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

FROM: James M. Stephens, Extension Vegetable Specialist

VEGETARIAN NEWSLETTER 75-8

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THE VEGETARIAN NEWSLETTER

I. NOTES OF INTEREST

A. South Florida Tomato Growers Institute Date Set

The annual institute for tomato growers has been set for Wednesday, September 24, 1975. The location this year will be the County Agricultural Agent's Office in West Palm Beach. This year's program will include timely topics of interest to all growers, handlers and buyers of tomatoes in Florida. Place this date on your calendar now and make plans to attend.

(Montelaro)

B. Vegetable Variety Trial Circular

Experiment Station Circular S-234, "Vegetable Variety Trial Results in Florida for 1972-73-74 and Recommended Varieties," has recently been released and should be available for distribution now. County personnel are again reminded that moderation should be exercised and only enough ordered to satisfy needs, as the supply is limited.

(Kostewicz)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Pointers in Fertilizing Tomatoes and Peppers Under Mulch

Growers who have used the full-bed plastic mulch system for the production of tomatoes and peppers have been successful with it. As would be expected with a change-over in production practices, the system is not without problems. In meetings and farm visits over the past two years, the questions that arose most often related to fertilization rates, placement, sources, timing, etc. There were questions asked about other practices used in plastic mulch culture, but with less frequency than those relating to fertilization. This article describes those fertilization practices which we feel can be relied on to produce good crops of tomatoes and peppers regularly under plastic culture. These suggestions are based on research and several years of observations under field conditions. The practices can and have been modified with success by growers in their operations. However, growers should be cautious in making major modifications until they have been tested for one or two seasons.

In order for a fertilization program for mulched tomatoes and peppers to succeed, all other operations have to be performed correctly. This includes land selection and preparation, developing adequate drainage and irrigation systems, supplying adequate irrigation water low in soluble salts, good fumigation, etc. Failure in any one operation can result in partial to total crop failure. The soil pH level should be about 6.5 and the Ca/Mg ratio about 4 to 1 as determined by soil tests. Lime, if needed, should be applied and mixed thoroughly in the soil 6 to 8 weeks before planting. Where magnesium is found to be low, use dolomite as a source of lime. Otherwise, high calcic lime can be used.

Only when land that is well-prepared, free of undecayed plant residues, free of obstacles and properly limed is it ready for subsequent operations including applications of fertilizer. The rates, timing, sources and placement of fertilizer suggested are as follows:

I. Broadcast the following:

(1) Starter fertilizer--about 500 lbs. of 4-8-8 or equivalent.

(2) Micronutrients (minor elements)--about 20 to 30 lbs. of FTE 503 or equivalent from a chemical mix.
(3) Superphosphate—on new land add about 1000 to 1200 lbs. On old land, determine amount by soil test. Reduce amount recommended for new land by 1/3 if soil test level for P2O5 is in the medium range and by 2/3 if in the high soil.

(4) Disk the soil thoroughly.

II. After the soil is disked, it can be bedded-up, fumigated, bed-shaped (flat and level as possible for one-row tomatoes and either flat or slightly crowned for two-row peppers). Herbicide, if used, and insecticide for mole cricket control can be applied on the surface of the bed. The balance of nitrogen and potassium should be applied as follows. (The suggestions for tomatoes are based on research conducted by Dr. P. H. Everett, ARC, Immokalee, Florida.)

Tomatoes

Fertilizer rates for tomatoes should be adjusted according to the expected length of the harvest season and/or the expected number of pickings. The following rates, in terms of nitrogen, are suggested for tomatoes grown with full-bed mulch on south Florida’s sandy soils.

(a) Ground (unstaked) culture—1 or 2 pickings as mature-green
120-150 lb N/acre

(b) Stake culture—4 to 5 pickings
200-250 lb N/acre

(c) Stake culture—15 or more pickings
300-350 lb N/acre

Potash (K2O) can be applied at a rate of about 1.5 times the amount of nitrogen used. When graywall of tomatoes is a problem, increase K2O rate to 2.0 times the amount of nitrogen.

Apply the N and K2O fertilizer mixture in two bands on the surface of the bed, each about 9 inches to the side of the plants. At least 50% of the nitrogen should be in the nitrate form. Potash should be derived from sources other than muriate of potash.

