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REMINDER FOR UF/IFAS VEGETABLE SPECIALISTS AND AGENTS

Please continue to take advantage of the *Power Point Exchange Web Site for Agents and Specialists in State Major Program FL107* at http://fl107.ifas.ufl.edu/ .

Specialists: Post your meeting presentations by following the directions at the Web site.

Agents: Review the site to increase your knowledge base in commercial vegetable production and harvesting practices, and to assist you in the planning, implementation, and reporting of educational activities for the commercial vegetable industry in Florida.

TOMATO VARIETIES FOR FLORIDA

Variety selections, often made several months before planting, are 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 1400 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, race 2 and in some areas race 3; 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, such as Tomato Spotted Wilt and Bacterial Wilt resistance in northwest Florida.

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. In years past we have been able to give a breakdown of which varieties are used and predominantly where they were being used but this information is no longer available through the USDA Crop Reporting Service.

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; and North Florida Research and Education Center, Quincy for the Spring 2003 season are shown in Table 1. High total yields and large fruit size were produced by Fla. 8092, Solar Fire and FL 91 at Bradenton. There was very little overlap between locations. The same entries were not included at both locations.

Table 2 shows a summary of results listing the five highest yielding and five largest fruited entries from trials at the University of Florida's Indian River Research and Education Center, Ft. Pierce and the North Florida Research and Education Center, Quincy for the fall 2003 season. High total yields and large fruit size were produced by Fla. 8092, Solar Fire, and FL 91 at Fort Pierce. Solar Fire produced high yields at both locations and Fla. 8092 produced large fruit at both locations. Not all entries were included at all locations.

Tomato Varieties for Commercial Production

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

Large Fruited Varieties

Amelia. Vigorous determinate, main season, jointed hybrid. Fruit are firm and aromatic suitable for green or vine ripe. Good crack resistance. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1, 2 and 3), root-knot nematode , gray leaf spot and Tomato Spotted Wilt. **For Trial.** (Harris Moran).

BHN 640. Early-midseason maturity. Fruit are globe shape but tend to slightly elongate, and green shouldered. Not for fall planting. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1, 2 and 3), gray leaf spot, and Tomato Spotted Wilt. **For Trial.** (BHN).

HA 3073. A midseason, determinate, jointed hybrid. Fruit are large, firm, slightly oblate and are uniformly green. Resistant: Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), gray leaf spot, Tomato Yellow Leaf Curl Virus and Tomato Mosaic Virus. **For Trial.** (Hazera)

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. (Seminis).

Florida 91. Uniform green fruit borne on jointed pedicels. Determinate plant. Good fruit setting ability under high temperatures. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, and gray leaf spot. (Seminis).

Sebring. A late midseason determinate, jointed hybrid with a smooth, deep oblate, firm, thick walled fruit. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1, 2 and 3), Fusarium crown rot and gray leaf spot. (Syngenta)

Solar Fire. An early, determinate, jointed hybrid. Has good fruit setting ability under high temperatures. Fruit are large, flat-round, smooth, firm, light green shoulder and blossom scars are smooth. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1, 2 and 3) and gray leaf spot. **For Trial.** (University of Florida)

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

Solimar. A midseason hybrid producing globe-shaped, green shouldered fruit. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), Alternaria stem canker, gray leaf spot. (Seminis).

Tygress. A midseason, jointed hybrid producing large, smooth firm fruit with good packouts. Resistant: Verticillium wilt (race 1), Fusarium wilt (race 1 and 2), gray leaf spot, Tomato Mosaic Virus and Tomato Yellow Leaf Curl Virus. **For Trial.** (Seminis).

Plum Type Varieties

Marina. Medium to large vine 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, root-knot nematodes, gray leaf spot, and bacterial speck. (Sakata).

Plum Dandy. Medium to large determinate plants. Rectangular, blocky, defect-free fruit for fresh-market 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. (Seminis).

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

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 2), Verticillium wilt (race 1). **For trial.** (Syngenta).

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. (Seminis).

