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TO: COUNTY EXTENSION DIRECTORS AND AGENTS (VEGETABLES AND HORTICULTURE) AND OTHERS INTERESTED IN VEGETABLE CROPS IN FLORIDA

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VEGETARIAN NEWSLETTER 77-11

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THE VEGETARIAN NEWSLETTER

I. NOTES OF INTEREST

A. Greenhouse Tomato School - Final Announcement

A one-day session on Greenhouse Tomato Production is planned for Florida county agents and producers.

DATE: November 15, 1977

TIME: 9:30 to 3:00 Lecture and panel discussion
      3:00 to 4:00 Tour of a local greenhouse

PLACE: Community Center, Oxford, Florida

(Montelaro)

B. Greenhouse Tomato Production Costs and Returns

A preliminary study published recently on greenhouse tomato costs and returns should be of interest to individuals considering greenhouse tomato production as a business venture. Dr. D. L. Brooke and Dr. G. B. Wall summarized their results briefly as follows:

"Interest in hothouse tomato production is increasing in central, north and west Florida. A survey of eight growers indicated requirements of 504 hours for production and 208 for harvesting and marketing 7,425 pounds of tomatoes from 900 plants in a 3,000-square foot house. Returns to labor were $1.97 per hour and house construction cost was $2.80 per square foot."

A copy of this publication can be obtained from this office. It is entitled "Cost and Returns from Hothouse Tomato Production in Florida," Economics Report 87, D. L. Brooke and G. B. Wall, Food and Resource Economics Department, University of Florida, Gainesville, Florida, 32611.

(Montelaro)

C. Seedling Plant Production Short Course

A one-day short course on seedling plant (transplant) production is planned for county agents, industry representatives, and transplant producers.

DATE: December 6, 1977

TIME: 9:30 to 3:00 p.m.

PLACE: Manatee Agricultural Center
       Palmetto, Florida

A copy of the program will be mailed out shortly. Any question on this program should be directed to Dr. G. A. Marlowe, Extension Vegetable Specialist, AREC, Bradenton.

(Montelaro)
D. ChloroIPC Herbicide Outlets in Florida

Many county agents have requested information pertaining to ChloroIPC (trade name Furloe) outlets in Florida. The basic manufacturer, PPG Industries, has assured us that ChloroIPC can be purchased from at least one statewide distributor of agricultural chemicals. Be sure to ask for this herbicide by both the trade and common names listed above. Because warehouse stocks are maintained at minimum levels, growers should contact their local distributor(s) at least 2 weeks prior to the intended use date. Additional information may be obtained by calling the Vegetable Crops Extension Specialists.

(William)

E. North Florida Vegetable Marketing Meeting - Thomasville, Georgia

Last reminder for county agents in North and Central Florida - the meeting will be held at 9:30 a.m. on December 2, 1977, at the Thomasville Market in Thomasville, Georgia. The program will emphasize production and marketing of quality vegetables.

(William)

F. Postharvest Horticulturist

Effective November 1, Dr. Mason Marvel has returned to the Vegetable Crops Department as Extension Vegetable Specialist with statewide responsibility for the postharvest extension program. Many of you remember Mason as a specialist when he shared the vegetable production responsibilities with Jim Montelaro. He has served since as Chief of Party on the UF-IFAS project in Vietnam, Assistant Director of IFAS International Programs and as Program Director in a legume development program in Ethiopia. Mason will be making the rounds in this coming season and looks forward to assisting in establishing programs with our state and county staffs.

(Kelly)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Crop Residue Problems in Vegetable Production

Every season we see a number of problems in vegetable production resulting from untimely or improper destruction of crop residues. Crop injury can vary from slight to almost total failure. Reduction in plant stand, poor plant vigor, disease and insect injury, reduced yield and quality, etc., can be attributed directly to crop residue problems in many cases. To a large extent, these costly problems can be avoided without undue cost with simple but good management practices.
Four of the more common problems observed over the past several years in Florida are:

1. Abandoned crops acting as pest reservoirs for other crops nearby.
2. Reduction in effectiveness of soil fumigation.
4. Interference with precision mechanical operations such as planting, fumigation, etc.

Even though there may be other lesser problems, a discussion of the four listed above should suffice to emphasize the importance of good management of crop residues.

Old abandoned crops act as reservoirs for many plant diseases and insects. This is especially true of plant viruses which can be so destructive to vegetable crops. Attention should be given, not only to abandoned crops, but to volunteer and escaped plants in and around the field. This was demonstrated vividly this fall in a central Florida squash planting. It was so severely infected with mosaic that it had to be plowed under without a single harvest. It is good agricultural practice to completely destroy a crop residues as soon as harvest is completed. By doing this, growers not only benefit themselves but their neighbors.

