in high towers. Less than 1,000 plants had produced over 9,000 pounds as of the end of April and the Tygress harvest was continuing. Each tower requires 14 to 16 square feet or 3.5 to 4 square feet per plant.

Simple Choice:

The choice is fairly simple. Marketing is the key. If growing seasons can be extended or the crop harvested earlier than local field crops, then vertical towers under removable shade is entirely feasible. This method of growing hydroponic tomatoes can be adapted to northern climates to offset the high cost of summer cooling (for both tomatoes and peppers). In the Verti-Gro system (using high towers), no part of the plant touches the ground, nutrition is closely controlled and no herbicides are needed. The quality of the tomato increases dramatically and there is less damaged fruit and sunscald, especially under shade during

the summer months.

Plant density is about the same as in greenhouses – possibly 30 percent more depending on the variety used. The plant density for large tomatoes is from 9,000 to 12,000 plants per acre. With some plants, and with high towers, the plant density could go as high as 13,500 plants per acre. However, the investment cost is far less than in greenhouses. Shade houses, or high tunnels for rain or cold protection, may be recommended for certain climates. Using commercial varieties bred for each area of the country reduces the costs of disease and insect control. The shelf life is dramatically improved as is the taste. (See other papers and research reports on the author's web site)

Planting Procedures:

There are over a dozen varieties of tomatoes available for planting in Verti-Gro towers. Some do better than others. The criteria for selecting varieties are outlined in

a separate paper. TYLCV (Tomato Yellow Leaf Curl Virus) is very important to understand. These virus tolerant varieties are essential in the south, especially when long crops are grown.

All of the varieties grown by Verti-Gro are determinate except for some of the cherry and plum types. Some are also semi-determinate. Place three pots on a high tower using a 1" x 36" PVC pipe riser. The top pot adds stability and can be used to grow onions, herbs, lettuce or other small plants. In some cases another two tomato plants can be planted in the top pot, even at a later date. Start training the tomato to lean by gently pressing it downward when flaccid (slightly wilted), rather than when it is turgid as in the morning. The plant is usually at least 12 to 14 inches tall at this point.

Pruning Required:

All of these varieties require a certain amount of pruning but far less than with the standard greenhouse tomatoes. This is a difficult procedure to describe on paper. You learn by doing what you might refer to as simply determining "how to balance"



Tim Carpenter with his innovative production system.

the plants. Determinate varieties branch profusely. Do not pull off the suckers or side shoots until there are too many (*more than four*). Pull off the weakest ones only after you have encouraged the plant and branches to bend down. Some will break but more will come. Strive to keep an open

plant. Prune off excessive leaves, particularly those inside the plants. Remove all the diseased or dead leaves and never let the plant touch the ground. Top off all branches after two to three sets to keep the plant from overloading.

High production can be obtained with varieties, such as Tygress, FL91, FL 47, FL7514, Biltmore, Summerfield and Seminis 6153. The costs of these seeds are only \$.05-\$.06 each compared to greenhouse indeterminate varieties at \$.25-\$.35 each. Large plants should be planted very deep, even bending the plant at the bottom of the pot, if necessary. Plant up to the second cotyledon or even deeper. You may even lay the plant sideways, keeping in mind that you want to encourage the plant to lean down.

Plants usually produce well for four to five months. At that time, a decision must be made whether to replant or keep growing the same plants. The current crops in Summerfield, both grape and the large varieties, have been continuously harvested since Oct. 8, 2007

(continued on page 10)

HYDROPONIC TOMATOES, PEPPERS, STRAWBERRIES, LETTUCE AND HERBS IN VERTICAL TOWERS ~ OUTSIDE OR IN A GREENHOUSE ~

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Growing media and nutrients:

The growing media of choice has been composted coconut fiber. Tomatoes do very well in this economical media. The cost of the growing media per plant is about \$.20-.25 per plant. Because of the massive root system in a small container the coconut fiber is not re-usable unless composted. Each tower only uses about 1.5 gallons of nutrient solution per day on the average or less than 4000 gpd/acre.

Determinate Variety Trials for the 2007-08 Season:

Tygress: New TYLCV resistant variety

with large, red fruit good for vine ripening. Resistant to many southern diseases; a top selection for 2006-2008.

FL 91: Heat tolerant favorite, high yield determinate, very large fruit, firm and smooth, excellent taste and shelf life. Resistant to most leaf and (many) soil-borne diseases. Well suited for high towers.

Biltmore: Very large red fruit, smooth and heavy, small blossom end scar and resistant to many southern leaf and root diseases. One of our best producers with excellent taste and shelf life (not trialed in Florida this season but a favorite in many southeastern states.

FL 47R: Well-adapted, stocky determinate plant for vine ripe production with uniform extra large red fruit, and excellent shelf life. Resistant to cracking as well as resistant to many leaf diseases.

FL 7514: Still a very good variety from the University of Florida. Large heat and cold tolerant (trialed in northern Florida only).

Floralina: Medium to large determinate plant. Firm, smooth fruit with good shelf life and improved disease resistance (not tolerant to TYLCV and not trialed in Florida this season).

Summerfield 3073: A variety from Israel with medium to large red fruit, excellent color and taste, and very resistant to TYLCV. Also called Polina.

Tyrannus: New TYLCV tolerant large red, determinate variety. Very prolific. (Eliminated from trials in 2007-2008 due to susceptibility to leaf diseases.)

Navidad: Large red grape, fairly tall plant that requires very little pruning when used in high towers. A grape type with high brix (sugar) and good shelf life. Navidad pollinates easily, even without bees, can be planted as a large transplant. It is early to harvest, very resistant to splitting and has excellent color. This variety has had high yields both in cold and hot climates.

Sun Sugar: New yellow with high sugar and vitamin A content. Good crack resistance and early production. No yellow tomatoes tested this season but several will be tested this summer under shade.

Note: All tests were done in 100% coconut coir including the organic trials.

The 2007 summer's trials under shade were extended into the summer with FL 91, Tygress and 6153. All continued to produce until pulled out August 7, 2007.

Other Crops:

Other crops that do well when grown under Verti-Gro High Towers include strawberries, lettuce, spinach, herbs, peppers, greens and other cold crops. 🍅

Editor's note: For more information on how to grow tomatoes and other plants under the Verti-Gro High Tower system, contact Tim Carpenter, 15000 U.S. Highway 441 South, Summerfield, FL 34491, e-mail: info@vertigro.com. Web: www.vertigro.com.



In the Verti-Gro system (using high towers) no part of the plant touches the ground, nutrition is closely controlled and no herbicides are needed.