Vegetarian 92-11
November 17, 1992

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I. NOTES OF INTEREST

A. Vegetable Crops Calendar.


Jan. 26, 1993. Watermelon and other Cucurbit Institute, 8:30 AM to 4:30 PM at Marion County Extension Auditorium, Ocala, FL. (Contact George Hochmuth).


B. New Publications.


Circ. SP 110. Production of Florida greenhouse vegetables in rockwool: Greenhouse design and crop management. (FOR SALE, IFAS Publications Distribution Center, Bldg 664, Univ. Fla., Gainesville, FL 32611).

II. COMMERCIAL VEGETABLES

A. IFAS Vine Crops Institute.

IFAS VINE CROPS INSTITUTE
8:30 AM to 4:30 PM
Tuesday, January, 26, 1993
Auditorium,
Cooperative Extension Service
Ocala, FL

PROGRAM

8:00 AM Trade Show set-up.
8:30 Registration, Visit trade show.
9:00 Cucurbit seed and transplant quality - Charlie Vavrina, IFAS, Southwest Florida REC, Immokalee.
9:30 Watermelon N and K plant sap testing program - Chris Vann, IFAS, Lafayette County Extension Office, Mayo, FL.
9:50 Watermelon varieties and industry panel - Don Maynard, IFAS, Gulf Coast REC, Bradenton, FL, and Gary Elmstrom, IFAS, Central Florida REC, Leesburg, FL.
10:20 Pollination pointers - Malcolm Sanford, IFAS, Entomology and Nematology Department, Gainesville, FL.
10:40 Standardized shipping containers - Steven Sargent, IFAS, Horticultural Sciences Department, Gainesville, FL.
10:50 Muskmelon harvesting and handling - Steven Sargent, IFAS, Horticultural Sciences Department, Gainesville, FL.
11:10 Pumpkin production in Florida - Bob Hochmuth, IFAS, Suwannee Valley AREC, Live Oak, FL.
11:30 Marshmallow production - an opportunity for Florida? - Don Rau, Asgrow Florida, Alachua, FL.
11:50 Trade Show speakers.
12:00 Lunch provided.
B. Field Establishment of Bell Pepper Transplants as Affected by Planting Depth.

By most south Florida "wisdom", peppers should be planted no deeper than the root ball. Yet, bare ground crop cultivation often buries pepper stems significantly. With the help of Dr. Phyllis Gilreath and Karl Butts, studies were conducted in Immokalee, Manatee county, and Hillsborough county under commercial conditions prevalent in those areas to determine the effect of bell pepper planting depth under polyethylene mulch culture in south Florida. Commercially grown 'Jupiter' pepper transplants were planted at various depths in fall '91 and spring '92, either to the top of the root ball, the cotyledon leaves or to the first true leaf.

Pepper transplanted to the cotyledon (Immokalee, fall '91 or Manatee and Hillsborough, spring '92) showed either a significant yield increase or no difference in yield from pepper transplanted to the root ball (Table 1).

An infestation of pepper weevil in Immokalee in the spring '92 resulted in severe fruit loss negating the depth effect on yield (Table 2). However, early stand establishment parameters demonstrated that planting pepper transplants deeper was commercially beneficial. Transplants planted to the first true leaf 30 days after planting had more leaves, greater plant weight (DW), and more blooms than either transplants planted to the cotyledons or to the root ball. Furthermore, these plants exhibited reduced lodging compared to transplants planted to the root ball. (Deeper planting may alleviate the need for staking and tying on the East Coast!).

Transplants planted to the cotyledons had a greater DW and fewer lodged plants than transplants planted to the root ball. Transplants planted to the root ball were taller than the other treatments.