Reduction in effectiveness of soil fumigation for subsequent crops from undecayed crop residues results from: (1) absorption of the fumigant on undecayed organic matter and (2) inefficient kill of nematodes in organic matter, especially living tissue like roots, bulblets, etc. A problem observed one or more times annually is poor nematode control with fumigation following a gladiolus crop. Fumigants will not kill nematodes found in the tiny bulblets left in the soil after the large bulbs are harvested. Based on these observations, growers would be wise to turn their crops under early and re-disk as often as necessary to permit complete decay of all crop residues before attempting to fumigate the soil.

Stimulation of Rhizoctonia root rot by fresh, green organic matter is a common occurrence in Florida. This problem is most obvious on bean crops. Any kind of green crop residues may stimulate Rhizoctonia fungus under certain conditions. The results can be disastrous. An abandoned crop should be turned under four to six weeks before planting time to permit complete decay. This alone does not guarantee elimination of Rhizoctonia root rot, but will certainly lessen the severity.

Interference with precision mechanical operations also can be a serious problem. Undecayed plant stalks and limbs may clog fumigation equipment, fertilizer distributors, seeders, and transplanters. Though not quite so serious as the others, interference with mechanical operations can be costly to growers from troublesome delays, poor crop uniformity, and yield losses.

In summary, all vegetable crops should be plowed or disked under thoroughly as soon as harvest is completed. Advantages to be gained from this practice are worthwhile indeed. Any grower not tending to this important task, when needed, is inviting trouble in subsequent crops.

(Montelaro)
B. Irrigating Small Fields of Vegetables

Small farm operators or part-time vegetable growers often wish to irrigate their crops during periods of dry weather, especially on Florida soils having a limited moisture holding capacity. Professor Dalton S. Harrison, Extension Agricultural Engineer, suggests that either a small sprinkler system or a drip irrigation system should be considered. Both systems have limitations and require capital investments in basic equipment.

Consider first the major differences in pressure or horsepower requirements, water sources, and costs between the small sprinkler and drip irrigation systems.

Pressure or horsepower -- The small sprinkler system requires a much higher pressure (40 to 60 psi) to distribute the water uniformly from the sprinkler nozzles than the drip irrigation system (4 to 15 psi). Consequently, a one horsepower motor and a 4-inch well or large pond is needed to deliver the water for the small sprinkler system (up to 30 gpm). However, a low volume home water supply can be used to deliver the water for both the home and drip irrigation system.

Water source and quality -- The major consideration for drip irrigation is having an excellent source of CLEAN water containing no iron or sulfur. Either tiny particles or the growth of slime bacteria from dissolved iron (Fe) or sulfur (S) (0.2 to 0.6 ppm) can clog the porous tubing or holes in the drip emitter. Therefore, clean water free from all dissolved Fe, S, algae and sand is essential.

To reduce clogging of drip lines, chlorine should be injected into the irrigation water so that a one ppm concentration is maintained at the end of the drip tube. Chlorine will help precipitate the Fe which can be filtered before entering the drip lines and it will inhibit growth of the slime bacteria. A chlorine tester for swimming pools can be used to monitor the free chlorine in the drip tubes. These kits are listed in the last issue of "Citrus Newsletter."

According to Dr. Bill Stall, County Extension Agent in Dade County, water movement in clogged drip systems that contain only plastic tubes and fittings can be improved by mixing furnace grade phosphoric acid into the irrigation water behind the pump and all other metal fixtures. Before adjusting the irrigation water to pH 3.5 or 4.0, open the ends of all drip tubes to allow the "jelly-like" material to escape from the tube. Be certain to use free phosphoric acid. Complete clogging will occur if other materials containing phosphorus are used. Also, be certain that no metal parts of any kind are exposed to the phosphoric acid. Phosphoric acid corrodes all galvanized, zinc, brass, or iron pipes.

Estimated costs -- Initial costs for the small sprinkler system will range from $2000 to $2500 per acre. This estimated cost includes a 4-inch well, one horsepower motor, pump, irrigation pipe, etc. Subsequent costs will be minimal. Drip irrigation costs initially will average about $400 per acre, but subsequently $60 to $140 will be required to replace the drip lines after one to two crops depending on care and maintenance.
Additional engineering information and examples of irrigation system designs are available from the Agricultural Engineering Department, IFAS. Considerable production information relating to drip irrigation is available from several IFAS Departments, Extension offices, and Research Centers.

