VEGETABLE CROPS DEPARTMENT

The VEGETARIAN Newsletter

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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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THE VEGETARIAN NEWSLETTER

I. NOTES OF INTEREST

A. "Strawberry Production Guide" (Circular 1420) Available

The "Strawberry Production Guide" after being out-of-print for a period of time is now revised and ready for distribution. Because of a somewhat limited number of copies which were printed, we are again asking that good judgment be used in distribution of this publication. It is intended to service commercial producers of strawberries and representatives of allied industries serving such growers.

(Kelly, Kostewicz)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Double-Cropping Mulched Fields

It is estimated that 35,000 acres of vegetables are being produced this season under full-bed, black plastic mulch culture. A goodly portion of that acreage will be planted to a second crop of vegetables. The reason is simple--growers have found that they can grow a second crop successfully at minimal cost initially for soil preparation, fumigants, fertilizer, etc.

Research and experience in double-cropping mulched fields are somewhat limited. However, some information has been gleaned over the past few years which may be very helpful to growers trying it for the first time. The decision of whether or not to plant a second crop on a field to be mulched should be made before the plastic mulch is laid for the first crop. Once plastic is laid in a field, it is almost impossible to make any adjustments in the root zone under the mulch.

Probably the most important factor to take into consideration prior to mulching is the control of soil pests. These include weed seeds, nematodes, insects and diseases. A second crop may not succeed in a mulched field which showed moderate to heavy infestations of nematodes. To a lesser degree, this may be true of other soil pests, also.

Following are some pointers to be considered in planning for double-cropping of plastic-mulched fields.

1. Use good agricultural practices in land selection, leveling, drainage, irrigation, preparation, etc.

2. Lime soil, if needed.

3. Treat for soil pests with (a) multi-purpose fumigants or (b) with a nematicide, insecticide, fungicide, herbicide, or (c) combination of two or more listed under (b).

4. Apply adequate fertilizer for two crops. NOTE: A rule of thumb is to increase total fertilizer by 25% to supply second crop.

5. Keep moisture level at optimum level for plant growth even during fallow period between crops. Do not allow surface soil to become dry as it is hard to reestablish a desirable moisture level in that zone. In extreme cases, it may become necessary to punch small holes in the plastic mulch and overhead irrigate to wet surface soil.
(6) Do not seed or transplant second crop in holes where first crop plants were grown. Punch new hole to the side or between old holes for second crop.

(7) Do not follow tomatoes, peppers, eggplant with each other. The most successful second crops have been the short-season ones like cucumber and squash.

(8) When harvest is completed in late spring or early summer, remove plastic and plant a cover crop to protect the soil and trap residue fertilizer.

Growers using plastic mulch for fall and winter crops certainly should plan to double-crop their fields. They will probably find that double-cropping can add to profit potential.

(Montelaro)

B. Pruning Determinate Tomato Varieties

Should the determinate varieties of tomatoes like 'Walter' and 'Florida MH-1' be pruned and if so, how many prunes? It is a fact that if these questions were asked of trellised tomato growers, the answers would be quite different. Researchers at the Agricultural Research & Education Center at Bradenton, Florida, have conducted a series of experiments over the past few years to study this problem.

In a study completed in 1972, Mr. D. S. Burgis and Dr. Pat Crill reported that "pruning," restricted to the removal of 4 to 7 lateral branches up to, but not including the lateral shoot in the leaf axil below the first flower cluster resulted in earlier yield as well as increased fruit size over a 5-week harvest period for both 'Florida MH-1' and 'Walter' tomato varieties. Yield data is presented in Table 1. Note the sizable increase in yield in 'Walter' variety.

Table 1. Total marketing yield from pruned and unpruned 'Florida MH-1' and 'Walter' tomato plants expressed as number of 30 lb. packed boxes per acre at harvest.

<table>
<thead>
<tr>
<th>Harvest number</th>
<th>Florida MH-1</th>
<th>Walter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pruned</td>
<td>Unpruned</td>
</tr>
<tr>
<td>1</td>
<td>83</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>202</td>
<td>157</td>
</tr>
<tr>
<td>3</td>
<td>443</td>
<td>456</td>
</tr>
<tr>
<td>4</td>
<td>194</td>
<td>286</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>976</td>
<td>992</td>
</tr>
</tbody>
</table>

Any two sums followed by the same letter are not significantly different (LSD .01).

In a subsequent study, Mr. Burgis and Mr. Levins tested 0, 3, 6 and 9 prunes on 'Florida MH-1', a variety which would be most apt to be adversely affected because of its concentrated fruit set. They reported that "taking three prunes produced the highest total number of 13.61 kg cartons (30 lbs.) followed by 0, 6, and 9 prunes, in that order. Market value was at a maximum for three prunes and at a minimum for nine prunes."

