Vegetarian 90-09
September 14, 1990

Contents

I. NOTES OF INTEREST
   A. Calendar.
   B. Southwest Florida REC Vegetable Field Day and Trade Show.
   C. Publications.

II. COMMERCIAL VEGETABLES
   A. Vegetable Variety Demonstrations.
   C. Pesticide-Based Copper Toxicity in Tomato.

III. A Enquirik Label in Strawberries.

IV. VEGETABLE GARDENING

Note: Anyone is free to use the information in this newsletter. Whenever possible, please give credit to the authors. The purpose of trade names in this publication is solely for the purpose of providing information and does not necessarily constitute a recommendation of the product.
I. NOTES OF INTEREST

A. Calendar.

October 1, 1990. Vegetable Packinghouse Operators and Managers Seminar. Will meet at Tomatoes of Ruskin packinghouse in Ruskin from 2:00 PM to 5:30 PM. Contact: Karl Butts (813-621-5605) or Phyllis Gilreath (813-722-4524) or Steve Sargent (904-392-7911) for more information.


March 11-15, 1991. Commercial Harvest and Postharvest Handling of Horticultural Crops. For Extension faculty, packinghouse managers, graduate students. Will consist of one day of seminars and four days of tours.


B. Southwest Florida Research & Education Center's Vegetable Field Day and Trade Show.

Please mark your calendar for November 13, 1990 for the Southwest Florida R.E.C. Vegetable Field Day and Trade Show. At 9:00 am there will be a morning educational program followed by a sponsored luncheon. Field tour of research plots from 2pm - 4pm. The Trade Show will be ongoing throughout the day. Proceedings will be published and distributed at the Field Day. Please call Southwest Florida REC (813) 657-5221 to preregister.

(Vavrina, Vegetarian, 90-09)

C. Publications.

Allred, A. J. and G. Lucier. 1990. The U.S. Watermelon Industry. USDA, ERS Staff Report AGES 9015. Available from ERS-NASS, P.O. Box 1608, Rockville, MD 20849-1608. $11.00


II. COMMERCIAL VEGETABLES

A. Vegetable Variety Demonstrations.

As a new vegetable production season is beginning, agents may want to consider including vegetable variety demonstrations in their educational programs. Over the years, extension demonstrations have been proven to be one of the most effective means of communicating new ideas and technologies and the use of improved methods and varieties. Successful demonstrations require careful planning and a committed cooperator. Some of the factors to be considered when establishing a vegetable variety demonstration follow.
Variety trial demonstrations should be conducted 'in season', i.e. planting should be at the normal time in your area for the crop being evaluated.

At the time the demonstration variety trial is actually established in the field, you have already made an agreement with the cooperator, selected the varieties to be included, and obtained the needed seed or transplants.

There are at least two general procedures that can be followed in trial establishment:

1. Mark out a representative plot of the required size which the cooperator will leave for you to seed or transplant by hand or with small equipment. It usually works best for the cooperator to plant the field, except for the plot area, and then for the demonstration area to be planted immediately thereafter.

2. Where seed supplies are plentiful, the crop is mechanically established, and the varieties to be evaluated are acceptable on the market, the plots can be seeded in rows with the cooperator's equipment. When the plants emerge, uniform areas in the field can be selected for observation, yield and other appropriate measurements.

Whichever method of establishment is used, mark the plot clearly with field stakes and flags and make a field map showing all the plots and surrounding area. Photocopy the map and make sure the cooperator gets a copy.

Randomized complete block or completely randomized designs are most frequently used for variety trials. Plot size and number of replications are determined by the variability of the site and the plant material being evaluated. Commercially available seed is ordinarily quite uniform, so that is not usually a source of variability. Four replicates are generally satisfactory and acceptable. Plot size or the number of plants per plot is less definite and harder to establish with certainty. For tomatoes and peppers, 8 to 12 plants might be satisfactory, whereas 60 to 100 plants might constitute a minimum size bean plot. In any event, guard rows and plants will help reduce variability and thereby increase precision. It may be useful to allot space at the beginning of the trial plot to plant short rows of all of the varieties included in the trial. These rows can be left unharvested to show to field day participants. Observation rows are especially useful for leaf and root crops that are destructively harvested.