Yield benefits seen in Florida from deeper transplants may be the effect of a cooler root environment, earlier fertilizer acquisition, and greater water availability. Not all affects were positive, however. A tendency toward a greater incidence of bacterial spot may accompany deeper plants in the fall due to the rapidity of growth. Furthermore, a similar study with Dr. Mike Orzolek (Penn State Univ.) showed peppers planted 1 inch above the cotyledons resulted in lower yields. Orzolek intimated that a cold, wet spring may have "set-back" deep plants. More studies are under way to further corroborate the FL (Shuler, Palm Beach) and PA findings.
Table 1. Pepper Planting Depth Yields

<table>
<thead>
<tr>
<th></th>
<th>Immokalee Fall '91 Harvest</th>
<th>Kanatee Spring '92</th>
<th>Hillsborough Spring '92</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st</td>
<td>Total</td>
<td>1st</td>
</tr>
<tr>
<td><strong>---lbs/plot---</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotyledon</td>
<td>21.2a</td>
<td>46.2a</td>
<td>54.65a</td>
</tr>
<tr>
<td>Root ball</td>
<td>16.9b</td>
<td>39.5b</td>
<td>57.43a</td>
</tr>
</tbody>
</table>

* Means followed by the same letter are not significantly different by LSD at p<0.05.

Table 2. 30 day Plant Sample for the Pepper Transplant Planting Depth Study

<table>
<thead>
<tr>
<th></th>
<th>Stem Length1</th>
<th>Leaves (#/plt)</th>
<th>Plant Wt (Dry)2</th>
<th>Lodged Plants</th>
<th>Early Bloom</th>
<th>Yield lbs/plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Leaf</td>
<td>10.5c</td>
<td>44.3a</td>
<td>2.485a</td>
<td>0b</td>
<td>9.8a</td>
<td>15.9a</td>
</tr>
<tr>
<td>Cotyledon</td>
<td>13.1b</td>
<td>37.5b</td>
<td>2.049b</td>
<td>0.5b</td>
<td>2.0b</td>
<td>16.5a</td>
</tr>
<tr>
<td>Root ball</td>
<td>16.0a</td>
<td>32.7b</td>
<td>1.474c</td>
<td>11.2a</td>
<td>0.3b</td>
<td>14.7a</td>
</tr>
</tbody>
</table>

1 Single plant/plot, replicated 6 times
2 Soil line to base of growing point
3 Stem cut at cotyledon, whether above or below ground level
4 Means followed by the same letter are not significantly different by LSD at p<0.05.

(Vavrina, Vegetarian, 92-11)


Seed for planting seedless watermelons results from a cross between a selected tetraploid female parent, developed by treating diploid lines with colchicine, and a selected diploid (normal) male parent. The resulting triploid is sterile and does not produce viable seed. However, small, white rudimentary seeds develop which are eaten along with the flesh just as immature seeds are eaten in cucumber.

Fruit enlargement in normal fruit, including watermelon, is enhanced by growth-promoting hormones produced by the developing seed. Growth hormones are lacking in seedless watermelons so those agents must be provided by pollen. Since flowers on triploid plants lack sufficient viable pollen to induce normal fruit set, normal watermelons are interplanted with triploids to serve as pollenizers. An adequate bee population is necessary to insure that sufficient transfer of pollen occurs. Seedless fruit (from triploid plants) tend to be triangular shaped unless sufficient pollination occurs.

Specialty vegetables are in high demand and seedless watermelons offer an attractive alternative for the discriminating consumers and the food service industry. Seedless watermelons are being actively promoted by marketing organizations and seed companies to stimulate demand. At the same time, new varieties are being developed that are superior to those previously available.

The objective of this trial was to evaluate the performance of seedless
watermelon varieties and experimental lines under west-central Florida conditions.

Seeds of 20 seedless watermelon entries were planted in a peat-lite growing mix in No. 150 Todd planter flats on 31 January. The watermelon transplants were grown by a commercial plant grower and field planted on 4 March.

Watermelons were harvested on 29 May, 10 June and 18 June. Marketable (U.S. No. 1 or better) according to U.S. Standards for Grades were separated from culls and counted and weighed individually. Soluble solids were determined with a hand-held refractometer on at least six fruit from each entry at each harvest.

Early yields, represented by the first of three harvests, ranged from 124 cwt/acre for 'Scarlet Trio' to 437 cwt/acre for HMX 7928 (Table 1). Early yields of 15 other entries were statistically similar to those of 'Scarlet Trio', whereas eight other entries had yields similar to those of HMX 7928. Average fruit weight ranged from 10.0 lb for NVH 4296 to 17.0 lb for CLF 1025. Average weight of fruit at first harvest of 11 other entries was similar to that of NVH 4296, whereas 18 other entries had average fruit weight similar to that of CLF 1025. Soluble solids of fruit from the first harvest varied from 12.1% for 'Crimson Trio' to 14.4% for 'Cotton Candy', however, these differences were not significant. Accordingly, there were few differences in yield, average fruit weight, or soluble solids at the first harvest.

