Prepared by Extension Vegetable Crops Specialists

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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 75-11

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I. NOTES OF INTEREST

A. Abstracts for Papers Presented at FSHS Meetings

There will be 30 papers presented in the Vegetable Section at the Annual Meeting of the Florida State Horticultural Society to be held on November 4-7, 1975. Anyone wishing to obtain these abstracts can do so by writing this office.

(Montelaro)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Beehives -- Supply Available for Pollination Through "Clearinghouse"

Growers of cucurbits (watermelon, cantaloupe, squash and cucumber) who are finding it almost impossible to rent bees for pollination should be interested in a program developed to aid them in overcoming the problem. It is listing of beekeepers who have beehives for rent to cucurbit growers. Dr. Fred Johnson, Extension Entomologist, working with honey producers, is getting an excellent response to his request for listings from members of this group. He reports that there are several thousand beehives available for rent to cucurbit growers this season. The list can be obtained by writing or calling Dr. F. A. Johnson, Entomology & Nematology Department, University of Florida, 214 Newell Hall, Gainesville, Florida, 32611; telephone (904) 392-1939 or by contacting this office.

Dr. Johnson's services are limited to a program of getting interested parties together. Detail of arrangements for rental charges, time of delivery, care of beehives, etc., are to be made by cucurbit growers directly with the beekeepers.

Cucurbit growers are urged to work with beekeepers in caring for hives during the pollination period. They may find that, in doing this, it will work to their mutual benefit. Beekeepers will be more apt to continue renting bees to growers if they are returned to him in good shape. By the same token, growers can benefit, not only from ready availability of strong beehives, but by learning how to handle the bees most effectively from the beekeeper who is an expert. The advice of the beekeeper can be invaluable to cucurbit growers.

(Montelaro)

B. Dolomite Overuse and Associated Problems

Over the years, when a need for lime was indicated, vegetable growers were encouraged to use dolomite as the liming material if magnesium levels were found to be low. Our guidelines suggest a calcium/magnesium ratio (Ca/Mg) of about 8 to 1 for vegetable crops in general. Dolomite should be used as the liming material when the Ca/Mg ratio is 9 to 1 or more. On the other hand, high calcic lime is recommended to raise pH when the Ca/Mg ratio ranges down to about 4 to 1. In those cases where pH levels are satisfactory, but magnesium is low in the soil, it can be supplied together with the fertilizer materials.

Recent experiences indicate that we may have failed to emphasize the danger of overuse of dolomite. This season alone, we have noted several cases of Ca/Mg ratios as low as 1 to 1. There are no benefits to be derived from an oversupply of magnesium in the soil. In fact, the reverse may be true. An overabundance of magnesium may be antagonistic to calcium and other cations in the soil and, subsequently, may cause deficiencies of these cations. This, together with the extra cost of dolomite, makes the overuse of dolomite an uneconomical practice. Vegetable growers should have their
soils tested annually. These soil tests should be used to help make decisions on sources and rates of liming and fertilizer materials.

Failure to monitor every practice carefully, can mean the difference between success and failure in vegetable production. This is especially true of liming, since it affects so many biological, chemical and physical properties of the soil.

(Montelaro)

C. Growing Broccoli and Cauliflower in Florida

Growers interested in vegetable production for local sales to consumers on the retail level are frequently interested in what crops they can grow during the cool months of the year. For growers willing to try small scale trial plantings and having the initiative to "learn" a new crop, broccoli and/or cauliflower may provide them with a rewarding experience.

Broccoli and cauliflower are cole crops (Brassicas) and are related to cabbage. This point is important because most of the cultural practices for cabbage can be adaptable to these two crops. Thus, the general guideline for pesticides and fertilizers, etc., given in Circular 117C, "Cabbage Production Guide" can be applied. However, there are some important cultural differences (note there may be some pesticide usage limitations also) which set these crops apart from cabbage and must be understood for successful production.