Grape Tomatoes

Grape tomatoes are elongated cherry type tomatoes with very sweet fruit and fruit length about twice that of the diameter. The fruit usually weigh about 1/3 to ½ oz. The plant habit and fruit flavor are very similar to Sweet 100 and Sweet Million, two old indeterminate cherry varieties. These varieties had limited commercial use due to plant growth habit and severe fruit cracking. The original 'grape' tomato variety was Santa, a high quality indeterminate variety. Santa is a proprietary variety and has limited availability. St. Nick is another indeterminate variety that is available. There are also available several new indeterminate varieties available but information is limited. Also on the market are several determinate varieties such as Sweet Olive and Jolly Elf, but flavor is not as good as the older indeterminates. There are also new yellow and pink varieties available. Most of the grape varieties are fairly resistant to fruit cracking.

Reference

This information was gathered from results of tomato variety trials conducted during 2003 at locations specified in each table. Tomato variety evaluations were conducted in 2003 by the following University of Florida faculty: D.N. Maynard, Gulf Coast Research & Education Center - Bradenton; S.M. Olson, North Florida Research & Education Center - Quincy, P.J. Stoffella, Indian River Research & Education Center - Fort Pierce.

Table 1. Summary of University of Florida tomato variety trial results. Spring 2003.

Location	Variety	Total yield (ctn/acre)	Variety	Average fruit wt. (oz)
Bradenton	Fla. 8135	3223	HA-3072	8.2
	TY02-1276	3036	TY02-1276	8.0
	XTM 0233	3035	HA-3603	7.9
	Fla. 8093	3023	HA-3073	7.8
	ACR 2012	2807[1]	EX 2427	7.7[2]
Quincy	Fla. 8135	2724	Fla. 8092	7.5

	SVR 8383	2665	Biltmore	7.3
	SVR 7421	2505	SVR 8383	7.2
	NC 0227	2426	XTM 0231	7.2
	NC 0236	2400[3]	Amelia	7.1[4]

[1] 21 other entries had yields similar to ACR 2012.
[2] 10 other entries had fruit weight similar to EX 2427.
[3] 23 other entries had yields similar to NC 0236.
[4] 7 other entries had fruit weight similar to Amelia.
[6]14 other entries had fruit weight similar to Fla. 7973.

Seed Sources:

Abbott & Cobb: ACR 2012
Hazera: TY02-1276, HA-3072, HA-3073, HA-3603
Harris Moran: Amelia
North Carolina State: NC 0227, NC 0236
Seminis: Biltmore, EX 2427, SVR 7421, SVR 8383
Sakata: XTM 0231, XTM 0233
University of Florida: Fla. 8092, Fla. 8093, Fla. 8135

Table 2. Summary of University of Florida tomato variety trial results. Fall 2003.

Location	Variety	Total yield (ctn/acre)	Variety	Average fruit wt. (oz)
Fort Pierce	Fla. 8135	1699	FL 91	7.5
	Fla. 8092	1548	Fla. 7973	6.8
	Solar Fire	1496	FL 47	6.7
	Fla. 8093	1486	Fla. 8092	6.5
	FL 91	1481[1]	Solar Fire	6.1[2]
Quincy	Fla. 8093	3147	Amelia	6.8
	Fla. 7964	2700	Soraya	6.5
	Solar Fire	2632	Sebring	6.4
	RFT 2103	2604	Fla. 8092	6.2
	SVR 8383	2581[3]	SVR 8152	6.2[4]

[1] 5 other entries had yields similar to FL 91.
[2] 5 other entries had fruit weight similar to Solar Fire.
[3] 21 other entries had yields similar to SVR 8383.
[4] 11 other entries had fruit weight similar to SVR 8152.

Seed Sources:

Harris Moran: Amelia, Solar Fire
Seminis: FL 47, FL 91, SVR 8152, SVR 8383
Syngenta: Sebring, Soraya, RFT 2103
University of Florida: Fla. 7964, Fla. 7973, Fla. 8092, Fla. 8093, F

(Steve Olson, NFREC-Quincy and Don Maynard, GCREC-Bradenton (retired) - Vegetarian 04-09)

HERBICIDES IN STRAWBERRIES

FFVA was able to obtain a CUE (critical use exemption) for strawberry production in Florida for 2005. This has reduced the crises that would have existed for herbicide use under the mulch for season long weed control in strawberry production in Florida. The following is an update on herbicide labels for use in Florida and the work in progress to obtain more tools for weed management.