Peppers

Like tomatoes, fertilizer rate of peppers can be adjusted according to length of harvest season and/or number of pickings for full-bed mulch on sandy soils.

(a) Peppers—1 to 2 pickings
175 to 225 lb N/acre

(b) Peppers—3 or more pickings
250 to 300 lb N/acre

Potash (K2O) can be applied at a rate of about 1.5 times the amount of nitrogen used. Apply the N and K2O on the bed surface in 3 bands. Locate one in the center of the bed and the other two 9 inches to the sides of the pepper plants.

Even if everything is done perfectly to this point, all will fail if the soil under the mulch is not kept moist. The surface soil where much fertilizer is located must be moist at all times.

Equally important is the need for fast removal of excess water during periods of flooding rains. Upon receding, fertilizer salts may be moved down into the root zone.
B. Nutrients Removed by Potato Tubers

A recent article published in Better Crops with Plant Food, Volume LIX, February 1975, entitled "Nutrients Potatoes Remove Estimated Rapidly" should be of interest to Florida potato growers. The author, Dr. Robert Kunkel, Washington State University, analyzed potato tubers yearly from 1966 to 1969 for major and minor elements. His observations are worthy of note.

He found "that mineral element composition of the tubers was quite uniform, regardless of fertilizer rate and ratio or potato variety used. The correlation coefficients relating to amount of mineral elements in the tubers to yield were 0.9 or above (a coefficient of 1.0 is the highest possible) while those relating yield to percentage dry matter were negligibly low. Neither the percentages nor the amount of mineral elements found in the vines was correlated with yield."

Based on his findings of uniformity between varieties, seasons, etc., he estimated that a yield of 100 cwt (5 tons) of potato tubers will remove the following from the soil.

<table>
<thead>
<tr>
<th>Element</th>
<th>Lbs. element/100 cwt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>30.0</td>
</tr>
<tr>
<td>Phosphorus (P₂O₅)</td>
<td>7.0 (16)</td>
</tr>
<tr>
<td>Potassium (K₂O)</td>
<td>44.0 (52.8)</td>
</tr>
<tr>
<td>Calcium</td>
<td>0.8</td>
</tr>
<tr>
<td>Magnesium</td>
<td>2.5</td>
</tr>
<tr>
<td>Sulfur</td>
<td>2.4</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.02</td>
</tr>
<tr>
<td>Copper</td>
<td>0.016</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.015</td>
</tr>
<tr>
<td>Iron</td>
<td>0.047</td>
</tr>
<tr>
<td>Boron</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Dr. Kunkel states "the following inferences seem justified:"

(1) Large yields of potatoes remove large amounts of plant nutrients from the soil. If the soil cannot provide them, these nutrients must be applied.

(2) The data agree with the range of yields from 300 to 600 hundredweight per acre which would include most present-day commercial potato yields.

(3) Knowledge of soil tests, the amount of nutrients applied to the land, and the amount removed in a given sized crop should help determine fertilizer rates required for different yield levels.

NOTE: This material is being presented here with the permission of Mr. Santford Martin, Editor, Better Crops with Plant Food. Anyone interested in more details should refer to the complete article.

(Montelaro)

C. Herbicides for Florida Tomatoes

The list of recommended materials for use in Florida has dwindled over recent years for one reason or another. In some cases, growers have experienced only marginal control of weeds with herbicides and coupled with a buildup of difficult-to-control weeds, the situation has tended to become worse instead of better. The feeling that we have made a complete cycle and have now returned to the "hoe", while extreme, exemplifies the frustration of many people to the weed situation in Florida tomato production.
The arsenal of recommended materials:

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Lbs/Acre (Active Ingredient)</th>
<th>Time of Application to Crop (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials Needing Incorporation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treflan</td>
<td>1/2-1</td>
<td>Pretransplant or Post-thinning</td>
</tr>
<tr>
<td>Tillam</td>
<td>4</td>
<td>Pretransplant</td>
</tr>
<tr>
<td>Surface Applied Materials (No Incorporation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dymid or Enide</td>
<td>4-6</td>
<td>Preemergence or Post-thinning or Posttransplant</td>
</tr>
<tr>
<td>Amiben Granular</td>
<td>3</td>
<td>Posttransplant</td>
</tr>
</tbody>
</table>

(1) All treatments are preemergence to weeds.