(William)

C. Some of the Causes of Poor Fruit Set in Tomatoes

Visits to commercial tomato fields in central and southwest Florida during the past several weeks revealed a serious delay in fruit set for the fall crop. In many fields the bottom two or three clusters were completely blank. Fruit counts of tomatoes 2 inches or more in diameter averaged approximately 4 per plant in a great number of fields. Most growers have correctly attributed this problem to the high temperature and humidity which prevailed during the early period of flower development and fruit set. Fortunately, fruit is now setting normally as the cooler weather develops.

It should be helpful to review the principle environmental factors and flower structures involved in tomato fruit formation to give a better understanding of this important segment of tomato production.

The characteristic, bright yellow flowers of most tomatoes generally have five sepals, (green) five petals, (yellow) five anthers, (pollen-bearing male structures) and one female structure, which resembles a small round-bottom flask with a long neck flared at the top (ovary, style, and stigma). The anthers, which contain the pollen, are usually united in the form of a "tube" which surrounds the style and sticky, pollen-receptive stigma. This arrangement generally insures self-pollination since the pollen is shed from the inside of the anther "tube." Although air movement is adequate to accomplish this under most field conditions, it is necessary to mechanically vibrate plants or flower clusters in the greenhouse.

Fruit formation depends on successful pollination and a series of important changes which lead to maturity. Essential steps in pollination are:

1. Production of viable pollen in the anthers.
2. Release of this pollen onto the female receptive structure, the stigma.
3. The germination of the pollen grains on the stigmatic surface.
4. The movement of the pollen tubes down the neck (style) into the round bottom structure (ovary) and union of the male sex cells with the female egg cells resulting in fertilization.

In the ovary, each pollen cell that unites with an egg cell results in a seed. The seeds develop in jelly-like cavities called locules. Most of the commercially important tomato cultivars grown in Florida have 5 or more locules per fruit. If only one side of the stigmatic surface receives pollen, only that side will develop into a well-rounded fruit. Many cat-faced and otherwise mishapen fruit are the result of poor pollination.
Unfavorable temperatures, (above 90°F or below 55°F) may cause one or more of the pollination processes to fail due to:

a. production of sterile pollen,

b. inhibition of pollen germination on the stigma, or

c. retardation of pollen tube growth.

Poor light, excess nitrogen, low humidity, high temperature (above 90°F) may cause the style to elongate excessively and pass through the anther "tube" before the pollen is shed. This condition results in blossom drop and poor fruit set. In general, the high temperature effect on the blossoms is not visible until about 3 days after the damage is done.

The time it takes to complete the pollination process has advantages and disadvantages. Under normal temperatures, nutrition, and relative humidity the stigmas become receptive for 1 to 2 days before the anthers split open and shed their pollen. Stigmas remain receptive for about 6-8 days. The anthers shed their pollen about 24 hours after the yellow petals open and the pollen remains viable for up to 2 weeks. The time from pollination until successful fertilization takes place is usually 2 to 3 days.

During the development of the flower, pollination and the period until fertilization occurs the fruit formation potential of the tomato is subject to many hazards. This brief article has mentioned only a few.

(Marlowe)

III. VEGETABLE GARDENING

A. Conserving Water in the Garden

Water is one of the two most common soil additives required for plant growth. The other is fertilizer. However, due to extreme competition from an ever-growing population of Floridians for this scarce resource, gardeners must find ways to grow vegetables with as little water as possible.

Hopefully, home vegetable gardeners will not have to give up watering their gardens in order to safeguard municipal needs of a more basic nature. Prospects of this happening would be especially dire since home food production is of such importance to many Florida families.

Here is a brief summary of some of the conservation techniques available to gardeners:

1. Plant fast-growing early-maturing vegetables. The longer the garden is occupied, the more the water is needed.
2. Plant during periods of adequate rainfall. Home gardeners have a fairly wide choice of planting dates for most crops, since "hitting a market" is not a consideration.

3. Avoid over-watering. Young plants will not require as much water as older plants.

4. Improve the water-holding capacity of the soil. The coarser the soil particles, such as Florida sands, the less water will be held. Apply liberal amounts of organic materials such as animal manures, cover crops, and compost.

5. In general, water thoroughly once a week to encourage deep rooting. However, shallow soils and very sandy soils need more frequent and lighter waterings.

6. Use watering methods that apply water just in the root zone where needed. Overhead sprinkling wastes water by the wind carrying it away and by wetting areas between the rows. Many plants are set far enough apart that they can be individually watered by hand.

