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I. NOTES OF INTEREST

A. Vegetable Crops Calendar.

May 17, 1995. 41st Vegetable Field Day, 8:15 AM-4:00 PM. Gulf Coast REC, Bradenton, FL. (Contact D. N. Maynard).


II. COMMERCIAL VEGETABLES

A. Butternut Squash Variety Evaluation.

Butternut, as well as other fall and winter-type squash are grown throughout Florida in appropriate seasons, but on a very limited acreage. Accordingly, production data are not available.

This trial was arranged to evaluate performance of some butternut inbreds and hybrids which were developed at the Central Florida Research and Education Center (CFREC-Leesburg) with commercial hybrid and inbred butternut squash varieties in central and west central Florida.

Butternut squash seeds of 17 entries were planted in holes punched in the polyethylene mulch at 3 ft in-row spacing on 3 August at Bradenton. The plots were 15.0 ft long, had five plants each, and were replicated three times in a randomized, complete block design. Weed control in row middles was by cultivation and application of paraquat. Pesticides were applied as needed for control of silverleaf whitefly (endosulfan and esfenvalerate), and aphids (endosulfan).

Seeds were planted in holes punched in the polyethylene mulch at 3 ft in-row spacing on 15 August at Leesburg. The plots which were 30 ft long and had 10 plants each were replicated four times in a randomized, complete block design. Weed control in the middles was by Curbit and cultivation. Pesticides were applied as needed to control pickleworms (methomyl and endosulfan) and gummy stem blight (chlorothalonil and maneb).

Squash were harvested on 4 October at Bradenton and on 9 November at Leesburg. Marketable fruit (U.S. No. 1 or better) according to U.S. grades were separated from culls (fruit<0.9 lb and/or crookneck) and counted and weighed.

Plants were rated from 1 (least resistant) to 5 (most resistant) for downy mildew on 3 October. The designation of individual plant appearance ratings was 1 = dead, 2 = 10% green, 3 = 40% green, 4 = 70% green, and 5 = 100% green.

Marketable yields in Bradenton ranged from 5 bu/acre for 'Hercules' to 229 bu/acre for J25xJ31. The three highest yielding entries were the J25 inbred and two hybrids with J25 as one parent. In Leesburg, yields ranged from 70 bu/acre for 'Ponca' to 303 bu/acre for J25. 'Hercules', a late maturing variety, had a much higher yield at Leesburg than at Bradenton. Generally, yields of experimental lines exceeded those of named varieties. This could be related to the fact that the named varieties were developed in more temperate areas of the country.
Yields obtained in this trial are similar to those obtained in recent trials in Florida. At Leesburg, yields ranged from 160 to 452 bu/acre in spring 1988 from 134 to 212 bu/acre in spring 1989, and 33 to 90 bu/acre in spring 1990. At Live Oak, yields in fall 1990 ranged from 217 to 250 bu/acre.

Grade standards do not provide guidelines for neck curvature, however, straightneck butternut fruit are demanded in most markets and this trait has been selected for by plant breeders. The proportion of straightneck fruit at Bradenton ranged from 53% for J22xJ31 to 100% for J25 and 'Hercules'.

Cull fruit were those judged to be too small, i.e. less than 0.9 lb or have neck curvature greater than what would be accepted in most markets. Using these criteria, the proportion of marketable fruit at Bradenton varied from 32% for J21xJ30 to 90% for J25xJ31. Average weight of marketable fruit at Leesburg ranged from 0.9 lb for J21xJ30 to 3.0 lb for J25 and J25xJ31.

Downy mildew was prevalent because of the frequent rains. However, there was a marked variation among entries in reaction to downy mildew. In Bradenton, all of the plants of J25xJ32 were dead whereas all of the plants of J25xJ31 and 'Hercules' were not visibly affected by the fungus. Factors other than reaction to downy mildew were related to yield, however, since the highest (J25xJ31) and lowest ('Hercules') yielding entries were the most tolerant of the fungus. Furthermore, the second highest yielding entry (J25xJ32) was the most susceptible.

The results of this trial indicated that butternut squash experimental inbreds and hybrids developed in Florida perform better under summer/fall conditions than varieties/hybrids developed under more temperate conditions.