Total yields (Table 1) ranged from 297 cwt/acre for CLF 1012 to 691 cwt for 'Millionaire'. Sixteen other entries had total yields similar to those of CLF 1012, whereas 15 other entries had yields similar to those of 'Millionaire'. Average fruit weight for the entire season varied from 9.8 lb for NVH 4296 to 16.0 lb for 'Cotton Candy' and CLF 1011. Seven other entries had similar average weights similar to 'Cotton Candy' and CLF 1011. Total yields far exceeded the state average yield of about 181 cwt/acre for the 1986-87 to 1990-91 seasons and were higher than those reported from this location in 1991 but lower than those from the 1989 or 1990 seasons.

Soluble solids over the entire season (Table 1) ranged from 12.7% for 'Crimson Trio' and 'Tycoon' to 13.9% for 'HMX 7928'. Accordingly, soluble solids in all entries far exceeded the 10% specified for optional use in the U.S. Standards for Grades of Watermelons.

Seedless watermelon variety trials have been conducted at GCREC each spring season since 1988. The highest yields have ranged from 546 cwt/acre in 1991 to 970 cwt/acre in 1989. The highest yield in 1992 was 691 cwt/acre which was slightly below the five-year average yield of 730 cwt/acre. An undiagnosed vine decline may have contributed to the lower than average yield. 'Millionaire' was included in four of the five trials, and was the highest yielding variety in three of the trials and in the statistically highest yielding group in the other trial. The complete report of this trial is available as GCREC Research Report BRA1992-18.
### Table 1. Early and total yields, average fruit weight, and soluble solids of seedless watermelons. Gulf Coast Research and Education Center. Spring 1992.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Source</th>
<th>Weight (cwt/h²)¹</th>
<th>Early Harvest¹</th>
<th>Total Harvest¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Weight (lb)</td>
<td>Soluble (°Bé)</td>
<td>Weight (lb)</td>
</tr>
<tr>
<td>Millionaire</td>
<td>Harris Moran</td>
<td>264 a-d</td>
<td>15.8 ab</td>
<td>13.4 a</td>
</tr>
<tr>
<td>90U1146</td>
<td>Rogers NK</td>
<td>180 b-d</td>
<td>16.4 a</td>
<td>13.0 a</td>
</tr>
<tr>
<td>SWH 8702</td>
<td>Sakata</td>
<td>381 ab</td>
<td>14.0 a-c</td>
<td>13.1 a</td>
</tr>
<tr>
<td>Exp. 460015</td>
<td>Shamrock</td>
<td>288 a-d</td>
<td>14.7 a-c</td>
<td>13.2 a</td>
</tr>
<tr>
<td>Tiffany</td>
<td>Angrow</td>
<td>268 a-d</td>
<td>13.6 a-c</td>
<td>13.4 a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean separation in columns by Duncan’s multiple range test, 5% level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nova</td>
<td>Sakata</td>
<td>222 b-d</td>
<td>12.2 a-c</td>
<td>13.2 a</td>
</tr>
<tr>
<td>Crimson Trio</td>
<td>Rogers NK</td>
<td>297 a-d</td>
<td>16.5 a</td>
<td>12.1 a</td>
</tr>
<tr>
<td>Tri-X-313</td>
<td>American</td>
<td>264 a-d</td>
<td>15.9 ab</td>
<td>12.6 a</td>
</tr>
<tr>
<td>HMX 7928</td>
<td>Harris Moran</td>
<td>437 a-c</td>
<td>11.9 a-c</td>
<td>14.3 a</td>
</tr>
<tr>
<td>Exp. 460023</td>
<td>Shamrock</td>
<td>272 a-d</td>
<td>15.7 ab</td>
<td>13.0 a</td>
</tr>
<tr>
<td>NVH 4296</td>
<td>Rogers NK</td>
<td>350 a-c</td>
<td>10.0 c</td>
<td>12.7 a</td>
</tr>
<tr>
<td>Cotton Candy</td>
<td></td>
<td>184 b-d</td>
<td>16.7 a</td>
<td>14.4 a</td>
</tr>
<tr>
<td>CLF 1025</td>
<td>CFREC-Leesburg</td>
<td>167 c-d</td>
<td>15.0 a-c</td>
<td>13.4 a</td>
</tr>
<tr>
<td>Exp. 460016</td>
<td>Shamrock</td>
<td>184 b-d</td>
<td>13.8 a-c</td>
<td>13.6 a</td>
</tr>
<tr>
<td>CLF 1011</td>
<td>CFREC-Leesburg</td>
<td>159 c-d</td>
<td>13.7 a-c</td>
<td>13.6 a</td>
</tr>
<tr>
<td>90U1145</td>
<td>Rogers NK</td>
<td>188 b-d</td>
<td>13.3 a</td>
<td>12.9 a</td>
</tr>
<tr>
<td>Tycoon</td>
<td>Harris Moran</td>
<td>124 d</td>
<td>12.6 a-c</td>
<td>13.3 a</td>
</tr>
<tr>
<td>Scarlet Trio</td>
<td>Rogers NK</td>
<td>159 c-d</td>
<td>12.4 a-c</td>
<td>13.1 a</td>
</tr>
<tr>
<td>CLF 1003</td>
<td>CFREC-Leesburg</td>
<td>177 c-d</td>
<td>16.4 a</td>
<td>13.3 a</td>
</tr>
</tbody>
</table>