Sometimes it may be unrealistic to plan a replicated trial for certain vegetables that require frequent and multiple harvests like summer squash, okra, or strawberry. In these cases, single plots of each variety, two or three times larger than that suggested in the individual crop section may be used.

Every extension vegetable agent should have a copy of Circ. 762, Vegetable Variety Evaluation Demonstrations: A Manual for County Extension Faculty which provides detailed information on the topic. If yours is missing, or you need another copy, please let me know.

(Maynard, Vegetarian 90-09)


The course Commercial Harvesting and Postharvest Handling of Horticultural Crops will be offered during the week of spring break. For the first time the course will be open to extension faculty for graduate credit and industry personnel for Continuing Education Units. The course will also be expanded to include a one-day short course on campus at Gainesville, followed by a four-day tour of Florida horticultural industries.
The short course will include the latest practical information for postharvest handling of vegetable, fruit (tropical and subtropical) and ornamental crops, and will present the concept of systems analysis as a tool for evaluating and optimizing postharvest operations. Topics to be presented will include:

- Harvest operations
- Postharvest quality evaluation
- Precooling operations
- Packing line performance
- Shipping operations
- Modified and controlled atmospheres
- Marketing

The tour will consist of visits to a wide variety of harvest, packing and shipping operations throughout the state, as well as stops at a port facility and a warehouse operation. The tour will leave Gainesville on March 12 and return to Gainesville on March 15. Contact Steve Sargent for further details (904-392-7911).

(Sargent, Vegetarian 90-09)

C. Pesticide-Based Copper Toxicity in Tomato.

Many growers have questioned the long-term effects of the copper-based bactericides used in tomato production. Copper in excess amounts, can cause toxicity to plants and it accumulates in the soil. In a typical growing season, as much as 25 to 30 pounds of copper are applied per acre to control bacteria diseases such as bacterial spot on tomatoes or pepper. Copper in addition to this amount might be added at the rate of 1 to 4 pounds per acre from the fertilizer. Copper concentration builds to high levels in soil used continuously for vegetable production, especially in tomato and pepper fields.

Research at the North Florida AREC in Quincy by Drs. Fred Rhoads and Steve Olson showed that tomatoes can be negatively affected by high copper concentrations in the soil. In soils with pH 5.5 or less, there was a linear decrease in plant growth as copper rate was increased from zero to 1400 pounds per acre. There was an approximate 30% decrease in growth with the first addition of 350 lb per acre of copper. This roughly represents 12 years of copper additions. Liming the soil to pH 6.5 effectively eliminated copper toxicity except at very high copper rates. Growth was still reduced, even at pH 6.5 when over 700 lb per acre of copper was applied (more than 20 years of accumulation).

In field situations, the reduction in growth might not be so dramatic as to be easily noticeable. However, with time yield reductions could occur.

Tissue copper concentrations of 30 ppm and above seemed to be associated with copper toxicity (reduced growth). However, growth was not reduced in all cases of tissue with 30 ppm or above copper. This means that tissue-copper concentration alone might not be a good indicator of toxicity.

There are some suggestions to avoid problems in future years from copper toxicity. These are:

1. Follow soil-test predicted liming programs. Lime to pH of 6.5 for soils with large copper concentrations (probably those with Cu above 50 ppm Mehlich-I Cu).
2. Follow soil-test predicted copper fertilizer programs. Do not add copper in the fertilizer when it is not needed.
3. Where possible, grow disease resistant or tolerant cultivars.
4. Try to use brands of copper pesticides that can achieve control at very low copper rates.
5. Apply copper only when needed and at recommended rates with a carefully calibrated sprayer.