(Maynard and Elmstrom, Vegetarian 95-04)

B. New Transplant Bulletins.

Two transplant publications will soon be available through the University of Florida. Production of Vegetable Seedlings: Concept, Budgets and Cashflow, by David Zimet and Charles Vavrina reviews the cost of starting and operating a small greenhouse to produce vegetable seedlings. An analysis is performed to determine the cost of producing seedlings over a 15 year time frame so that cost can be compared to projected purchase prices. In the example tomatoes are used, but many of the production costs would be similar for most vegetable transplants. This publication was "in press" at the time of this writing.

An Introduction to the Production of Containerized Vegetable Transplants, by Charles S. Vavrina (Bulletin 302) evaluates the many parameters involved in vegetable transplant production. Topics range from the physical to the physiological including information on greenhouses, benches, trays, media, seed, fertilization, irrigation, shipping, production pointers for specific crops, and much more. This 15 page manual contains 42 references for those wanting more in depth information. Publication date is mid-April.

These bulletins can be obtained by calling the University of Florida, Institute of Food and Agricultural Sciences, Publications Department at 904-392-1764.

(Vavrina, Vegetarian 95-04)
C. Recent Innovations in Strawberry Cooling and Handling.

Part 1. Improving Cooling Efficiency

The Florida strawberry industry is winding up a record 1994-95 season with over $105 million in total farm gate sales. This progressive group of growers continues to explore emerging technologies and techniques to remain competitive. During this past season there have been increased sales of specialty packs, such as the clear, clamshell package introduced a few years ago by California shippers, and the adoption of the standard 40"x48" pallet. Although the clamshell package is popular with consumers and has brought higher returns to growers, it can extend the time required for forced-air cooling by more than 40%. And, as we are all well aware, to maximize shipping life strawberries must, first, be rapidly cooled to about 2°C (36°F) within a few hours of harvest, and, second, be maintained at as close to 0°C (32°F) as possible during subsequent handling and shipping operations.

Recent tests indicated that strawberries could be hydrocooled, a method which is significantly faster than forced-air cooling, and which reduces water loss. This work was part of the Master of Sciences research of Marcos D. Ferreira, in cooperation with Jeff Brecht and myself of the Horticultural Sciences Department and Jerry Bartz of the Plant Pathology Department. Hydrocooled strawberries required only a few minutes to achieve commercial cooling (7/8 Cooling) whereas forced-air cooling required an hour or more. We also determined that hydrocooled strawberries which were packed wet in pint baskets did not have reduced shipping life when directly compared to those which were forced-air cooled. On the contrary, after cooling and two weeks storage at 1°C (34°F), hydrocooled fruits had less weight loss (and in some cases a gain in weight), better color, and were firmer than those which were forced-air cooled. Additionally, the two principal postharvest pathogens of strawberry, Rhizopus stolonifer and Botrytis cinerea, were effectively controlled by maintaining free chlorine at 120 ppm and pH of 6 to 7 in the hydrocooling water.

Another concern with the use of clamshell packages relates to quality control. Growers rely solely on the individual pickers for every operation from harvest of the strawberries at the proper ripeness stage to packaging with minimal mechanical injury. Packing efficiency and uniformity could be enhanced through the use of an appropriately designed packing line. However, this would require additional handling and increase the potential for bruising. Next month I will describe results from other tests related to the resistance of strawberries to simulated handling operations.

(Sargent, Vegetarian 95-04)

III. VEGETABLE GARDENING

A. Vermigardening

Last month I introduced Vermitechnology as a topic for discussion in a series of three articles: vermitechnology (March, 95), vermicomposting (April, 95), and vermicomposting (May, 95).

As a reminder, in my Vermi-terminology, vermifarming was defined as farming with earthworms in the garden.
Notice the similarity to “Earthworm farming”, which is the commercial production of earthworms. Again, much has been written on this latter subject, so I do not intend to address the raising of earthworms for sale.