Both of these crops are less tolerant to cold weather than cabbage. Cauliflower is the least tolerant of them, but it can withstand light frost. Broccoli can survive frosts very well and perhaps would be most suitable for periods when the potential incidence of heavy frost is greatest.

These crops can be either direct-seeded or transplanted in the production area. The use of direct-seeding might be better in the fall and the use of transplants better during very early spring or late winter. Generally broccoli can be planted between August and February in North Florida, but cauliflower should be limited to August-October and January-February planting dates. In Central and South Florida, a serious limiting factor is the high temperatures of fall and spring. Thus, while broccoli and particularly cauliflower can be planted during the winter months, the total range of planting dates is smaller.

Seeding Dates in Florida

<table>
<thead>
<tr>
<th></th>
<th>North</th>
<th>Central</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broccoli</td>
<td>August-February</td>
<td>August-January</td>
<td>September-January</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>January-February</td>
<td>September-January</td>
<td>September-January</td>
</tr>
<tr>
<td></td>
<td>August-October</td>
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</table>

The mature heads of cauliflower are sensitive to cold weather and for that reason, it is advisable to avoid having mature cauliflower in the field during our coldest months. However, realizing that it is a calculated risk, growers may wish to experiment with limited plantings for harvest during those months when competition may be low and price may be high.

The cultural requirements of the two crops are somewhat different from several standpoints. Cauliflower is a single harvest crop in that the marketable product is a single head from each plant. The edible portion of cauliflower (the curd or head) is proliferated tissue which develops on the tip of the plant. The normal range from
seeding to harvest is 55-70 days depending on variety, growing conditions, etc. The use of transplants generally stretches this time length 7 to 14 days, but shortens time in the production field. Of the two crops, cauliflower is the more difficult to grow. It requires a growing situation in which growth can be continuous without any stresses. A frequent result of stresses is a condition called "buttoning". If the stress occurs when the plants are young, the head will start to form too early and the plant will not be of sufficient size to promote the development of a sufficiently large head. This buttoning can occur at any stage. Thus, providing a continuous favorable growing environment is critical. Two particularly important aspects to adequately maintain are water and fertility levels. In addition to providing the proper growing environment, it is necessary to "blanch" the heads to insure a white color. This may involve tying the leaves with string or rubber bands to protect the developing heads from light, which turns them green. This practice is usually done when the heads begin to form. Following tying, the heads should be inspected every couple of days to determine the best harvest time. Some of the newer varieties are "self-blanching". The leaves of these varieties tend to be more upright and provide a protective canopy over the head eliminating the need to "tie". A desirable head is one which is fully developed, compact, and clear white. Over-mature heads are less compact and the surface of the head becomes "ricey". When harvesting, the leaves immediately below the head are left attached (wrapper leaves) to provide protection.

Broccoli is usually harvested more than once. The initial cutting is of the larger central "head" which develops at the top of the plants. Side shoots or heads will continue to develop in the leaf axils on the stem. Thus, several cuttings can be made over a 2-3 week period. The normal range from seeding to first harvest is 70-80+ days. Transplanting again will add 7-14 days depending upon growing conditions. Maintaining a continuous favorable growing environment is desirable for best production. Broccoli is harvested by cutting the stem 6 to 8 inches below the head. The "head" of broccoli is a mass of flower buds which should be harvested before these begin to open. When open, the yellow color of the flowers appears and the head becomes loose. Both of these are undesirable because quality broccoli is dark green and compact. In addition over-mature broccoli becomes woody further reducing its quality. The whole broccoli plant is edible, even the main stem before it becomes woody. The leaves may be hunched as greens. These products are not marketable in normal wholesale channels, but they offer an opportunity for roadside stand operations.

