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

FROM: James Montelaro, Extension Vegetable Specialist

VEGETARIAN NEWSLETTER 76-8

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NOTE: Anyone is free to use the information in this newsletter. Whenever possible, please give credit to the authors.
I. NOTES OF INTEREST

A. Vegetarian Newsletter Mailing List Update

We are required by law to revise our mailing list annually. If you wish to continue receiving the Vegetarian Newsletter, please fill out the enclosed form (last page of this issue) and return it to us promptly. If we do not receive the completed form from you by September 1, 1976, your name will be removed from our mailing list. Please check to see if we have your correct mailing address.

(Montelaro)

B. Index for 1975-76 Vegetarian Newsletters

We consider our production season for vegetable crops in Florida to be from July 1 to June 30. Annually, we prepare an index of our newsletter articles to cover this period. It is enclosed as a separate report with this issue.

County Extension Agents wishing to maintain a reference file of Vegetarian articles should bind issues for last season (July, 1975 through June, 1976) in a folder together with this index. When needed, it is a simple matter to check each annual folder for the articles desired. There are on file in our office indexes for the 1971-72 through 1974-75, as well as a "catch-all" index for the more important articles spanning from the early fifties to 1971. These are available upon request from our office.

(Montelaro)

C. Florida State Horticultural Society Membership

Membership in the Florida State Horticultural Society is open to anyone involved in horticulture. It is a non-profit association serving our vast horticulture in many ways. It needs the support of all.

We urge you to join. The annual dues are minimal, but the benefits are many. Send ten dollars ($10.00) to Florida State Horticultural Society, P. O. Box 552, Lake Alfred, Florida, 33850. Be sure to give your correct mailing address so that correspondence and the annual proceedings may reach you promptly.

We, also, urge you to attend the annual meeting to be held November 2-5, 1976 in Miami Beach. There will be about 150 or more excellent papers presented on all aspects of horticulture.

(Montelaro)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Fertilization and General Sequence of Operations Under Pull-Bed Plastic Mulch Culture*

*This information is being published as Vegetable Crops Extension Report VC 9-1976. A limited supply is available for distribution to the industry. Anyone wanting a few copies may obtain them from our office.

Introduction

Full-bed plastic mulch culture is being used presently on about 40,000 acres of strawberries, tomatoes, peppers, eggplant and other vegetable crops in Florida. Under this system of culture, using conventional sub-surface or overhead irrigation,
the crop must be supplied with all of its soil requirements (lime, soil pesticides, nutrients, etc.) before plastic mulch is applied. The reason for this is that it is almost impossible to correct a soil problem after the plastic mulch is placed over the bed. With drip (trickle) irrigation, certain modifications can be made in the root environment not possible with sub-surface or overhead irrigation. These include addition of fertilizer and other material after plastic mulch application. This report presents a general sequence of operations which must be carried out properly if the mulched crop is to succeed. Fertilization under full-bed mulch culture is presented in this report since it is not covered adequately in other publications. On the other hand, operations which are described elsewhere are given here, briefly, only to stress the importance of sequence of operations.

Sequence of Operations

Following is a sequence of operations which may serve as a general guide to growers using full-bed plastic mulch. Operations are grouped where it is felt that growers may combine two or more to increase efficiency. Suggestions made here are intended as guidelines to be modified as growers gain more experience.

A general sequence of operations for full-bed plastic mulch culture.

Step I
A. Land preparation
B. Development of drainage and irrigation systems
C. Liming soil (if needed)

Step II
A. Application of soil-incorporated fertilizer materials (if used)
B. Application of soil-incorporated insecticide (if used)

Step III
A. Preparation of rough beds
B. Application of soil-incorporated herbicide (if used)
C. Fumigation
D. Shaping and pressing of beds
E. Application of herbicide on bed surface (if one is to be used)
F. Application of mole cricket bait over bed surface
G. Application of remainder of fertilizer in a band or bands on bed surface
H. Installation of drip irrigation system (if used)
I. Mulching

(Note--Operations "C" through "I" must be done in rapid sequence to avoid loss of fumigant.)

