VEGETARIAN
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I. NOTES OF INTEREST

A. Calendar.


B. New Publications.


C. Ninth Annual FSGSA-IFAS Seed Seminar 1990.

February 14

11 a.m. - 5 p.m. Registration, Convention Center.

1:15 Welcome - Bill Weyand, President Florida Seedsmen and Garden Supply Association.


1:30 Resistance to biotic and abiotic stresses. Eduardo Vallejos, Vegetable Crops Department, IFAS, Gainesville, Fl.

1:50 Biocides, an alternative to chemicals. Yan Narayanan, Vegetable Crops Department, Tropical Research and Education Center, IFAS, Homestead, Fl.

2:10 Starch endosperm mutants of corn. Curt Hannah, Vegetable Crops Department, IFAS, Gainesville, Fl.


2:50 Seed developmental mutants in corn. Don McCarty, Vegetable Crops Department, IFAS, Gainesville, Fl.

3:10 Synthetic seeds, a product of the future. Dan Cantliffe, Vegetable Crops Department, IFAS, Gainesville, Fl.

3:30 BREAK


3:45 Seed borne pathogens - their identification and control. Ron Gitaitis, Department of Plant Pathology, Tifton, Georgia.
II. COMMERCIAL VEGETABLES

A. Freeze Covers.

It's not too late to plan for protection of vegetables against freezes. Crop losses to freezing temperatures are still a potential threat this winter and for winters to come. The December 1989 freeze proved to several growers that non-woven, wide row covers can protect vegetables against some very low temperatures. I have heard stories from Palm Beach and Immokalee of successes (on large and small-scale) in protecting vegetable crops against freezes.

Our work with strawberries a few years ago showed that row covers in the weight range of 1.0 to 1.5 ounces per yard offer protective capabilities down to 24 to 25°F. Wide row covers can be deployed
easily and quickly. Most covers are available in widths of at least 40 feet. Covers currently are expensive, but some growers have gone to the expense to be able to benefit from the extremely high prices of vegetables after the freeze.

Advantages that covers have over sprinkler irrigation include:

1. Covers are versatile. They can be moved with the crop rotation.
2. Covers obviate the need for a sprinkler irrigation system installation.
3. Covers do away with the problems of water and ice damage to fruits and plants. Fruit quality can be better because of reduced water damage to fruits.
4. With covers, there is no worry about power outages or pump failures.
5. With covers, there is no leaching of fertilizer or soil erosion from heavy water applications.
6. With covers, harvesters can work in the field easier the day following a freeze since the plants and row middles are dry.

We know that row cover technology for freeze protection works. We need only to provide growers with the information. Circular 728 deals with row cover use both from the growth enhancement angle and from the freeze protection angle. In addition, growers might benefit from small demonstrations of row covers deployed in their field during a freeze or frost. It would be a good idea for interested counties to have on hand a sample of one or two of these covers to put out on a grower's field during a freeze. If anyone is interested, give me a call.

Row cover availability has not been a problem where growers purchase ahead. Sometimes, there will be discounts offered for early purchases. Covers can be purchased from at least two sources here in Florida, April Corporation in Captiva Island, and Asgrow Florida.

(Hochmuth, Vegetarian 90-01)

B. Geminivirus '89 Tomato Yield Assessment.

Two field studies were conducted this past fall by the SWFREC around the Immokalee area to assess the impact of Geminivirus on fresh market tomato production. One study catalogued yield and fruit size from six farms showing a "high" incidence of virus. A second study related earliness of Geminivirus symptom expression to yield and fruit size. Plants without visual virus symptoms in the same fields were used to establish a "normal" population for yield and fruit size assessment.

Figure 1 shows a "high" incidence of Geminivirus can reduce overall yield (two harvests) by as much as 1/3. Yield reduction is further compounded by the effect of Geminivirus on tomato fruit size (Fig. 2). Virus infestation tends to shunt production toward medium sized fruit (6 x 7) at the expense of the larger grade (6 x 6 large, 5 x 6 extra large) fruit. This has a definite economic impact, as larger fruit commands a better price.

When Geminivirus infects the plant during early growth (approximately 4 weeks after planting) yield reduction is much greater than if infection occurs later (10 weeks after planting). Figure 3 indicated that the longer a grower can keep the virus out of the crop the better are his chances of getting a "normal" yield. Similarly (Fig. 4) the ratio of extra large tomatoes to medium tomatoes was more acceptable when virus infection was delayed.

(Vavrina, Vegetarian 90-01)
Fig. 1 The effect of Geminivirus on FL. tomato yield averaged from harvests of 6 growers fields from fall 1989.