In this regard, I have received from nematologist Bob Dunn a copy of a 1978 Wildlife Report on Earthworm Farming in Florida by the late A. S. “Tony” Jensen. For those interested, that report (4-78) includes the following as an outline:
- Kinds of worms raised
- African nightcrawler
- History and description
- Culture - bedding, watering, feeding
- Pests
- Harvesting
- Marketing
- Storing and handling
- Soluble salt injury

An additional excellent reference piece is Earthworm Biology and Production, IFAS Cir. 455, 1979. It was authored by J. P. Martin, Univ. of Cal. This publication discusses some facts bearing upon the possibilities of vermigardening. Some of the more important effects of earthworms on soil properties are:

a) They help decompose organic residues thus releasing such elements as carbon, nitrogen, sulfur, and other plant nutrients.

b) Their body fluids help to dissolve inorganic plant nutrients in soil minerals.

c) The structure of ingested soil is activated by microbial activity both while within the worm and later in the castings.

d) The extensive burrowing of the earthworms improves and maintains aeration and water penetration.

e) Earthworm feeding helps transfer digested nutrients from surface litter further down into the root zone.

A “vermigardener” would therefore try to take advantage of these improvements in the soil environment to obtain better plant growth in the presence of the earthworms. However, the California circular cautioned gardeners that although these benefits to the soil are well known, few valid studies had been made at that time to show that the presence of earthworms would actually improve plant growth. They cited one study (Hopp and Slater, 1949) which found that growth of clover was improved by earthworms in a heavy, clay soil, while in yet another study (Chadwick and Bradley, 1948), increased crop productivity could not be demonstrated. Even today the inoculation of earthworms in the soil for the purpose of improving production of a crop is not a common practice.

Having stated the above, it should be of interest that some gardeners have successfully utilized earthworms in a grow-box arrangement for the growing of vegetables. One such person is vermitechnologist Larry Martin from Orange Lake, Florida.

A major concern for vermigardeners is that suitable conditions must be maintained both for the earthworms and the plants in the same container or plot, since they are growing together concurrently. The following are some of those conditions, and suggestions from Larry Martin on how he strives to maintain them.
Temperature - Luckily temperatures ideal for tender vegetables are also suitable for earthworms. Freezing temperatures kill both, although the worms can dig deeper to survive in some cases. Night temperatures should be 60-70°F, and daytime temperatures around 80-90°F. Bed temperatures should be in the range of 60-70°F.

Moisture - Bed moisture requirements generally coincide well both for the earthworms and the plants. Beds should be crumbly moist, not soggy. To prevent drying out and exposure to the hot sun, a mulch of hay or straw should be used to keep the soil moist.

Alkalinity - The pH of the soil best suited for vegetables is ok for the earthworms. Thus, the soil may be limed if necessary to maintain a pH range of 6.0-6.5.

Bed construction - For vermigardening a grow-box is suggested. It should be of practical dimensions, constructed using 2x12 inch lumber or concrete blocks. A 4x8' or 5x10' size would be best to allow ease of cultivation. The bed must have a wire cloth bottom with a maximum of 1/2 inch squares. This barrier prevents moles and other animals from feeding on the worms.

Bedding material - The selection of bedding material is very important to the survival and activity of the earthworms. The basic criteria are: 1) It should hold moisture; 2) must remain porous and resist packing; 3) should be low in protein to prevent excessive ammoniation; 4) should not contain large amounts of topsoil; 5) should not contain high soluble salts; and 6) ideally should be derived from a composted animal manure combined with a bulking agent such as straw or a combination of composted horse manure mixed with bedding used in the horse stalls.

Stocking the bed - Place six to eight inches of bedding in each bed. Water heavily for three days to leach out possible chemical contaminants. Check temperature and if it remains constant below 80°F after 5-6 days, the bed may be stocked with earthworms.

Add a minimum of 300 worms per square foot of surface area. Dump them onto the bedding in the presence of light. Untangle them and spread them evenly. The worms will disappear into the bedding to avoid the light. Water heavily twice a day for the first three days to settle the worms. Some form of lighting for the first 10 days will keep the worms from crawling out.

Feeding - Worms are top feeders, so after 10-14 days the worms will come to the top to feed. Aged cow manure is an ideal feed. A small amount of fresh manure may also be added to increase the nutrient supply. But there is a wide range of feeds that may be used.

Planting the vegetables - The bed is ready to plant after 6-8 weeks. Till the worm bed to a depth of four inches which leaves five to six inches of worm castings mixed into the root zone. Seeds or transplants may then be planted directly into the bed.

After harvest, old plant residue may be incorporated into the top six inches of the bedding. Thereafter the worms should be fed continuously until time for the next planting. Usually the beds are completely cleaned out every 6 to 12 months. This rich soil may be used as a potting soil or soil amendment.

(Stephens, Vegetarian 95-04)