Step IV
A. Maintenance of good soil moisture
B. Seeding or transplanting
C. Top water or overhead irrigation often in hot, dry weather to reduce soluble salt injury

1. Micronutrients

On sandy soils planted for the first time, use 6 lbs MnO, 4 lbs ZnO, 6 lbs Fe2O3, 4 lbs CuO and 4 lbs B2O3 per acre. Otherwise, use only one application annually
to maintain micronutrient supply in the soil. In limestone soils micronutrients become unavailable rapidly. These soils require micronutrient application for each crop. The micronutrients can be supplied from several forms including chelates, fritted glass and inorganic salts and oxides.

2. Sources of N-P-K

A. Nitrogen - At least 50% of total N should be in the nitrate form for soil treated with multi-purpose fumigants. More ammonia-N and less nitrate-N may be used where regular fumigants for control of nematodes are used. The remainder may be obtained from ammonia-N and some urea and water-insoluble organics. The latter two materials are not recommended generally under full-bed mulch because fumigated soils retard nitrification.

Table I. Fertilizer Rates for 3 Irrigation Systems Under Full-Bed Mulch Culture on Mineral Soils

<table>
<thead>
<tr>
<th>Crop</th>
<th>Sandy Soils</th>
<th>Limestone Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total/lbs/A</td>
<td>Total/lbs/A</td>
</tr>
<tr>
<td></td>
<td>N-P₂O₅-K₂O</td>
<td>N-P₂O₅-K₂O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tomato:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ground crop</td>
<td>160-240-240</td>
<td>175-400-350</td>
</tr>
<tr>
<td>2. Trellised crop</td>
<td>240-240-360</td>
<td>---</td>
</tr>
<tr>
<td>2. Trellised crop</td>
<td>340-240-510</td>
<td>---</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

(Note—Where graywall and blotchy ripening are problems, increase amount of K₂O by one-third.)

<table>
<thead>
<tr>
<th>Pepper:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Short-season crop</td>
<td>160-240-240</td>
<td>175-400-350</td>
</tr>
<tr>
<td>2. Long-season crop</td>
<td>240-240-360</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eggplant:</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Short-season crop</td>
<td>160-240-240</td>
<td>175-400-350</td>
</tr>
<tr>
<td>2. Long-season crop</td>
<td>240-240-360</td>
<td>---</td>
</tr>
</tbody>
</table>

| Cucumber and Squash   | 120-160-160 | 120-270-240     |
| (1st crop)            |             |                 |
| Cantaloupe and        | 180-240-240 | ---             |
| Watermelon            |             |                 |
| Lettuce and Endive    | 160-160-160 | ---             |
| Broccoli and Cauliflower | 150-200-200 | ---             |
| Strawberry(3)         | 120-160-160 | 120-270-240     |

(1) The rates suggested in this table are for soils low in residual N-P₂O₅-K₂O. For soils with medium to high residual level of any of these nutrients, the amount to be applied should be reduced proportionately. For soils (excluding those under drip irrigation) to be planted to a second crop on the same plastic mulched bed, rates suggested in this table should be increased by 25% to insure adequate nutrients for the second crop.
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(2) On limestone soils, add 50 to 75 lbs/acre of MgO for each crop.

(3) In areas where heavy overhead irrigation is used to start strawberry plants, increase the amount suggested in this table by 20 to 25%.

B. Phosphorus - Superphosphate and triple superphosphate are highly recommended for a large part or all of the phosphorus needs under full-bed mulch culture. Highly ammoniated superphosphate and di-ammonium phosphate can be used to supply some of the phosphorus needs on sandy soils. Highly ammoniated superphosphate is not recommended on the limestone soils.

C. Potassium - All sources can be used. The chloride (muriate form) ion contributes to soluble salt problems under full-bed mulch and for that reason should be used sparingly, if at all, where soluble salt causes plant injury.

3. Liming, pH, Calcium and Magnesium

A. A pH level of 6.0 to 6.5 during the growing season is recommended for vegetable crops. Fallow, unfertilized soils can drop as much as one pH unit after fertilization. Compensate for this possible drop by liming properly. A KCl pH test should be used to more accurately anticipate pH drop.