Spacing

<table>
<thead>
<tr>
<th>Between Rows</th>
<th>Between Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cauliflower</td>
<td>24&quot;-30&quot;</td>
</tr>
<tr>
<td>Broccoli</td>
<td>30&quot;-36&quot;</td>
</tr>
<tr>
<td></td>
<td>20&quot;-24&quot;</td>
</tr>
<tr>
<td></td>
<td>16&quot;-22&quot;</td>
</tr>
</tbody>
</table>

Seeding

1 lb. of seed will direct seed 1 acre
1 ounce of seed will produce about 3,000 plants
Seed about 1/4"-1/2" deep

Varieties (For additional varieties, see Experiment Stations Circular S-234 "Vegetable Variety Trial Results in Florida 1972-73-74 and Recommended Varieties").

Cauliflower
- Snowball X, Snowball Y, Snowdrift

Broccoli
- Waltham 29, Early Green Sprouting, Atlantic

(Kostewicz)
D. Field Characteristics of Three Tomato Vascular Wilt Diseases

The full-bed mulch cultural system was designed to create a minimum stress environment for vegetable crops. The many advantages of the proper use of the system include higher yields, better quality and more effective management of pests, fertilizers and soil moisture.

In this system, the higher levels of fertility, soil pH and soil moisture associated with higher yields and more uniform plant growth may also create a more favorable environment for various plant diseases. Most plant pathologists agree that higher pH soils favor the development of Verticillium wilt; and most agree that Fusarium wilt activity is decreased as the soil reaction is brought to neutral or slightly alkaline conditions.

As with most systems, there are good and bad features upon which alternatives must be based. The enhancement of Verticillium wilt is an unfortunate side effect of the system, but the alternative of encouragement of Fusarium wilt may be of greater potential disaster.

Disease activity may be more noticeable under a full-bed mulch system than the conventional method because of the more favorable crop growing environment. Research findings over the past decade have shown that fast growing crops usually express Fusarium and Verticillium wilt more than those under stress.

Fusarium wilt, Verticillium wilt and Southern Bacterial wilt have many symptoms in common, are all serious diseases in Florida tomatoes, and all demand meaningful disease prevention programs. It should be of value and interest to extension agents, field men, and growers to compare the field symptoms of these three vascular wilt diseases.

Resource information for these comparisons was provided by Dr. John Paul Jones, Department of Plant Pathology, AREC, Bradenton, various textbooks and research monographs on these three major soil borne wilt producing pathogens. (See pages 6 and 7.)

III. HARVESTING AND HANDLING

A. Ripening Tomatoes With Ethylene - Safely

Ethylene gas is extremely flammable and may explode if ignited; also, ethylene is a gas with a characteristic suffocating, sweetish odor. It is both an anaesthetic and asphyxiating. High vapor concentrations can cause rapid loss of consciousness and perhaps death by asphyxiation.

At the recommended concentrations for ripening tomatoes, ethylene possesses neither of these characteristics. During the past few years in Florida, two ethylene ripening chambers have been blown-up—why?

Optimum concentration for ripening tomatoes with ethylene is 1000 ppm or less. Room temperature should be maintained at 70-75°F and the relative humidity should be about 90%. The explosive concentrations of ethylene is from 30,000 to 280,000 ppm or 30 to 280 times the recommended concentration for ripening.

Studies in Florida have shown that ethylene concentrations in ripening rooms range up to 14,500 ppm. This is substantially below the explosive range but far in excess of the amount needed.
### Field Characteristics of Three Tomato Vascular Wilt Diseases