6. Rotate when possible to crops that do not require heavy copper pesticide applications.

7. Avoid overhead sprinkler irrigation which could increase disease severity, requiring more copper.

8. Deep plow soil to dilute copper concentrations.

(Hochmuth, Vegetarian 90-09)

III. PESTICIDE UPDATE

A. Enquik Label in Strawberries.

Enquik herbicide has been granted a 24C Special Local Need registration in Florida for the control of weeds in row middles of strawberries. Apply 5 to 10 gallons ENQUIK as directed, shielded spray to crop row middles for control of escaped broadleaf weeds. ENQUIK herbicide is strictly contact in nature, so thorough coverage is essential. Flat fan and hollow cone type nozzles are recommended. They may be either 80° or 110° with not larger than 04 orifices, or high pressure hollow cone types. Flooding-type fans and cone types, which produce large droplets CANNOT BE USED. ENQUIK herbicide should be applied using a high-quality nonionic surfactant at a rate of 0.25-.50% (2-4 pints per 100 gallons of total spray volume). Apply using a minimum boom pressure of 40 psi.

A total spray volume of 20 to 50 gallons per acre with a dilution rate of water: ENQUIK not to exceed 6:1 is recommended for best results. ENQUIK should be applied to small, actively growing weeds. Where weed populations are dense, a second application may be required 3 to 7 days later. Do not apply to weeds which are wet from rainfall or dew, or to weeds under drought stress, as reduced weed control may result. Avoid spray contact with desirable foliage as injury may result. A preharvest interval in not restricted.

(Stall, Vegetarian 90-09)

IV. VEGETABLE GARDENING


Back in February the Vegetable Crops Department kicked off the educational organic gardening project located across Hull Road from Fifield Hall on the University of Florida campus.

As has been stated, the purpose of the 4-acre project is to learn and teach as much as we can about growing vegetables the organic way. The various activities may be classified as teaching, research, and/or extension. The bottom line is that they are educational, so we are calling them that.

Although the initial phase of the project has involved such start-up procedures as personnel hiring, plot design and layout, irrigation installation, fence building, and materials procurement, we still have managed to grow a lot of vegetables with a variety of treatments. The following are some of the more significant observations recorded during this first season.

Organic "Model" garden

In this 2,500 square feet garden we successfully grew a wide assortment of vegetables commonly grown in Florida home gardens. These included legumes, cucurbits, crucifers, solanaceous crops, salad crops, sweet corn, and okra. In each and every case we obtained normal, satisfactory growth and yields of good quality vegetables.

We used trickle irrigation for water conservation, but realized an extra bonus when we were able to use it during periods of water restrictions.
On one half the garden we incorporated a 1 1/2 inch-thick layer of aged chicken litter. The other half received a 3-inch layer of aged sheep manure. Both were supplemented with gypsum. No other fertilizer was used on the plots (which had not been fertilized in the previous two years).

For insect control we sprayed weekly with insecticidal soap and Bt. Still, we had a problem with ants and aphids. The ants actually fed on the terminal portions of eggplants, and the pods of okra, as well as crawling all over our hands as we picked peas and okra.

Weeds were effectively suppressed with yard waste and oakleaf mulch.

**Grow-box demonstrations**

Several soil treatments of organic fertilizer and/or soil amendments produced some interesting observations in these 50 square feet boxes.

**Chicken litter**

Fresh chicken manure only a few days out of the cages was applied to one gro-box at the rate of 20 T/a, which is roughly 1 pound per square foot. We arrived at this rate based in part on the success we had last year with equivalent amounts of mushroom compost in North Florida gardens, as well as equivocal rates of nitrogen.

Tomatoes and summer squash, both fruiting type vegetables, grew and produced very satisfactorily without supplemental fertilizer and with no readily observed effects of the fresh nature of the manure.

Again we had difficulties with ants feeding on the stems and terminal portions of eggplants, finally destroying the plants. Grits applied to the base of the infested plants did not help.