The problem areas in open culture of tomatoes are straightforward in that the materials (1) may not control the weed species present in the field, or (2) do not give effective control for longer than 4 to 5 weeks. In this type of culture, a combination of weed control methods should be used in the program. That is, mechanical and chemical methods. An illustration would be a preplant incorporated material, a careful cultivation or two followed by a posttransplant or post-thinning application of a surface-applied material.

Full-bed mulch culture offers one advantage in that with the exception of nutsedge, few weeds will penetrate the plastic after it is applied to the bed. However, two problem areas remain. One is "at the hole" where weeds will grow in direct competition with the crop and the second is the shoulder area where the edge of the plastic is held down by the soil. At this shoulder area, weeds grow and cannot be removed by cultivation equipment because of the danger of damaging the plastic bed cover.

Several options may be considered for use on these problem areas by the grower. The use of a multi-purpose soil fumigant, if used at the proper herbicidal rate, can offer some relief of the weeds "at the hole" problem. While these materials are more costly, the multi-purpose facet (effective in controlling nematodes, certain soil-borne diseases, insects and weeds) increases their value for such a use. Another consideration would be to use an application of an herbicide in a band to the top of the bed center where the plants will be placed. In this situation, the herbicide could be applied in front of the plastic-laying machine. A less desirable method would be to direct a band of herbicide at the hole post-transplanting. Usually an interrupted pattern occurs because of the plant stems and ragged edges of the hole in the plastic so that untreated areas occur.

Control of weeds between the rows particularly on the strip of soil holding the plastic mulch down is the second problem area. Normally, any of the recommended materials can be used initially. Cultivation can control problematic weeds between the row, but the shoulder strip is not touched because of danger of damaging the plastic mulch. As a result, weeds grow unchecked in that area because the normal herbicides will not give season-long control. Various techniques have been tried to overcome this problem. One is the use of Tillam in a bed-over type use. A band of Tillam is sprayed on the strip of soil which holds the plastic down and soil from the middle thrown on top of it with a sweep, hence, the bed-over expression. Some have tried throwing soil to the shoulder to cover newly emerging weeds without the use of an herbicide. In either case, the number of times this can be done is limited. The weed problem in this area could be reduced if a long lasting herbicide was available that could be applied to the area or a short residual contact type herbicide which could be used periodically to "mow" the
weeds. At the present time, however, there are no long residual materials cleared for such usages by the tomato grower. Only one short residual contact material, mineral spirits, has clearance for between-the-row application in tomatoes. Its cost has increased tremendously in the past year and its critical time of application requirement (weeds should not be taller than 2-3") make its use somewhat limited.

(Kostewicz)

D. The Importance of the Fertilizer Salesman in Farm Fertilizer Use

A nationwide study was recently conducted by the National Plant Food Institute to determine farmer attitudes toward the use of fertilizer. One portion of the study which may be of interest to Florida vegetable growers is the section on fertilizer practices observed in the Yolo and Stanislaus counties of California.

In this region of the San Joaquin Valley, a great many vegetables are produced. These growers, like Florida growers, are already convinced of the value of effective fertilizer programs, are using rather high levels of fertilizer, and are aware that it is becoming increasingly difficult to keep up-to-date on current fertilizer technology.

(1) It was found that only 33-45% of the growers contacted knew the correct kind and amount of materials to use on their crops.

(2) Fertilizer salesmen reported that 90% of the growers purchasing fertilizer asked for information on the kind, amount, placement and proper time of application.

(3) It was noted that 57% of the growers listed the fertilizer salesman or fieldman as their primary source of information and that 43% listed the extension agent as most important.

(4) Fertilizer salesmen reported that approximately 60% of the growers followed the recommendations they gave them, and that the other 40% modified their suggestions in light of their own experiences.

(5) There was no significant difference between growers operating large and small farms on their source of information or on their degree of dependence on the judgment of the fertilizer representative.

(6) The primary source of information for the fertilizer company representatives was found to be the land grant universities, the secondary sources were company research and technical journals.