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Fusarium Wilt</th>
<th>Verticillium Wilt</th>
<th>Bacterial Wilt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organism name</strong></td>
<td>Fusarium oxysporum f. sp. lycopersici (Sacc) Snyder &amp; Hansen</td>
<td>Verticillium albo-atrum Reinke and Berthold</td>
<td>Pseudomonas solanacearum E. F. Smith</td>
</tr>
<tr>
<td><strong>Type of organism</strong></td>
<td>Fungus (Fungi imperfecti)</td>
<td>Fungus (Fungi imperfecti)</td>
<td>Bacteria (rod shaped)</td>
</tr>
<tr>
<td><strong>Vegetables attached</strong></td>
<td>Tomato (only).</td>
<td>Tomato, potato, eggplant, okra, cucumber, watermelon.</td>
<td>Tomato, pepper, potato, eggplant, peanuts, soybeans.</td>
</tr>
<tr>
<td><strong>Early symptoms</strong></td>
<td>Poor growth, yellowing, wilting of oldest leaves first, margins curl downward. Evident very early.</td>
<td>Stunting, wilting, yellowing, leaf margins curl upward. Usually not noticeable until time of first harvest.</td>
<td>Younger leaves wilt first, slight yellowing of older leaves, and collapse of stem tips.</td>
</tr>
<tr>
<td><strong>Later symptoms:</strong></td>
<td>Yellowing may affect one side of plant only. Plant stunted.</td>
<td>Yellowing, stunting, fruit size reduced.</td>
<td>Wilting and death usually very sudden and general.</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td>Wilting and death seldom accompanied by yellowing.</td>
</tr>
<tr>
<td><strong>Leaf appearance</strong></td>
<td>Oldest leaves yellow, turn brown, die and cling to plant.</td>
<td>Leaves Vee-shaped lesions, yellow margins. Leaves drop prematurely.</td>
<td>Wilting and death usually diurnal.</td>
</tr>
<tr>
<td><strong>Wilt pattern</strong></td>
<td>Permanent wilt common.</td>
<td>Permanent wilt infrequent, usually diurnal wilting.</td>
<td>Wilting diurnal at first, later permanent.</td>
</tr>
<tr>
<td><strong>Vascular coloration</strong></td>
<td>Vascular tissue dark brown, from base of plant to axil of yellowed leaves.</td>
<td>Vascular tissue usually tan color, evident in leaf axil more than base of stem.</td>
<td>Vascular tissue and pith becomes brown, then pith decays as yellow-grey ooze develops.</td>
</tr>
<tr>
<td><strong>Affect on yield</strong></td>
<td>If serious, no yield.</td>
<td>Yield usually reduced.</td>
<td>If serious, no yield.</td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Fusarium Wilt</th>
<th>Verticillium Wilt</th>
<th>Bacterial Wilt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of crop growth disease most likely to appear.</td>
<td>Any period in which conditions are favorable for pathogen.</td>
<td>Any period of stress on crop usually at fruit sizing period.</td>
<td>Any period in which conditions are favorable for pathogen.</td>
</tr>
<tr>
<td>Soil type in which pathogen is most active.</td>
<td>Light sandy soils.</td>
<td>Wide range of poorly-drained soils.</td>
<td>Wide range of poorly-drained soils.</td>
</tr>
<tr>
<td>Soil pH in which pathogen is most active.</td>
<td>Mildly acid soils, activity low in alkaline soils.</td>
<td>Neutral to alkaline, activity very low in acid soils.</td>
<td>Mildly acid soils with high soil moisture.</td>
</tr>
<tr>
<td>Soil temperature in which pathogen is most active.</td>
<td>Optimum approx. 82°F (28°C).</td>
<td>Optimum approx. 75°F (22°C).</td>
<td>Optimum approx. 88°F (31°C).</td>
</tr>
<tr>
<td>Climatic conditions in which pathogen is most active.</td>
<td>Wide range of climatic conditions.</td>
<td>Cool, dry periods.</td>
<td>Warm, wet periods.</td>
</tr>
<tr>
<td>Usual means of transmission.</td>
<td>Infection occurs through the young roots, vascular parasite.</td>
<td>Infection occurs through root system, vascular parasite.</td>
<td>Entry of root wounds, caused by cultivation, nematodes, abrasion.</td>
</tr>
<tr>
<td>Method of overwintering or survival.</td>
<td>Soil saprophyte, survives as thick-walled cells during adverse conditions.</td>
<td>Soil saprophyte, survives as dessication resistant structure.</td>
<td>Moist organic matter and in weed hosts.</td>
</tr>
<tr>
<td>Key control features, field culture.</td>
<td>Area avoidance, long rotation, soil fumigation, sanitation, resistant varieties.</td>
<td>Area avoidance, long rotation, soil fumigation, sanitation, resistant varieties.</td>
<td>Area avoidance, long rotation. Weed control of host plants. Resistant varieties not available at this time.</td>
</tr>
</tbody>
</table>