7. Use drip or trickle irrigation. Drip irrigation trials in Florida have shown that vegetables produce as well or better and use 80% less water than those grown with overhead sprinkling.

8. Use a mulch such as hay, straw, leaves or plastic.

9. Keep weeds out of the garden. They use water for their own growth and transpire large amounts to the air.

10. Gardeners should use good judgement in determining when to turn off the water.

(Stephens)

B. Know Your Vegetables - Brussels Sprouts

Brussels sprouts (Brassica oleracea var. gemmifera) gets its name from having been grown 400 years ago in the vicinity of Brussels, Belgium. As a commercial crop, it is produced in the U.S. primarily in such states as California and New York. They are widely grown and highly esteemed in the British Isles. Very little is grown in Florida, and that almost totally is in back yard gardens.

Description. Brussels sprouts is a tall-stemmed cabbage in which many tiny heads call "sprouts" form along the stem at the bases of the leaves instead of making one large head at the top of a short stem. It hybridizes freely with other forms of the same species, such as cabbage, kale, collards, cauliflower, kohlrabi, and broccoli. The round vegetable sprouts are about walnut size, from 3/4 to 2 inches across, and are comprised of tightly packed leaves and a core. Each resembles a miniature cabbage head. The plants, which reach a height of 28-30 inches, form the sprouts from near the ground up.
Climatic Adaptation. Brussels sprouts require cool weather for best growth. Warm weather causes the sprouts to be soft and open rather than solid and tightly-packed. An ideal average temperature would be around 58°-60°F. The plants withstand light to heavy frost; however, temperatures well below freezing are detrimental even to this hardy vegetable.

The best time to grow Brussels sprouts in Florida is during the winter. When planted in October through December, sufficiently cool weather is encountered in most areas of the state for fair results. At other times of the year, such as the spring, temperatures become too high for quality sprout production.

Varieties. Two suggested varieties are "Jade Cross" and "Long Island Improved." "Jade Cross" is a hybrid variety which matures in about 85 days. "Long Island Improved" is an open-pollinated variety that takes a few days longer for the sprouts to reach an edible stage. The plants are taller and more leafy than "Jade Cross."

Planting. For those wishing to include Brussels sprouts in their Florida garden, it should be grown much like cabbage. Brussels sprouts can be started either from seeds or transplants. Since good plants for starts are not always available at local garden supply stores, it probably will be necessary to begin with seeds. Seeds can be planted in flats or other starting containers such as peat pellets, peat cups, or plastic pots. They may be concentrated in an open outdoor seed bed, and of course they may be sown directly in the garden row.

To start plants in a flat or seedbed sow seeds about 20 to 25 per foot of row and cover with ½ to ¾ inch of soil or medium. Thin seedlings to stand one inch apart. Plants are ready to set out in the garden when they are 3 to 4 weeks old. Plant them in 3-foot wide rows, with plants 30 inches apart.

Fertilizing. Fertilizer should be applied similarly to other vegetables in the garden. Some fertilizer should be worked into the bed as it is prepared. On most sandy Florida soil, broadcast about 6 pounds of 6-8-8 per 100 linear feet of row, then build the bed over it. The fertilizer should be mixed thoroughly with the top 6 inches of soil. An additional 6 pounds per 100 linear feet of row should be banded in a shallow furrow beside the seed or plant furrow. Periodic sidedress applications of nitrogen fertilizer every 2 weeks or so are suggested. On the alkaline soils of south Florida, adjust your fertilizer program according to local advice. Since it is much warmer in areas where these soils occur, Brussels sprouts would not be expected to produce as well as in central and north Florida.

Pests. The most common pests likely to be encountered in the Florida garden are worms (loopers and imported cabbage worms) and aphids. Various diseases, such as downy mildew, will be damaging from time to time. The regular garden spray programs as used for the other vegetables usually will give adequate control. Nematodes if prevalent in the soil, will attack Brussels sprouts. Fumigating the soil prior to planting may become necessary.

Harvesting. Sprouts should be picked after they reach full size and become fairly firm, but before they are tough and yellow. The first sprouts near the bottom
of the plant should be ready after about 3 months. First, pull off the leaves below the mature sprouts, then remove the sprouts by twisting them from the stem. Pick the sprouts as needed, but usually at about 2-week intervals. Continue harvesting as long as good sprouts are formed.

Storing. Keep sprouts in the crisper of the refrigerator. Temperatures of 32-34°F and a relative humidity of 90 to 95 percent are best for Brussel sprouts.

(Stephens)