Yields of the various sizes obtained for pruning treatments are presented in Table 2.
Table 2. Projected per hectare (2.47 acres) yields by sizes of number of 13.61 kg (30 lbs.) cartons of tomatoes for different pruning procedures.

<table>
<thead>
<tr>
<th>Prunes</th>
<th>Total Fruit</th>
<th>7x7</th>
<th>6x7</th>
<th>6x6 larger</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2836</td>
<td>450</td>
<td>1465</td>
<td>731</td>
</tr>
<tr>
<td>3</td>
<td>3456</td>
<td>420</td>
<td>1611</td>
<td>1090</td>
</tr>
<tr>
<td>6</td>
<td>2763</td>
<td>138</td>
<td>1001</td>
<td>1320</td>
</tr>
<tr>
<td>9</td>
<td>2286</td>
<td>101</td>
<td>739</td>
<td>1080</td>
</tr>
</tbody>
</table>

Note the effect of number of prunes on yields of the larger size tomatoes. To relate size and yield more practically, the researchers estimated value of the crop under different marketing conditions. The data are presented in Table 3.

Table 3. Estimated F.O.B. market values of dollar yields under different pruning procedures.

<table>
<thead>
<tr>
<th>No. prunes</th>
<th>Without supply control</th>
<th>With supply control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average prices</td>
<td>Good prices</td>
</tr>
<tr>
<td></td>
<td>per carton</td>
<td>per carton</td>
</tr>
<tr>
<td>0</td>
<td>12,063</td>
<td>18,794</td>
</tr>
<tr>
<td>3</td>
<td>14,901</td>
<td>23,726</td>
</tr>
<tr>
<td>6</td>
<td>12,788</td>
<td>20,200</td>
</tr>
<tr>
<td>9</td>
<td>10,887</td>
<td>17,583</td>
</tr>
</tbody>
</table>

Average prices were estimated from (4) and were taken to be $3.00, $4.00, $5.00 and $5.50 F.O.B. per carton for 7x7, 6x7, 6x6 and 5x6 and larger, respectively. Good prices were based on grower estimates of spring 1974 prices and were taken to be $4.00, $6.50, $8.00 and $8.50.

The data in Table 3 clearly show that 3 prunes increased market value of the 'Florida MH-1' tomato crop under the conditions of this study.

(Montelaro)

C. Growing Tomatoes in Greenhouses

A great deal of interest in greenhouse tomato production has been generated in the last several years in North and West Florida as well as other southeastern states. It is common to find sales literature and popular articles speaking glowingly of handsome profits to be made with this method of production. Unfortunately, a good number of people have been rudely awakened by the realization and costly experience that it is not as easy or as profitable as they were led to believe. In too many instances after several years of operation, they find that it has not been profitable and they cease operation.
Greenhouse production of tomatoes is a very exacting and demanding operation that requires technical know-how and management ability before commercial success can be realized. If one examines the historical development of greenhouse tomato production, an enlightening story unfolds. In early years, this means of production was the only source of fresh tomatoes for people in the northern areas of the United States. In recent years as the outdoor production of tomatoes from Florida and Mexico increased during the winter months, extreme economic pressure was placed on the greenhouse tomato market. What resulted was a decrease in numbers of greenhouse operations because they could not meet the competition. The first to go were the poorly-managed houses or the ones unable to master the production techniques necessary for economic production.

The development of plastic-covered structures and artificial growing media for production stimulated some renewed interest because of decreased costs to get established in a range of houses. This combined with a switch to warmer southern areas meant less cost for heating during the fewer and shorter colder periods of the year seemed to bring about a renewed interest in this type of production. However, the same economic pressure exists, if not greater, from outdoor-grown tomatoes and still affects success or failure.

In a previous Vegetarian article (72-12), a few of the intensive production aspects were pointed out as examples of the technical know-how that needs to be mastered to successfully grow greenhouse tomatoes. To this list must be added the new concept of managing artificial soil media such as the peat-vermiculite mixes now being used in many areas. Initially, slow-release fertilizer materials were tried, but success with these was limited. The newest fertilization method in use is that of injecting soluble nutrient materials to the system via drip or other irrigation lines. The when, how much, and how frequently are some of the problems to be dealt with as well as other unknown quantities with this method.

It has been our experience that a person familiar or experienced with intensive vegetable production and one that starts with a small unit to master the total greenhouse program has been the most successful. In this way, the mistakes and failures, and indeed there will be some, will result in a minimal financial loss. A number of inquiries we receive are from relatively large investors with no experience with growing plants of any nature. It has been our approach to attempt to scale down their ideas to "get their feet wet" first along the lines mentioned above.