¹Early harvest based on first of three harvests.
²Acres = 4840 lb.
³Mean separation in columns by Duncan’s multiple range test, 5% level.

(Maynard, Vegetarian 92-11)

### III. VEGETABLE GARDENING

#### A. Effects of Yard Waste Compost as a Soil Amendment for Growing Vegetables.

**Yard Waste Compost (YWC)**

Yard waste compost, as received from the Tampa municipal facility in 1990 and subsequently from the Gainesville Wood Recovery Center, was applied and planted with various vegetables from 1990 to 1992 at the Organic Gardening Research and Education Park, U.F., Gainesville. In both cases the source of raw material for the composting process included mostly ordinary yard waste such as leaves and woody trimmings and excluded metals, glass, and plastic. While such compost is variable in chemical composition, our compost was considered to be in the range of .5 - 1.0 percent nitrogen, and slowly available, based on reports (Journal Environmental Quality 21:318-329 (1992)).

Spring 1990 Yard waste compost alone (Box D) - A finely ground yard-waste compost (Tampa product) was applied to the box at two rates: 1 lb/ft² (east 1/2 box) and 2 lb/ft² per sq ft (west 1/2 box)
broadcast and incorporated (1 May, 1992). 'Clemson Spineless' okra and 'California Blackeye #5' Southern peas were seeded immediately.

**Spring 1990 Yard waste compost + organic fertilizer - (Box E)** - In Box E the YWC was applied in the same manner and rates as for Box D. However, bands of organic fertilizer (Fertrell™ 3-2-3) were placed beside each row of okra and So. peas at planting at the rate of .16 lb/ft².

**Fall 1990 YWC (Box D)** - Additional YWC (Gainesville product) was broadcast/incorporated into both halves of box at the rate of 2 lb/ft² (12 Sept.). Therefore, the total YWC applied in 1990 was 3 lb/ft² in the east 1/2 of Box D, and 4 lb/ft² in the west 1/2. 'Poinsett' cucumbers and 'Florida Broadleaf' mustard greens were seeded immediately (12 Sept.).

**Fall 1990 YWC + organic fertilizer (Box E)** - No YWC was applied in the fall in this box. However, more organic fertilizer (Fertrell™ 3-2-3) was banded beside rows at the rate of .1 lb/ft². 'Poinsett' cucumbers and 'Florida Broadleaf' mustard were seeded the same day (12 Sept.).

**Spring 1991 YWC (Box D)** - More YWC was broadcast into the box. The east 1/2 received 2 lb/ft² while the west 1/2 received 4 lb/ft². With residuals from 1990, the east 1/2 of Box D now had 100 T/A, and the west 1/2 had 160 T/A equivalent rates of YWC. 'Better Boy' tomato plants were set the same day as treatment (22 Mar.).

**Spring 1991 YWC + organic fertilizer (Box E)** - Additional YWC was added to this box as described for Box D, plus a supplement of .04 lb/ft² Fertrell™ 3-2-3 banded around each 'Better Boy' tomato plant at setting time (22 Mar., 1991).