Available Labels

Napropamide (Devrinol 50 DF).now is labeled for preplant incorporation or preplant-water incorporated. The previous label was for application post-plant. Devrinol is labeled for 4 lb ai/A under mulch. The herbicide will leach with all the irrigation use at the present time for stand establishment. Changes in irrigation timing and amounts need to be made for all herbicides to be effective under mulch.

Clethodim (Select) is labeled for control of emerged grasses. This is the only post-grass herbicide labeled in Florida.

Terbacil (Sinbar) has a label for application under mulch for annual strawberries in Florida only. Sinbar is not as leachable as Devrinol, but there is a 110 day preharvest interval on the use.

Oxyfluorfen (Goal) does not have a label for strawberries, but does have a stale seed-bed label and may be applied under mulch 30 days preplant.

Paraquat (Gramoxone Max, Gramoxone SuperTres, Cyclone Max) is labeled for preplant application to burn down emerged weeds and a directed shielded label for row middles. None of the above products have a crop destruct label. Boa, the product that had the crop destruct label had been discontinued.

Glyphosate (Roundup Original II, Roundup UltrMax, Roundup WeatherMax) have fallow labels, preplant labels and row middle application labels.

Work in Progress

Terbacil (Sinbar). Residue studies are being carried out to reduce the preharvest interval to less than 110 days. Two trials were carried out last year where harvest was 45 days from application, but the supplied herbicide did not meet EPA standards. Two more trials will have to be redone this year to reduce the phi for Florida needs.

Oxyfluorfen (Goal). A request has been submitted to the IR-4 committee from the southeastern states to obtain residues of Goal under mulch on annual strawberries at 5-7 days preplant. The Goal formulation may also change from a 2XL to a 4F making the product less volatile. Row middle residue trials have already been done.

Clopyralid (Stinger). Residue trials on the use of Stinger in strawberries have been carried out. Stinger is a growth regulator herbicide and is good for POST control of many broadleaf weeds, including vetch, black medic, and clovers as well as Carolina geranium and evening primrose. Under some conditions, Stinger will deform flowers and fruit. The preharvest interval on the labels in other states now is 30 days. We have run residue tests in Florida for 3 and 7 days. There is too much residue at 3 days, and we have not been informed on the 7 day phi. Hopefully, chlopyralid will obtain labeling in the state this year. The label on strawberries will have to be a third-party label if obtained.

Sulfentrazone (Spartan) is another herbicide that does not have a Florida label at the present time. It is used on tobacco in several southeastern states, and is a candidate for use in tomato, pepper, and several cucurbits. Spartan does present control of nutsedges when applied under mulch. In trials in Florida, strawberry does have a great deal of tolerance to its application. IR-4 residue trials have been carried out in 2003.

Carfentrazone (Aim) is a burn down herbicide that has a section 18 label in tomato, pepper and eggplant in Florida as a post-directed shielded spray for control of paraquat resistant nightshade. EPA is expected to give a super-crop group tolerance to carfentrazone for use in row middles. When that happens, Aim may be labeled in strawberries.

Crop Destruct Labels

Even though Boa had a crop destruct label, there had to be efficacy trials run with the Gramoxone products for them to obtain a crop destruct label. This was done this past year at 3 rates and 4 different gallon/a applications. Hopefully, a crop destruct label can be obtained.

(Bill Stall, Horticultural Sciences Department - Vegetarian 04-09)

MANUAL OF MINOR VEGETABLES - POPULAR IFAS BOOK BACK IN CIRCULATION

At one time or another, most of us have found ourselves sitting at a restaurant toying with our tossed salad, aimlessly wondering just what *were* each of those odd-shaped little pieces of green, red, or yellow morsels. Some resembled lettuce, while others perhaps spinach, but something about them seemed different - maybe the shape of the leaf, the color, or the flavor.

Because in these modern times, we place so much emphasis on not just what we eat, but on how much of it and its nutritional value, we hurry home to identify those tasty but strange little pieces of greenery. Unfortunately, none of our gardening guides show pictures or describe anything except the vegetables we already know- leaf lettuce, romaine, iceberg lettuce, and maybe even endive and escarole.

