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I. NOTES OF INTEREST

A. Vegetable Crops Calendar.

April 18, 1991. Postharvest Handling and Precooling Seminar. Presentations by S. Sargent, J. Brecht and M. Talbot at the Southwest Florida REC, Immokalee from 6:00 PM to 9:00 PM. (Contact Charlie Vavrina).


May 16, 1991. Gulf Coast REC Vegetable Field Day, 8:45 am. A box lunch and three field plot tours featuring (1) plant improvement, (2) plant protection, and (3) plant production research are scheduled throughout the day. Contact Dr. Don Maynard or Dr. John Paul Jones for information (813-755-1568).


B. Prospective Greenhouse Vegetable Growers Seminars.


Prospective Greenhouse Vegetable Growers Seminar Program

Registration fee: $2.00 each.
7:00 pm Welcome
Overview of the greenhouse vegetable industry in Florida - Bill Thomas, Columbia County Extension Director.

Major points to consider prior to becoming a greenhouse vegetable producer - Bob Hochmuth, Multicounty Extension Agent, Suwannee Valley, AREC.

Choosing a production system - Mike Sweat, Baker County Extension Director.

Budgets for greenhouse vegetables in Florida - Emil Belibasis, Greenhouse tomato grower, Wellborn, FL.

9:00 pm Discussion
9:30 pm Adjourn

II. COMMERCIAL VEGETABLES

A. Spinach Varieties for Florida.

Spinach, (Spinacia oleracea L.) is a fast-growing, cool-season, annual vegetable of relatively limited economic importance in the United States. In the 1979-1981 period (the USDA discontinued data collection after the 1981 crop) fresh-market spinach was grown on 15,523 acres with an average yield of about 79 cwt/acre. For processing in the same period, 20,763 acres of spinach were grown with an average yield of 7.58 tons/acre. California, Texas, and Colorado were the leading spinach-producing states in the 1979-1981 period.

Spinach production in Florida for processing was a flourishing industry until the processing plant closed. In the mid-1960's, more than 2500 acres of spinach were grown in central Florida. Current acreage is estimated to be about 200 statewide. This trial was initiated because of grower interest in spinach as an alternative crop for winter production.

The EauGallie fine sand at GCREC, Bradenton was prepared in early January by incorporating 4 lbs 18-0-25 and 4 lbs 18-6-12 (Osmocote) per 100 linear bed feet (lbf). The final beds were 32 in. wide and 8 in. high and were spaced on 5 ft centers with six beds between seepage irrigation/drainage ditches which were on 41 ft. centers.
On 3 January 1991 seeds of 16 spinach hybrid entries (Table 1) were planted in two rows 14 in. apart on the bed with a Model 1001B Earthway precision seeder using the spinach seed plate. Each plot was 12 ft long and was replicated three times in a randomized complete block design. The spinach was thinned periodically to attain an in-row spacing of approximately 4 in. Weeds in the bed were hoed or hand pulled and row middles were cultivated. Additional fertilizer, 5.7 lb 6-6-6/100 lbf, was sidedressed on 1 February 1991. One application of Bacillus thuringiensis was made for worm control.

Time of harvest was judged subjectively according to plant size. Plants were harvested during the period between 19 and 22 February by cutting at the base and then counted and weighed.

Leaf form of the spinach entries in this trial included three smooth leaf, four semi-savoy leaf, and nine savoy leaf types. These designations agree fairly well to those provided by the seed sources. As a broad generalization, smooth-leaf types are used for processing, savoy-leaf types are used for fresh market, and semi-savoy leaf types may be used for either processing or fresh market. However, local market demand may favor production of one type over the others.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Leaf Form</th>
<th>Growth Habit</th>
<th>Yield/Acre1</th>
<th>Seed Source3</th>
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<tr>
<td>#10</td>
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<td>Semi-erect</td>
<td>222 a2</td>
<td>A&amp;C</td>
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<tr>
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<td>Semi-erect</td>
<td>201 ab</td>
<td>A&amp;C</td>
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<td>Upright</td>
<td>198 a-c</td>
<td>A&amp;C</td>
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<tr>
<td>Ambassador</td>
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<td>Upright</td>
<td>193 a-d</td>
<td>A</td>
</tr>
<tr>
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<td>Semi-Savoy</td>
<td>Semi-erect</td>
<td>190 a-d</td>
<td>A&amp;C</td>
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<tr>
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<td>184 a-d</td>
<td>A</td>
</tr>
<tr>
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<td>Savoy</td>
<td>Prostrate</td>
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<td>A</td>
</tr>
<tr>
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<td>A&amp;C</td>
</tr>
<tr>
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<tr>
<td>Skookum</td>
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<td>Vienna</td>
<td>Savoy</td>
<td>Prostrate</td>
<td>142 d</td>
<td>A&amp;C</td>
</tr>
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</table>

Acre = 8712 lbf.