B. Try to maintain a calcium:magnesium ratio of 5:1 to 8:1 in the sandy soils.

C. Liming - If pH is low and ratio of Ca:Mg is 5 (or less):1, use high calcic lime. If pH is low and Ca:Mg ratio is 8 (or more):1, use dolomitic lime. If pH is satisfactory and either Mg and/or Ca is low, they can be supplied in the fertilizer mix from a number of sources.

D. There is no practical means of lowering pH in limestone soils.

4. Fertilizer Timing and Placement

A. Where sub-surface and overhead irrigation is used.

(1) Before bedding, broadcast and mix into soil the following:

(a) 400 to 500 lbs. of 4-8-8 or 5-10-10 (Note - This amount of fertilizer may be broadcast in a band 30 inches wide over the center of a false bed and bedded over about 4 inches deep. It may also be broadcast over the finished bed just prior to mulching.)

(b) All the micronutrients to be used.

(c) Remainder of P2O5.

(2) After bed is shaped and pressed, apply the remainder of nitrogen and potash on the surface in a band or bands 8 or 9 inches from plants. Use 2 bands on 1-row crops and 1 or 3 bands on 2-row crops.

B. Where drip irrigation is used.

(1) Broadcast and mix into soil before bedding the following:
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(a) 50% of total N and K₂O recommended
(b) All of P₂O₅ recommended
(c) All micronutrients recommended

(2) Apply remainder of total N and K₂O recommended through the drip system in increments daily to weekly as the crop develops. Increase amount applied each time as crop develops need for more nutrients.

(3) Additional nutrients can be supplied through drip irrigation if deficiencies occur.

Acknowledgments:

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E. E. Albrects  N. C. Hayslip
H. H. Bryan     S. J. Locascio
G. W. Elmstrom  P. G. Orth
P. H. Everett   G. A. Marlowe
C. M. Geraldson W. M. Stall

(Montelaro)

B. Influence of Water pH on Effectiveness of Pesticides

During the past growing season, many vegetable growers felt that they were not getting as good pest control from applied materials as they expected. One of the first things one should check, of course, is the thoroughness of the coverage. A second and often over-looked factor is the stability of the pesticide (fungicide or insecticide) in its relation to the pH of the water.

It is not uncommon for spray mixtures to stand overnight or even longer before reagitation and use. During these hours of standing, many pesticides lose varying degrees of effectiveness as a function of time, temperature, pH of solution, and exposure to light and air.

This article is intended to point out that pesticides should be used as soon as possible after mixing in the spray tank, and that the pH of the water used and sensitivity of the pesticide should be known. Corrective procedures are available.

Some of the pH sensitivities of commonly used fungicides and insecticides in Florida tomato production may be of interest. This information has been compiled from the "Guide to Chemicals Used in Crop Protection," 5th Edition by E. Y. Spencer, Publ. 1093, Canadian Department of Agriculture, and from Publ. 3005, "pH Effect on Insecticides", Leffingwell Chemical Company, 1976.

The pesticides in question were examined at various pH levels for various lengths of time and their effectiveness evaluated. From these studies half-life determinations were made, similar to those stated for radio-isotopes. At a pH of 9.0, carbaryl (Sevin) had a half-life (hydrolyzed 50%) in 24 hours; at pH 8.0 had a half-life of 2-3 days; at pH 7.0 had a half-life of 24-30 days; and at pH 6.0 was still 50% effective at 100-150 days. Guthion had a half-life of 12 hours at a pH of 9.0, whereas, half-life ratings of 10 days and 17 days were associated with pH conditions of 7.0 and 5.0. Pesticides vary in their response to acid-base relationships, therefore, it may be convenient to group them according to their relative sensitivity.
1. Sensitive to alkaline conditions

- Benomyl (Benlate)
- Dyrene
- Difolatan
- Demeton (Systox)
- Malathion
- Dimethoate (Cygon, De-Fend)
- Methomyl (Lannate, Nudrin)
- Carbaryl (Sevin)
- Naled (Dibrom)

2. Sensitive to acidic conditions

- Diazinon
- Maneb (Manzate, Dithane M-22)

3. Most stable in neutral solutions

- Mevinphos (Phosdrin)
- Endosulfan (Thiodan)
- Azinphosmethy1 (Guthion)

(NOTE: Adapted from publications referred to above.)