A critical factor for success is marketing the tomatoes after they are produced. As with any business venture, one does not produce an item blindly and then try to sell it, but one seeks out and analyzes the market before heavy investment and production costs are incurred. In the area of tomato production, it was mentioned earlier that indeed the competition from outdoor-grown tomatoes is tremendous. However, there does exist in some areas at some times of the year a certain local or specialty trade. Some growers have been successful in finding this, but we are still looking for the operation that has "made it big" financially.

In summation, we are recommending that interested people:

(1) Seek out and analyze the marketing picture in their area before investing.

(2) There are many sources and suppliers of greenhouses and greenhouse supplies. Investigate as many as possible.
(3) Start small. Identify and master the techniques and know-how needed.

(4) Check your local Extension office for information. If they don't have it at their fingertips, they know who to contact to get it.

(5) Keep accurate records on costs and labor involved. Are you working or would you work for 50¢ an hour?

(6) Concentrate on quality. People won't buy "junk" even if it was grown with tender loving care.

(Kostewicz)

III. HARVESTING AND HANDLING

A. Lettuce - Handling and Quality

Although the per capita consumption of most fresh vegetables has been declining during recent years, lettuce consumption has increased on both a total tonnage and per capita basis. At present, the per capita consumption is approximately 22 pounds. There are a number of reasons for increased demand for lettuce including the increase in percentage of meals eaten away from home. A second factor may be the changing profile of our present population. The fastest growing segment of our population is the young adult group between 25 and 34 years of age. In addition to being the fastest growing group, these young adults also control a large share of the purchasing power in the United States, and are the leaders in salad consumption.

It has been obvious for some time that we are in an age of "consumer awareness." A great number of today's consumers are much more critical, particularly in regards to the foods they eat, than were their parents. They expect more quality in all fresh vegetables they buy. Lettuce, because of its importance in salads and fast foods, and also due to the changing profile of the population will probably continue to be demanded in greater quantity. In short, it appears that the lettuce industry can expect increased demands in both quality and quantity.

Lettuce is one of the produce leaders in terms of number of shipments which are rejected or discounted at the terminal markets. The loss rate continues to be high during wholesale, retail and in the home. A large percentage of these losses is attributable to poor handling at some point between harvesting and consumption. Poor handling at any point causes deterioration of quality and increased losses. The damage may not be apparent immediately after it occurs. In fact, losses incurred by poor handling during or shortly after harvest may not be obvious until the lettuce has reached the terminal market--or even the retail level.

The relatively high respiration rate of lettuce presents a series of problems, most notably heat and carbon dioxide accumulation.

(1) Heat - One of the products of respiration of any living organism is heat. The faster the respiration rate, the greater the amount of heat produced, and with vegetables the warmer a product is the faster it respires. A ton of lettuce at 40°F will produce approximately 3,000 to 4,000 BTU's per day. In other words, that much refrigeration will be needed just to maintain the lettuce at a temperature of 40°F even without considering heat exchange from outside the storage. At 60°F (because of increased respiration rate) roughly twice as much refrigeration will be needed just to maintain the same temperature.

(2) Carbon dioxide - CO₂ is another major product of respiration which can present problems during storage and transportation of lettuce. Since CO₂ is a direct
product of respiration, the rate of production is dependent on temperature. In storage or transport vehicles when there is very little air exchange, temperature may be an important factor in whether or not enough CO₂ accumulates to cause damage to the lettuce. For long periods of storage or transport, there is some benefit to be derived from the use of hydrated lime to absorb CO₂ from the atmosphere but this will not compensate for improper temperature regimes.

As can be seen from above, temperature plays an extremely important role in maintaining quality of lettuce. Reports from the University of California show that stored lettuce will remain in a salable condition twice as long as 32°F as at 38°F and that a few hours with temperatures in the 80's will cause as much deterioration in quality as a week at 32°F. Since lettuce is mostly water and has a high freezing point (31.7°F), quality and storage life are dependent on precise temperature control. Precooling immediately following harvest is essential. Lettuce should always be kept cold after precooling. Vehicles used to transport lettuce should be cooled before loading. In order to deliver high-quality lettuce to the market and the consumer, the temperature must be brought down immediately after harvest and maintained throughout marketing until consumption. Everyone in the chain from grower to retailer and the consumer must do their part if losses are to be minimized.

This article has dealt primarily with the effect of temperature on lettuce quality. There are numerous other factors which result in excessive trimming and other forms of loss at retail level such as mechanical damage, decay and transpiration or water loss. The causes of mechanical damage are usually apparent. While decay and transpiration cannot be entirely eliminated by temperature manipulation, the proper temperature regime does play an important part in reducing the amount of loss from these two factors.