Fig. 2 The effect of Geminivirus on FL. tomato fruit size averaged from harvests of 6 growers fields from fall 1989.

(Projected from a sample of 250 infected and 250 non-infected plants.)

Fig. 3 The effect of date of symptom expression of Geminivirus on FL. tomato yield in fall 1989.

Fig. 4 The effect of date of symptom expression of Geminivirus on FL. tomato fruit size in fall 1989.

(Projected from a sample of 10 plants per date.)
C. Whiteflies and Virus: Does the Freeze have a Silver Lining?

It may seem like small compensation to tomato growers who saw their crops literally disappear overnight, but we are likely to see less whitefly transmitted geminivirus this spring, thanks to last month’s freeze. What’s more, the freeze may teach us some valuable lessons that will enable us to lick the virus problem for good.

It would have taken a real white Christmas to kill all sweetpotato whiteflies; a few got through on cold resistant weeds like sow thistle, and protected vegetables and ornamentals, especially to the west and south of Immokalee where the mercury did not dip so low. On the other hand, the whitefly population has been greatly reduced, commensurate with the loss of tomatoes and wild hosts such as swamp primrose, spurge, and hairy indigo.

Geminivirus has fewer host options than the whitefly - in fact we know of only one to date: tomato. Even if we eventually find other hosts, their role in virus propagation is likely to be small by comparison. While unproven at this point, I think this is our best working hypothesis for the time being. Let’s follow it through to its logical conclusion.

How we can equate the almost total loss of tomato north and east of Naples with an equal loss of virus inoculum, at least in the field. If our transplants go in virus-free in the spring, we should start out the season with a clean slate. If they don’t, the initial pattern of virus appearance will be random throughout the field. Either case would be convincing evidence that tomato is the main culprit in keeping the virus around.

With the hypothesis verified, we will know how to avoid virus problems again next fall: eliminate the tomato reservoir during the summer, this time without the help of mother nature. We can do this in the field by cleaning up crop residues immediately after harvest and controlling volunteers by periodic disk ing or herbicide application. After the clean-up, greenhouse managers within the production area should schedule a minimum month-long break during which they have no live tomatoes present. This is because at least a month without a virus source is required to give all viruliferous whitefly adults time to die. Of course there will still be whiteflies after that, but they would come from non-infected sources.

Everyone got hurt by the freeze. Let’s make the most of it by cleaning up on geminivirus!

(Phil Stansly, SWFREC Entomologist Vegetarian, 90-01)

D. Bed Width for Micro-Irrigated Vegetables.

Vegetables in West Central Florida are typically grown on raised polyethylene-mulched beds that are 30 to 36 in. wide. A wide bed is required for utilization of the nutrient gradient-seepage irrigation production system. Concentrated bands of fertilizer are placed in shallow grooves near both shoulders of the bed. The wide bed is necessary to insure appropriate soluble salts concentrations in the bed center where the crop is planted.

When liquid fertilizer is injected into the micro irrigation system, the need for a wide bed for fertilizer management is circumvented. In addition, we have noted that in sandy soils, only the center portion of a well-managed, micro-irrigated wide bed is wetted. Accordingly, growth is restricted to the wetted zone of the bed.

With this background, this experiment was planned with the objective of determining the response of several vegetable crops grown on 16, 24,
and 32 in. wide beds with micro irrigation and N and K fertigation.

The beds were formed, superphosphate was incorporated, methylbromide-chloropicrin fumigant injected, and the beds were pressed. Drip irrigation tubing was placed 3 in. deep and 4 in. off the bed center before the black polyethylene mulch was applied. Plots to be planted with pepper had the tube positioned at the center of the bed.

Cucumber, summer squash, and large-fruited and icebox watermelons were direct seeded. Eggplant, muskmelon, pepper, tomato, and cherry tomato were transplanted on March 2.

Tensiometers were placed 6 in. deep between the irrigation tube and plant row in the tomato plots and irrigation was scheduled to maintain soil water potential levels at or above -10kPa. Daily irrigation was divided into multiple cycles so that each application was maintained within the top 10 in. of soil. Fertilization with N and K was by daily injection of a 4-0-8 solution through the tube according to a 12 week schedule that provided a total of 200 lb N and 400 lb K\(_2\)O per acre. Vegetables that require less than 12 weeks to produce a crop received proportionately less fertilizer.

Summer squash marketable yields increased with increasing bed width, but yields of the other vegetables were not affected by bed width. Average fruit weight of all vegetables and soluble solids content of melon fruit were not affected by bed width.