The decomposition is due to a reaction called hydrolysis in which the pesticide is split by the water (in either acidic or alkaline conditions) and converted to inactive forms.

Correction of pH in the spray tank should be considered if the spray water is found to be questionable. This can be determined by a simple pH test using commonly available kits. Materials like muriatic acid and phosphoric acid to lower pH and household lye to raise pH, if needed, can be purchased locally. Only minute quantities of these materials are needed to change pH. To determine the exact amount, add the acid or base in small increments and test the water each time until the desired pH (about 7.0) is reached.

Stability information is not always available on the pesticide label. Technical information sheets on specific chemical and physical properties of pesticides can be supplied by the manufacturers.

(Marlowe)

III. 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 15-21

**Question**

Can I grow garlic down here in Florida?

**Reply**

Garlic is not well adapted to Florida's climatic conditions. As a cool-season vegetable, it might be expected to do well here in the wintertime; however, the days are too short in the winter for its best performance. Most cultivated garlic varieties
are "long-day" varieties. That is, they require 13 to 14 hours of daylight to form the bulb. When grown in Florida during the time of year having these long days (summer), it is too humid and warm. So, there is no good time for garlic this far south. Early spring might be the best time for a trial planting since the days are lengthening then without the severe heat and rainfall of the summer.

(2) Timely Topic for Week of August 22-28

Question

This past spring my onions were oversized and split. How can I avoid this next year?

Reply

Try closer spacing. For best bulb size, space seedlings 2 inches apart in the row. A 4-inch spacing often results in oversized bulbs that tend to split and rot. Also, a slight reduction in your fertilizer application should further reduce the size. Should a cooler spring occur next year than last, a further reduction in size should result.

(3) Timely Topic for Week of August 29-September 4

Question

I'm not having much luck with celery in my garden. What might I be doing wrong?

Reply

Keep in mind that celery is a cool-season crop requiring more soil moisture than most vegetables. Seeds are sown shallow, very near the soil surface. Soil moisture must be maintained at or very near the soil surface while the seeds are sprouting. Furthermore, the seedlings must be shaded if grown before October in Florida. Unless you are providing these conditions, chances are your efforts at growing celery will meet with less than acceptable success.

(4) Timely Topic for Week of September 5-11

Question

Is lettuce a good crop for my Florida garden?

Reply

All four types of lettuce can be grown in all parts of the state with some degree of success. The main types are crisphead, butterhead, leaf and romaine. All are cool-season vegetables and grow best in the cooler months. Crisphead in particular needs cool weather to produce a solid, firm head. Warm weather causes toughness and bitterness, as well as the development of a seed stalk. The other three types can tolerate warmer weather, such as would result with a spring planting.

(Stephens)
Snow Pea (Pisum sativum var. saccharatum) is also called edible podded pea, sugar pea (U. S.), shih chia wan tou, also ta li wan tou (Mandarin), sic kap woon dou (Cantonese), no laan tau (Hong Kong), Saya-endo (Japanese). Varieties of edible-podded peas are similar to the garden pea in plant and growth characteristics, except that the pods are flatter, broader, more fleshy and less fibrous than in garden peas. The terminal leaflet is tipped with a tendril. The pods are tender at the immature stage and not as fibrous as garden peas. The pods, including the immature seeds, are eaten. They are harvested before the seeds start to accumulate much starch, and are cooked much as snap beans. Its culture is similar to that for English peas. For best results, sow seeds in cool season of year in Florida. However, the snow pea has wider adaptation and does better under higher temperatures than the garden pea. For example, it is commonly grown in the lowlands of the Philippines. Some is grown in Mexico during the winter for export to the U. S. In California, snow pea is grown all year in San Luis Obispo County. The major states in which it is grown are: California—over 700 acres; New Jersey—small plantings; Hawaii—10 acres; Florida—grown by a few producers of oriental vegetables and a few home gardeners.

(Stephens)
August, 1976

VEGETARIAN MAILING LIST UPDATE FORM

Return to: Dr. James Montelaro
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