(Hicks)

IV. VEGETABLE GARDENING

A. Timely Gardening Topics

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

(1) Timely Topic for week of January 19-25.

Question

I plan to have a "WIN" garden. Where can I get advice and a booklet on how to proceed?

Reply

Various gardening literature and helpful assistance on gardening are available from your local Florida Cooperative Extension Service. Check the telephone listing under County Government.

Some of the literature for Florida gardeners distributed free by the Extension Service include: (1) Circular 104, "Vegetable Gardening Guide", (2) Circular 375, "Organic Vegetable Gardening", and (3) Vegetable Crops Fact Sheets.
The gardener may obtain these and other helpful booklets on gardening by writing to the appropriate address. Note—Exclusion of other similar booklets on gardening is not intended.

(1) "Florida Vegetables - How to Grow Them", an excellent booklet by Lewis S. Maxwell, 6230 Travis Blvd., Tampa, Florida, 33610, For Sale at garden supply stores; (2) "Vegetable Gardening in Florida", free from State Department of Agriculture, Tallahassee; (3) "All About Vegetables", For Sale from Chevron Chemical Company, 200 Bush Street, San Francisco, California, 94104; (4) "Vegetable Gardening", For Sale from Southern Living Magazines, P. O. Box 2463, Birmingham, Alabama, 35202; (5) "The Home Vegetable Garden", For Sale from Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, New York, 11225; (6) "Sunset Book of Vegetable Gardening", For Sale by Lane Magazine and Book Co., Menlo Park, California, 94025; and (7) "Suburban and Farm Vegetable Gardens, For Sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402.

(2) Timely Topic for week of January 26-31.

Question
I want to grow a few fresh garden vegetables, but my house sits in the only sunny spot in the yard. What can I do?

Reply
Why not consider a roof garden? These gardens have been common in such cities as London. It is not an easy venture, due to the carrying or hoisting up of the materials. Perhaps the major consideration is that the roof is strong enough to support the weight of the containers, plus persons tending the garden. Containers, whether wooden, plastic or other, can be varied in design to give an appealing effect. It is a good precaution to support containers on cross-members so that excess moisture drains away. Some roofs may have a railing, so as to allow a trellis for climbing plants such as pole beans, to give the effect of an enclosed garden, and to partially screen off the containers from the ground level.

(3) Timely topic for week of February 2-8.

Question
I have been plagued with a plant-destroying condition that my neighbor refers to as "damping off". The small plants turn dark at the soil level and fall over. What can I do for them?

Reply
Usually, "damping off" is caused by one or more fungus diseases living in the soil, although a similar condition may be the result of other causes such as salt injury. These fungi attack the stems of young vegetable plants at the soil level. The plant weakens at that point and falls over. In cases where this disease condition has been noticed previously, the soil should be fumigated with an approved fumigant before the seeds are planted. Further safeguarding can be accomplished by planting seed treated with a fungicide.
Where the disease shows up on the seedlings, a fungicide drench of captan, thiram or terrachlor applied to the base of the plants, along the seed drill is sometimes helpful. However, once infected, the plant's condition is seldom helped by use of such materials.

(4) Timely Topic for week of February 9-15.

Question

I have saved my tomato plants from freezing by covering the plants with cloth. Some of the fruits from these plants were picked green and placed in my house to ripen. About two weeks have gone by with very little color change showing up. Will they get ripe?

Reply

Although you covered the plants, chances are the fruits have been exposed to temperatures in the thirties and forties. Thus, they probably have suffered chilling injury, which will prevent them for ripening properly. There will more than likely be a color change, but it will be a light yellowish orange. Edible quality of the fruit will be greatly diminished. Tomato fruits should be refrigerated only after ripening for best color and quality. Furthermore, if you picked them too green before they became mature, they will remain green and have poor quality.

(Stephens)

B. Know Your Vegetables - Amaranth

Amaranth (Amaranthus sp.) is also known as Tampala, Hon-toi-moi, and Chinese spinach. Several species of Amaranthus are used for food in different parts of the Tropics. Leaves of the different species or varieties are either red, variegated or green. The green form of A. gangeticus L. is most commonly cultivated for use as boiled greens. It is an upright branched annual. The young leaves and stem tips are ready to eat 3 to 6 weeks after the seed is sown. There is a red-leaved species (probably A. tricolor L.).

Amaranth or Chinese spinach grows well and rapidly at all altitudes in the West Indies. The green-leaved variety Tampala, which can be obtained from United States seedsmen, is satisfactory. Direct broadcast seeding is practiced and the seedlings are thinned when quite young to 3 inches apart. The thinnings can be used for greens. Tampala may be killed by cold, so grow it in warm weather.

(Stephens)