(7) Growers were found to be quite consistent in patronizing the same fertilizer company year after year; only 15% of the growers sampled shopped around. The critical factor in selection of a firm to do business with depended mostly on the services provided.

(8) The fertilizer company representatives were found to be quite well trained and experienced; 80% had attended college, one-half had college degrees, 20% had twenty years of experience, and 60% had from 5 to 20 years of work in their field.

This information could be quite helpful in designing more effective Extension programs. As we go forth into an increasingly complex era of agro-chemical technology, the more we must take the leadership in providing these "key influencers" with the most meaningful and current information. The information program can include more technical material than is ordinarily provided growers at general meetings.
This information could also be quite helpful to the fertilizer industry in their appraisal of their services offered to growers. It appears that the service provided is the key to grower satisfaction.

(Marlowe)

III. HARVESTING AND HANDLING

A. Marketing New Crops

Quite often vegetable growers wish to try new or different vegetable crops which they feel have potential for their area. Whether a large grower who wants to try a different crop from the ones he is accustomed to growing, or a small grower who is just starting, there are a few criteria that should be met before the new venture is actually put into motion.

(1) Know your crop. It may not be as well adapted to your area as you think. Also, varieties, cultural practices, available equipment and just general "know how" may determine whether the venture is a success or failure. Usually it is advisable to start with a small acreage the first year. Regardless of how much information may be available on a particular crop, experience is helpful.

(2) Know your market. Production is only one step toward making a financial success of a new crop. In order to realize any return for his effort and investment, the grower must be able to sell his produce. Too often, we run into situations where a grower has made the crop, and is ready to harvest but has no market. The market potential should be established before the crop is planted. The way a commodity is to be marketed will have bearing on the production schedule and harvesting-packing procedures. Some of the more common sales outlets for growers producing new crops are:

(a) Roadside markets, farmers markets, and/or U-pick operations. In this type of marketing, scheduling is very important. A limited amount of the commodity may sell well over a long period of time. Harvesting a large volume over a short period of time is usually undesirable.

In addition, with roadside markets, it is helpful to have a selection of different vegetables. A grower planning to use this type of outlet should schedule the new crop so that harvest will occur with that of other vegetables in his area. Grading, sizing and method of packing are often not as stringent for this type of marketing, although care should be taken to offer only high-quality vegetables.

(b) Established sellers. Although a commodity may be new for a particular grower, it may be produced commercially in his area. This offers a chance to market through an established sales organization. These arrangements should also be made well in advance of harvest, particularly if the seller is to grade and pack the produce. This type outlet may also be used on specialty crops, or those not normally produced in a certain area. If storage conditions for your crop and the commodities being handled by the established sales organization are compatible, your commodity may be important in making up mixed loads. Going through commercial channels usually requires better grading and sizing and some type of a standard pack.

(c) Direct sales to local wholesalers or warehouses. This method, which may be very satisfactory, probably requires the greatest amount of attention in terms of making early arrangements and commitments. Suppliers to retail outlets must be sure of an adequate and constant supply of a commodity, yet an oversupply can be very costly. For this reason, they often make arrangements well in advance of delivery date. Since
convenience, cost of handling and quality of produce are important, wholesale or warehouse buyers may require "special" services when buying locally. These services can include anything from a particular grade and back to palletization and delivery. Anyone interested in using this type of a market should make arrangements in advance and be certain he will be able to meet any special requirements or restrictions before committing himself.

There are numerous markets for good fresh vegetables for both the large or small operations even if it is an established vegetable for the growing area, a new one, or a specialty crop. The markets should be analyzed prior to starting production of a commodity and a decision should be made as to the type of marketing to be utilized. A grower looking for a market today for a crop that must be sold tomorrow is not in a very good bargaining position.

(Hicks)

IV. VEGETABLE GARDENING

A. Timely Gardening Topics

These questions and answers are suggested for agents' use in developing periodic (weekly) radio or newspaper briefs. They are based on letters of inquiry from Florida gardeners.

(1) Timely Topic for week of August 17-23.

Question

What is this vegetable called "topato" which I have seen advertised in several places?