From the results of this study, it appears that yields and quality of vegetables would not be compromised by reducing the bed width of micro-irrigated crops, however, additional experiments must be conducted before final conclusions can be made. Associated benefits of narrower beds include less use of polyethylene mulch and reduced plastic disposal requirements at the end of the cropping cycle, reduced energy requirements for bed preparation, and lower fumigant requirements. If field drainage conditions permit, beds can be spaced closer, thereby increasing bed feet per acre. A potential disadvantage if bed spacing is unchanged is the increase in row middle area that would require weed management. In addition, equipment modifications would be required. There were some crop management problems; e.g. staking, crops falling over, and lack of space for melon fruit on the 16 in. wide bed. It appears that the 24 in. wide bed provides a good alternative for growers interested in testing narrower beds for production of micro-irrigated vegetables.

(Maynard and Clark, Vegetarian 90-01)

E. Simulated Shipments of Ripening Tomatoes.

A 1975 study made of consumer purchases of tomatoes at two Florida supermarkets has shown that red-ripe tomatoes were preferred to pink tomatoes. There is a growing trend by many supermarket chains to include "vine-ripe" tomatoes in the produce section as a premium-priced selection. According to the U.S.D.A., vine-ripe tomatoes are harvested either in the greenhouse or in the field after the breaker ripeness stage, or when at least 10% of the fruit surface shows a definite color change from green to tannish yellow, pink or red. However, as tomatoes ripen and soften after harvest, greater care must also be taken to minimize mechanical damage during handling and shipping operations. Such damage is characterized by bruising, cuts, punctures, abrasions and internal bruising. Although parasitic disease was the primary cause of loss for Florida and California tomatoes at retail and consumer levels, the predominant decay organisms present were those which require mechanical injury to be able to infect the produce. For these reasons, means of avoiding or reducing mechanical damage is of great interest to the Florida tomato industry.
This report will focus on a study which measured the performance of two package types for shipping tomatoes at three ripeness stages using simulated truck shipment.

Mature green tomatoes ('Sunny', 6x6 size) were harvested on October 30, 1989 and transported to Gainesville. After ripening was initiated, the tomatoes were classified into three ripeness stages: turning (T), light pink (LP) and pink (P). Fruits from each color stage were placed stem end down (tight-pack) in single layer fiberboard shipping cartons with 1/8 inch thick foam padding on the bottom. The cartons measuring 13 3/8 x 20 x 3.5 inches (width, length and height, respectively), were constructed from single corrugation and held about 27 tomatoes each. Tomatoes at the same ripeness stages were also placed stem end down in polystyrene cell pack trays described above, with 24 fruit per tray. The tray was placed in the above carton and an inverted tray placed over the fruit. Tomatoes at LP and P stages were also placed in 25-pound cartons.

A vibration test stand was constructed to simulate a refrigerated trailer making a transcontinental shipment of produce. For the treatments, the frequency was set at 550 cycles per minute for 30 minutes and had a displacement of 0.025 inches. On the same day as the color sorting, the cartons were secured on the test stand and shaken; they were then held at room temperature until the tomatoes were red-ripe and slightly soft for evaluation of incidence and severity of mechanical damage (bruises, abrasions, cuts, and punctures).

Results. The cell pack tray significantly reduced most categories of bruises on the tomatoes during the simulated shipment. There were 39.4% bruise-free and 64% abrasion-free tomatoes in cartons with the cell tray pack. Only 6.8% and 51% remained bruise-free and abrasion-free, respectively, in the cartons with the foam bottom pad. Ripeness stage generally had no effect on the incidence or severity of bruising or abrasion in this test; however, we have previously shown that breaker stage tomatoes are more susceptible to damage during packinghouse operations than mature green tomatoes (Vegetarian; July 1989). The incidence of moderate to severe bruising after simulated truck shipment and ripening 25-pound cartons was about 77% for LP and 92% for P fruit in this test.

A cell tray pack system would significantly improve appearance quality compared to the single layer, bottom foam pad system currently being used for shipping vine ripe tomatoes. Cell tray packs could be easily adapted to multi-layer package systems, allowing utilization of larger containers without compression damage since the trays are self-supporting. The cost of the additional packaging material may be offset by improved fruit condition on arrival at retail outlets.

(Sargento, Vegetarian 90-01)

Prepared by Extension Vegetable Crops Specialists

Dr. D. J. Cantliffe  Dr. D. D. Gull  Dr. G. J. Hochmuth
Chairman               Assoc. Professor              Assoc. Professor (Editor)

Dr. D. N. Maynard  Dr. S. M. Olson  Dr. S. A. Sargento
Professor             Assoc. Professor              Asst. Professor

Dr. W. M. Stall  Mr. J. M. Stephens  Dr. C. S. Vavrina
Professor              Professor            Asst. Professor

Dr. J. M. White  
Assoc. Professor