**Fall 1991 YWC (Box D)** - To observe effects of residual YWC from earlier applications, no additions were made in the fall of 1991. Two varieties of Southern peas ('Cal BE #5 and 'PEPH') were seeded on 6 Sept., and yields recorded at harvest-time.

**Fall 1991 - YWC + organic fertilizer (Box E)** - Likewise, on 6 Sept. the two varieties of Southern peas were seeded in the box containing residuals of YWC plus Fertrell™ 3-2-3.

**Spring 1992 YWC (Box D)** - As 'Better Boy' tomato and 'Jupiter' pepper plants were set on 26 Mar., 1992, Gainesville YWC was incorporated in the planting holes at two rates: .60 lb/ft² (east), and 1.20 lb/ft² (west).

**Spring 1992 - YWC + organic fertilizer (Box E)** - In this box, plant-hole applications of YWC at the two rates of .60 and 1.20 lb/ft² were supplemented with two rates of Fertrell™ 3-2-3 at .1 and .2 lb/ft², respectively.

**Results and Discussion**

**Spring 1990** - The compost was not available until 1 May, so the choice for late-spring test crops was okra and Southern peas. At both rates of compost (1 and 2 lb/ft²), fair yields of peas were obtained. However, the okra, without the nitrogen-fixing capability of the peas, grew poorly at both rates of the compost. Adding organic fertilizer (Fertrell™) to the compost resulted in improved yields of peas and better growth of okra. However, the okra never yielded, probably due to insufficient nitrogen.

**Fall 1990** - More YWC was applied to the box for the fall planting of cucumbers and mustard greens. The cucumber yields were poor, while the mustard grew a bit better. However, mustard yields were far lower than all other treatments. Apparently, 6 months was not sufficient time for the YWC to supply the nutrient needs of these and probably other vegetables. Again, the addition of organic fertilizer (Fertrell™) to the compost was accompanied by enhanced yields at both the high and low rates for both mustard and cucumbers. The best cucumber yield in the trial was recorded for YWC plus Fertrell™ (210 oz/plot),
topping yields on Fertrell alone (160 oz/plot) and chicken litter (128 oz/plot).

Spring 1991 - Further applications of YWC to the box just prior to planting 'Better Boy' tomatoes resulted in fair yields of fruit at the lower rate (2 lb/ft²), but rather poor yields where twice the amount (4 lb/ft²) was applied. The strong implication again is that YWC by itself needs sufficient time to decompose properly for best vegetable response. Larger rates tend to widen the C:N ratio, thus retarding growth. However, in this trial, the organic fertilizer (Fertrell™) supplement to the YWC was not accompanied by a yield increase, most likely due to the depressing effects of the YWC. Tomatoes yielded 117 oz/plant with Fertrell™ alone compared with 62 oz/plant where YWC was included.

Fall 1991 - Good yields (28 oz/plot) of 'California Blackeye' and 'Pinkeye Purple hull' peas were harvested in the YWC box at the high rate; however, a better yield (32 oz/plot) was recorded at the same rate of YWC with the Fertrell™ supplement. Apparently, with the passage of time during the summer months, the YWC became more productive. Even so, the organic fertilizer supplement was helpful.

Spring 1992 - A good yield of tomatoes (106 oz/plant) was obtained when YWC was mixed into the plant hole at the rate of .60 lb/ft². This was about equal to the yield of tomatoes (119 oz/plant) where chicken litter had been used. There was no increase in tomato yields from the supplement of organic fertilizer; however, pepper did respond to the supplement, producing an average of 3.5 pods per plant compared with only 1 pod with YWC alone. When YWC was mixed with poultry compost (Red Rooster™) and placed below tomato plants, the "burning" effects of the poultry compost were eliminated (the poultry compost used alone beneath the tomato plants had killed plants).

Summary - As had been expected, the amendments containing poultry manure were faster acting (thus more likely to burn plants) than the plant-derived yard waste compost. The yard waste compost tested shows promise for growing vegetables as a sole amendment, but better when supplemented with the animal manures and organic fertilizer. Indications are that relatively large amounts (40 tons/acre) of YWC could be applied yearly to garden soils if organic fertilizer supplements are added and sufficient time (several months) is allowed for its further decomposition.

(Stephens, Vegetarian 92-11)