Reply

The word "To-pato" is a patented name applied to a tomato plant and a potato plant growing in a very close proximity. Many who read the ads conclude that one advertised plant would produce potatoes on the roots and tomatoes on the branches. In actuality, what one gets is a potato tuber seed piece which has been hulled out. This potato "shell" is filled with planting medium (soil substitute). A packet of tomato seed is included with the purchase of the potato shells. The idea is to plant a tomato seed into the center of the medium filled shell, then plant the shell into the garden soil. The potato would produce potato tubers and the tomato would yield tomato fruits.

(2) Timely Topic for week of August 24-30.

Question

In planning my vegetable garden, in which direction should I run my rows?

Reply

Successful gardens are possible regardless of row direction. However, more even distribution of sunlight is obtained by laying out your rows in a north-south direction. As the sun rises, the east side of each row gets exposure to sunlight, then the west side of each row as the sun sets. If you had run them in an east-west direction, exposure would only have been on the south side mostly (sun tends toward the south as it traverses the sky from east to west during the September through June normal growing season in Florida).
(3) Timely Topic for week of August 31-September 6.

Question

I am just arriving in Florida and would like to have a garden. Can I get started right away?

Reply

Now is the time for your fall garden and for starting some things for your winter garden; when and what you plant depends upon your location within the state. Keep in mind that vegetables take longer to reach maturity in the fall than in the spring, since the days become shorter as winter approaches. Planting in fall and winter gardens in north and central Florida must be done early enough for plants to mature before the first killing frost, which varies up and down the state from early November to early December, on the average. Although killing frosts sometimes occur in South Florida (Pinellas across to Indian River and south of Lake Okeechobee), the cooler fall and winter months are the most desirable for both cool-season and warm-season crops. Some crops, such as strawberries and onions, which require cool weather for initiation of growth of the edible parts, must be started in the fall to insure harvest in the spring.

(4) Timely Topic for week of September 7-13.

Question

Do you have a list of vegetables grouped according to the pH range of the soil at which they grow best?

Reply

Most vegetables grow best at a pH range of between 5.5 and 6.5. The best average figure for all vegetables has been suggested as pH 6.2. It is within this slightly acidic range that most nutritional elements, if present, are available to the plant for proper growth. Even within this suitable range, however, you must be sure to supply required nutrients in quantities sufficient for plant needs. If the pH cannot be adjusted to the suitable range, extra effort must be taken to apply nutrients, particularly trace elements, as required in soil applications of fertilizer or as a foliar spray.

(Stephens)

B. Know Your Vegetables - Cassava

Cassava is also known as manioc, manihot, yuca, mandioca, sweet potato tree, and tapioca plant. It is an important food crop in the tropics where it is grown for its starchy, tuberous roots.

It has been grown in Florida for many years. Around 1895, it was grown to such an extent that a few small starch factories were started to process the crop. It became a common item in vegetable gardens all over Florida. While not important as a commercial crop any more, some small acreage is still to be found in Dade and other counties. Only a relatively few gardeners include it in their home gardens.

Description - The cassava is a shrubby perennial which grows to a height of 6 to 8 feet on smooth erect stems. It resembles the castor bean in appearance. The large compound, dark green, reddish veined leaves are palmately divided into around seven leaflets. The stems contain a soft white pith and have nodes from which new plants are obtained. The roots, which are the most valuable portions of the plants, grow in clusters...
of 5 to 10 at the stem base. Roots are from one to three inches in diameter and from one to three feet long. The pure white interior is harder than potatoes and has a very high starch content. They are covered with a thin reddish-brown fibrous bark which can be removed by scraping and peeling. This bark is reported to contain toxic hydrocyanic (Prussic) acid, which must be removed by washing, scraping and heating. There are two types of cassava recognized--"bitter" and "sweet". The "sweet" type contains only a small amount of the acid and is boiled and used as a vegetable, along with the young leaves. The roots are also used for animal feed and the starch for such things as glue, laundry starch and tapioca pudding.

**Culture** - Cassava needs 8 to 11 frost-free months to produce usable roots. It requires about the same soil and fertilizer program as for sweet potatoes for best growth. It is propagated by planting short 10-inch sections of the stems two to four inches deep at 4-foot intervals on 4-foot rows. The tops are cut away just before harvest. Then the roots are dug or pulled and used soon after harvest, since they deteriorate rapidly.

(Stephens)