Mean separation in columns by Duncan's multiple range test, 5% level.

A&C = Abbott & Cobb, A = Asgrow.
Growth habit of the spinach entries in this trial included five prostrate types, six semi-erect types, and five upright types. These designations generally agreed with those provided by the seed source. Again, as a broad generalization, those entries with an upright or semi-erect growth habit provide greater ease of harvest than those entries with a prostrate growth habit. Also, the upright types provide the advantages of being cleaner because of less soil contact and avoiding the possibility of being infested by soil-borne pathogens.

Although plant populations were thought to be standardized by thinning, there was considerable variation among entries. Populations ranged from 35.6 for 'Seven R' to 55.4 thousand plants/acre for '#10'. Undoubtedly, plant populations affected yields, but the population effect was not a dominant factor in yield determination.

Spinach yields in this trial varied from 142 for 'Vienna' to 222 25-lb bushels per acre for '#30'. The only Florida yields for comparison are those reported for processing spinach in the 1959-67 period which were equivalent to 432 bushels/acre. However, this spinach was grown on organic soils which traditionally produce higher yields of leaf crops than do sandy soils. Also, yields of processing spinach, because of higher plant populations, a longer production period, and predominant use of smooth-leaf varieties, may be almost twice those of fresh market spinach. Accordingly, the highest yields obtained in the trial were about what should be expected.

The average yield of the smooth-leaf varieties in this trial was 198 bushels/acre, semi-savoy leaf varieties had an average yield of 176 bushels/acre, and the lowest yields, 168 bushels/acre, were from the savoy-leaf varieties. These yields parallel observations of plant and leaf size made at harvest.

From the results obtained in this trial, based on yield and growth habit, '#30' was the most outstanding smooth leaf entry, 'Gladiator' and 'Chinook II' were the most outstanding semi-savoy leaf entries, and 'Hybrid 612' and 'Ambassador' were the most outstanding savoy-leaf entries.

(Maynard, Vegetarian 91-04)

B. Problems with Band Placement in Seepage Irrigated Vegetables.

There have been numerous instances of production problems recently with peppers and tomatoes in seepage fields. These problems have included reduced yields and fruit size from various nutrient deficiencies, especially N and K, blossom-end-rot, and soluble-salt injury to young plants. In several cases, we feel a large part of the problem arose from the placement of the N-K bands in the bed and the severe drought conditions. The fertilizer bands had dried out leading to the observed production problems.

In the so-called "gradient-mulch" system, the shoulder bands of fertilizer need to be continually moist so that nutrients are solubilized and move by concentration gradients to the root zone. This system requires a continuous supply of water to maintain the nutrient gradient. In the problem situations, this continuous moisture had been broken or severely reduced. In some cases, the problem was due to inability to supply enough water to the bed shoulder area; in others, it was due to placement of the N-K fertilizer too near the bed surface (even on the bed surface) so that the material was out of capillary reach of water.

When the bands (or beds) dry out, several things happen. Soluble salt concentrations increase and can lead to burning of plants, especially young seedlings or transplants. Early in the season, soil is usually moist because of irrigation during soil preparation. A large amount of N-K is solubilized soon after bedding and fertilizing. These nutrients
can contribute to soluble salt injury if the beds dry out, even slightly. The situation is made worse as fertilizer rates increase above recommended amounts.

As bands dry out, deficiencies of N and K show up, usually about harvest time. As mentioned before, nutrients are solubilized early in the season and these usually carry the plant to near harvest. If the beds dry out, deficiencies show up soon enough to result in reduced yield and fruit size.

Blossom-end-rot shows up as a result of the water deficit to the plant. Calcium moves in the water (transpiration) stream of the plant and so does not move rapidly to fruits. Developing fruits can, therefore, be seriously deprived of calcium during drought conditions.

These problems are not likely to go away as long as we experience droughts and especially in situations of restricted water availability due to local rules. Growers might wish to consider alternative fertilizer placements and reduced fertilizer amounts. Both factors can be interrelated in these production problems discussed above. Bands can be placed deeper in the bed to increase the chances the fertilizer will stay in contact with moist soil.

In a study in Martin Co. with Green Cay Farms, we saw no difference in deeper band placement (4 to 5 inches) versus one inch for the effects on soluble salt injury, yield, and fruit size of pepper. In other studies at Gainesville and Bradenton, incorporation of nutrients in the bed (i.e. no band) resulted in equal yields to band placement in drip-irrigation, sprinkler irrigation, and seepage test sites. The above studies show that there are alternatives to placement of the N-K fertilizer in bands. It seems investigating one or more of these options might be justified especially where a grower is currently placing N-K fertilizer on, or very near the bed surface.