**Agraferm (composted dairy manure)**

This composted material was obtained from a northern state as a by-product of their dairy industry. We applied it at the rate of 20 T/a and 40 T/a (non-replicated), or roughly 1 and 2 lbs/sq ft. Plant response was poor at both rates, indicating an inadequate fertility level for tomatoes and squash.

**Crabwaste compost**

This soil amendment, composted Appalachicola crab waste, was applied also at 1 and 2 lbs/sq ft (20 and 40 T/A). Late seeded black-eye peas grew very well on both rates, but yielded better at the higher rate. The okra grew poorly at either rate, indicating inadequate fertility level of this particular compost. Obviously, the peas' ability to fix nitrogen was a factor in their successful growth.

All okra roots were greatly swollen by root-knot nematodes, providing some indication that the crabwaste used did not live up to its reputation as a nematode suppressor.

**Yard-waste compost**

We received yardwaste composted at Tampa, and applied it to one gro-box at the similar rate of 1 and 2 lbs/sq ft. Southern pea growth and yields were about the same at either rate as in the crabwaste box. However, again the okra grew slowly with no yields. Root-knot nematodes were prevalent in all okra roots.

**Yard-waste compost plus Fertrell**

Anticipating a fertility deficiency in the compost, we supplemented this box with Fertrell (3-2-3), an organic fertilizer made from seaweed and sea products and routinely marketed in Florida. We banded the dry-mix fertilizer at 16 lb/100 sq ft, equivalent approximately to our usual recommendation of 4 lbs 10-10-10/100 sq ft. As expected, the peas were more prolific and yielded more than those grown without the supplement.

**Fertrell**

When used alone with 10 and 20 lbs/100 sq ft broadcast at planting time, fair results were obtained with tomato.
Ants were fewer and less problem than on the composts/manures. We probably needed to sidedress later.

**Sustane**

We tried another organic fertilizer which is accepted by some organic certifying agencies (if not all). Sustane (5-2-4) is the tradename for a composted turkey litter which is sold dehydrated and bagged, ready for use in the garden. We are seeing good results in its effects on the progress of a late planting of sweetpotatoes, when applied at 5 lbs/100 sq ft.

**Yard-waste compost-plus poultry litter**

This is a replicated trial. Results have not been analyzed as yet.

**Effectiveness of commonly used organic insecticides**

This is another on-going study (by the Entomology Department). Results have not been tabulated.

**General observations**

Our organic gardening area seems to be generally infested with root-knot nematodes due to previous cropping practices. Our cover crop of field peas were heavily damaged. Our okra on the poultry manure was heavily root-knotted, yet produced an abundance of pods. We noted definite resistance (absence of root-knot) in the 'Better Boy' tomatoes, while two Florida derived varieties - 'Floramerica' and 'Homestead' growing in the same boxes as 'Better Boy' were heavily infested. 'Better Boy' is widely grown in Florida gardens.

As has been stated, ants were a serious problem, particularly to okra and eggplants; aphids were serious on the southern peas, and spider mites took out some of the tomato plants late in the season. We were unable to control any of these three with soap plus Bt.

While the organic way involved an extraordinary amount of labor, we were able to achieve good to excellent results. However, I would caution readers to consider these observations as "leads" to a better understanding of the treatments and practices reported, rather than the final word. We expect to expand on these observations and continue to explore the many mysteries of the renascence of the organic way.

**Touring our plots**

Since our ultimate goal is to impact any knowledge gained to the organic community, we hope to have timely field days next spring as our plots become more presentable. In the meantime we would welcome visits by appointment from other educators such as county agents, Master Gardeners, Vo-Ag teachers, and 4-H members. We do not feel we can accommodate the general public except at specified field days. Already we have been hosts to such groups as Master Gardeners from Hillsborough, Marion, Osceola, Seminole, Lake, Orange, and Volusia Counties; Jacksonville Urban Gardeners; several county agents; television show hosts; Garden Club Short-Course participants; 4-H Judging teams; University students; and University faculty colleagues.

(Stephens, Vegetarian 90-09)