To the rescue comes the *UF/IFAS Florida Cooperative Extension Service.* A quick call to the local county office gets an all-knowing Master Gardener on the line. "Yes, we have that sort of information available in one of our publications. It is a for-sale booklet called *Manual of Minor Vegetables.* No, we do not sell it here. You will have to order it from UF/IFAS Extension Bookstore, University of Florida, P.O. Box 110810, Gainesville, FL 32611-0810. Send them a check for $7.00, plus shipping and handling."

The above scenario is just one of many that has put this popular publication in the hands of readers not only in Florida but all over the world. So much that the stock of several thousand copies was soon depleted following the initial printing in 1988. UF/IFAS recognized the need to re-print the publication and collaborated on the project with the author, James M Stephens, who retired as Florida Extension Vegetable Specialist, and who now is Emeritus Professor.

The vegetables described in this manual are listed alphabetically according to a common name. The manual also lists but does not describe the major vegetables. Common names are cross-referenced in the index.

The text includes other common and related botanical names, history, description, climatic adaptations, and brief cultural information. In some cases, a discussion of harvesting, preparation, marketing, composition, and uses are included.

A photograph or illustration of most every vegetable occurs with the text. An additional supplemental collection of illustrations is also included.

The collection of illustrations used in the first edition (1988) has been revised in the 2004 edition. Most of the photographs were taken by the author, and permission was granted for use of others.

The publication could not have been accomplished without major inputs from the UF/IFAS Communication Services staff of Ashley Wood. These contributors are word processing operators, Christy Ann Taylor and Jo Ann Lyons; editors, Lin Welch and Lee Herring; graphic designer, Angela Timpanaro; artist, Lilianne Ciacedo; manuscript and text editors, Chana Bird, Andee Cohen, and Carol Church; designer, Julissa Mora Hernandez, who won a national award for the cover; and Tracy Zwillinger for the layout of the book.

(Jim Stephens, (retired), Horticultural Sciences Department - Vegetarian 04-09)

WATER AND NITROGEN BUDGETS FOR AQUAPONIC SYSTEMS

Designing agricultural production systems for zero discharge of water to the environment protects groundwater quality and makes water permitting easier to obtain. In Zero Agricultural Discharge Systems (ZADS) what goes in does not come out, except as a harvestable product. One potential ZADS production arrangement combines hydroponic plant production and recirculating aquaculture systems into what is known as aquaponics. The potential for plants to use the by-products of aquaculture and keep recirculating water clean have been documented (Adler, 1996; Adler et al., 2000; Lin et al., 2002).

Two major components of both hydroponic and aquaculture systems are water and nitrogen. Most recirculating aquaculture systems replace 5 to 10% of system water daily to help prevent the buildup of toxic levels of ammonia and other fish by-products (Masser et al., 1999). A single plant can use between 1 to 5 liters of water per day depending on its size, maturity, and the growing season or temperature. If we assume an average of 3 liters of water use per plant per day, 100 plants could satisfy the water replacement requirements of a recirculating aquaculture tank containing 3000 (at 10%) or 6,000 liters (at 5% replacement). In general, the higher the water replacement percentage, the higher the fish stocking density the system will permit.

The main nutrient in plant production – nitrogen – could be supplied by fish in an aquaponic system. Sufficient nitrification to convert 75% of the ammonia to nitrate would be required since the recommended nitrate to ammonium ratio in hydroponics is 75:25 (Cockx and Simonne, 2003). One hundred kilograms of fish could produce an average of 40 grams of ammonia per day (Tetzlaff and Heidinger, 1990). Converting to elemental nitrogen (divide by 3.29) and allowing for nitrogen volatilization (25%), an average of 9 grams of N could be produced per day. An average nitrogen requirement of vegetable plants is 100 kg/ha depending on plant size, type, and length of growing season. If we assume an average plant density (Hickman, 1998) of one plant per 0.4 meter squared (25,000 plants per hectare), each plant would need 4 grams of elemental N during the growing season. A fish production rate of 9 grams of N per day would support 270 cucumber plants over a 120 day production cycle.

No water is wasted in either system and up to 4% of the variable cost in greenhouse vegetable production could be saved. Since certain other plant nutrients can fall below sufficiency standards in aquaponics without supplemental fertilization (McMurtry et al., 1990), nutrient application methods to make up this deficit by supplying specific elements without adversely impacting fish and nitrifying bacteria need further investigation.

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(Richard Tyson, Seminole Co. Coop. Ext. Serv. - Vegetarian 04-09)

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