Shoulder placed banded N-K fertilizer can be eliminated from drip-irrigated systems. It is rare to see these dry fertilizer bands completely solubilized in a drip irrigated bed unless they were placed close to the tube or extra water was applied to wet all the way out to the bands. If 20 to 40% of the N and K fertilizer is incorporated in the bed with the P, then the bands should not be needed if the remaining 60 to 80% of the N and K is injected.

Finally, use of excessive amounts of nutrients, no matter the placement, can lead to trouble, especially during drought periods. IFAS research and Extension trials have shown that current IFAS recommendations for fertilizer and water management can be used to reduce the potential for problems with soluble salts and nutrient deficiencies.

(Hochmuth, Vegetarian 91-04)

C. Postharvest Handling Seminar and Tour.

We were very pleased with the participation at the first Seminar on Harvest and Postharvest Handling of Horticultural Crops held in Gainesville. There were over 70 participants present, representing a wide spectrum of the industry, including packer/shippers, extension agents, wholesale buyers, students, researchers, and design/sales engineers from Florida and 3 states and Canada. Many thanks to each of the extension agents and specialists who helped publicize this event through newsletters and by word-of-mouth. The tour was at capacity with 24 participants, as we visited harvest, packing, shipping, and port facilities throughout central and south Florida. Karl Butz, Tom Schueneman, Mary Lamberts and Ken Schuler met the group at the respective stops and provided excellent overviews as to the different production areas. The enthusiasm and knowledge of the hosts at the various visits was also greatly appreciated.
Judging from the positive response of the participants, we will plan to have another seminar and tour next year, most likely from March 9 - 13, 1992, which is the week of spring break at U.F. With this advance notice, I hope we can have even more participation from extension agents and industry across the state.

(Sargent, Vegetarian 91-04)

D. Does Tomato Transplant Age Make a Difference?

Vegetable growing is not an exact science and delays in meeting field planting schedules complicate transplant production schedules and delivery dates. Should the grower have to hold transplants after arrival, storage conditions may affect performance. At first planting growers may reject the older transplants because they appear non-typical, yet should they need to replant, they may only find resets of greater age. The question then arises "Will these old plants do as well as my "optimum" age plants?"

Surprising as it may seem, reviewing our scientific knowledge reveals little evidence for designating an "optimum transplant age" for any vegetable. Research being conducted concurrently at the University of Florida Southwest Florida Research & Education Center (SWFREC) and Pennsylvania State University is providing new information about the importance of tomato transplant age.

Tomato transplant age studies conducted at SWFREC (fall '90) utilized transplant ages of 11, 9, 7, 5, and 3 weeks. Preliminary data shows that no significant differences occurred in fruit size or total yield at first harvest in mature green tomatoes. However, the red ripe/breaker data indicated that a three week old transplant produced a smaller extra-large crop and subsequently a smaller total red ripe/breaker harvest suggesting perhaps delayed maturity. No differences in total yield or fruit size were noted at second harvest among treatments. Combining the mature green information over the two harvests showed total yield was reduced in the 3 week old plants but only with respect to the 9 week old treatment. This phenomena appeared to be the result of a reduced pack out of extra-large tomatoes. Surprising few differences occurred in this study between transplants of differing age.

In the Penn State study (11, 9, 7, 4, and 3 week old transplants) extra-large fruit size was reduced among some of the older transplant treatments, but overall marketable yield was unaffected by transplant age. Dr. Mike Orzolek of Penn State says "Since PA growers have difficulty in correctly timing transplant deliveries, this study shows that the grower should order a five to seven week old plant. This way, as long as no hardening technique is performed, the grower would be able to tell the transplant grower to hold his order for 4 - 6 weeks without damaging fruit yield potential."

Additional studies are needed before generalities can be made about the effect of transplant age on crop yield. Florida grown transplants certainly experience different environments when shipped to other production areas and the effects of these environments on transplant age needs to be determined. There may also be varietal differences.

The choice of vigorously growing transplants will always be recommended over "old" transplants. However, preliminary data suggest that if tomato transplants must be held a couple of weeks to accommodate a planting schedule, the overall yield should not suffer. It is recommended however, that if transplants must be held, let the transplant producer do so, as they are the best-equipped and most-skilled people to do so.

(Vavrina, Vegetarian 91-04)
III. PESTICIDE UPDATE

A. Pursuit Label on Certain Edible Legume Vegetable Crops.

Imazethapyr (Pursuit) has a label for use in Navy, Great Northern, Red Kidney, Black Turtle, Cranberry, and Small White Type Dry Beans, Lima Beans, and Southern and English Peas only.

Rates of application vary for each commodity labelled. Pursuit may not be applied to Navy, Great Northern, Red Kidney, Cranberry, Black Turtle and small white type dry beans grown on sand or loamy sand soils.

Southern Peas must have 30 days between application and harvest. Application to Southern peas may be preplant incorporated, preemergence or early postemergence.

Pursuit controls a large number of broadleaf weeds. There are specific rotational crop restrictions that must be followed. Many crops are up to 18 months. The current label expires December 31, 1991.

The user must have the label in hand and follow all precautions before use.

(Stall, Vegetarian 91-04)

B. Changes in Paraquat Labelling.

1. The special local needs (24c) labels for the use of paraquat in melons, and lettuce has changed. Gramoxone Extra, the 2.5 lb paraquat/gallon material, is now labelled. Gramoxone Super, the 1.5 lb paraquat/gallon material no longer is labelled for use on these crops.

For labels that are not special local needs (24c), Gramoxone Super may be used until the supply is gone. For the above commodities, Gramoxone Extra must be used.

2. A supplemental label has been issued for Gramoxone Extra for use of nonionic surfactants or crop oil concentrates.

Nonionic surfactants: Add nonionic surfactant containing 75% or more surface-active agent at 0.125% v/v (1 pt per 100 gallons) or add a nonionic surfactant containing 50-74% surface-active agent at 0.25% v/v (2 pts per 100 gallons) of finished spray volume for ground applications.

Crop oil concentrate: Add a non-phytotoxic crop oil concentrate containing 15-20% approved emulsifier, at 1% v/v (1 gallon per 100 gallons) of finished spray volume for ground applications. For aerial applications, add 1 pt of crop oil concentrate per acre.

(Stall, Vegetarian 91-04)

IV. HOME GARDENING

A. 4 H'ers Help Solve Water Shortage Problems.

It appears ironic that in a state such as ours virtually surrounded by water, we should have water shortages. But that is the situation, and in fact we have severe water shortages in many sections of Florida.

For example, the Southwest Florida Water Management District has just established (March, 1991) emergency water use restrictions for that district, based on the determination that sufficient water is not and will not be available to meet user requirements, including gardening and landscaping.

Educating the general public on ways to grow landscapes and gardens with less water and within the guidelines of restrictions is the goal of 4 H'ers in six Florida counties who have just received grants in the 4H Southern States Utilities (SSU) Environmental Landscape Project.
The six counties that received a check for $725.00 along with a brief summary of their proposals, are as follows:

**Duval County** - Happy Homers 4H Club (Marilyn Halusky and Terri DelValle, leaders):

Summary - The 4H club will develop a Xeriscape Demonstration garden on a busy street corner in front of the Jacksonville agriculture Extension office.

**Escambia County** - Diamond "N" 4H Club and County 4H Council (Kay Brown and Beth Phelps, leaders):

Summary - The 4-H group will design and install demonstration landscape featuring water conserving practices, at the entrance to the Langley Bell 4H Center.

**Gilchrist County** - County 4H Council (Marvin Weaver and Elaine Faison, leaders):

Summary - The 4H Council will completely landscape two new public service buildings using drought tolerant plants and water conserving techniques.

**Marion County** - Majestic Oaks 4H Club (Bob Renner, Bill Phillips, and Mrs. William Bostwick, leaders):

Summary - The 4H Club will plant natural vegetation that survives on rainfall alone along a walking trail in Oakcrest Park (a public park).

**Nassau County** - Pine Grove 4H Club (David Dinkins, Cortney Mertz, and Charity Hall, leaders):

Summary - The 4H Club will completely landscape a public park, called "Peter's Point Beachfront Park," using drought/salt tolerant plants, yard waste mulch, low-volume irrigation, and other low-maintenance landscaping practices.

**Pinellas County** - County 4H Foundation (Craig Miller and Joan Bradshaw, leaders):

Summary - The Pinellas County 4H'ers will incorporate six informational stations around the entrance to a 10-acre extension demonstration teaching facility. Each station will address the main issues of ELM, including water conservation, as will all the landscaping within the facility.

In the words of the sponsoring company, SSU Services, "clearly each 4H organization, (who submitted a proposal) gave considerable thought and research on the continued preservation and availability of clean, safe drinking water, a critical concern to both Southern States Utility Services and the University of Florida's Institute of Food and Agricultural Sciences. Through these projects, we take an unprecedented step in the campaign to educate Floridians on the necessity of water conservation and the methods of accomplishing that conservation at home or on the grounds of government and business facilities."

We all look forward to some excellent reports at the conclusion of these exceptional 4H projects.

(Stephens, Vegetarian 91-04)