(Marlowe)
Method of "gassing" ripening rooms is the crux of the problem. Most gassing rooms operate on the principle of "pounds of ethylene gas per room"; injection is on a weight basis. Modern gas ripening rooms are constructed with an injection port but "experienced operators" do not like to use these ports. At the maximum rate of gassing, these ports freeze up. "Why take 5 minutes when 15 seconds will do?"

As pure ethylene gas leaves the tank, an interface is established with the room air. Within this interface an explosive concentration is established. The more rapid the discharge from the ethylene tank, the greater is the area of this interface.

For maximum safety and economy, ripen tomatoes with ethylene using one or more of the following:

1. Use only the recommended maximum concentration of 1000 ppm (this is 1.25 ounces of ethylene gas per 1000 cu. ft. of ripening room). Maintain air circulation within the room.

2. Introduce ethylene gas into the room slowly, through external "injection ports".

3. Use ethylene gas generators which have been designed specifically for this purpose.

4. Use "measuring tanks" for slow release of ethylene gas into the ripening rooms after the doors have been closed and room secured.

5. Establish a "trickle system" whereby ethylene is introduced at the desired concentration and carbon dioxide is prevented from accumulating (high concentrations of carbon dioxide interfere with the ripening process and counteract the effect of ethylene).

6. Within the ripening room, avoid open flame, sparks and use only explosion-proof motors.

NOTE: This article was prepared by Dr. D. D. Gull, Associate Professor, Vegetable Crops Department, University of Florida, Gainesville.

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 November 16-22.

Question

What should I do to my endive plants to keep them from being bitter?

Reply

With early varieties of endive, it was usually necessary to bunch the outer leaves together and gently tie with light cord in order to Blanch green color from the interior and prevent bitterness. With today's tight-leaved varieties, however, such
bunching and tying procedures are unnecessary. Light is excluded naturally from the interior section, leaving the central heart leaves white, tender and relatively sweet.

(2) Timely Topic for week of November 23-29.

Question

There seem to be many hundreds of varieties of garden vegetables. What distinguishes one variety from another?

Reply

To warrant a new varietal name, a newly introduced plant should be different in one or more easily recognized or easily determined characters and preferably should contain some characteristic of superiority over existing varieties. Just a mere difference in a minor character is not considered sufficient reason for a new name. On the other hand, a new and distinct improvement should be recognized as such with a new name rather than by confusingly substituting it under the name of a standard variety. Differences among varieties can be both in non-edible parts, such as bean leaves, and in edible products, such as bean pods.

(3) Timely Topic for week of November 30-December 6.

Question

It seems to me most of the vegetables one can grow in the fall and winter are leaf crops. What are the main things to consider in growing this kind of vegetable?

Reply

Most of these are cool-season crop, and as such need cool weather for best growth. For example, 'Red Crosby' beets were shown to produce twice the yield of foliage at 60°F than at 70°F, although leaves were longer and more slender at the higher temperature.

Since leaves are succulent and contain a lot of water, ample soil moisture is also important. Fertilizer, mainly nitrogen, is needed in adequate amounts to produce abundant foliage. One final factor to consider is spacing. Too close spacing causes spindly, slender leaves and reduced yields per plants. Too great a spacing maximizes size of each plant, but reduces yield per space.

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

Question

I have been canning beets and have seen some roots with poor color. Any idea what has caused this?

Reply

Certainly the appeal of your final product will be greatly enhanced by the deep red glow of your beets. Of course, zones of darker color and lighter color are natural in beets, but white is undesirable. Cooler temperatures (50-60°F) produce better colored beets than warmer temperatures (70°F+). In general, fall and winter grown beets are darker colored than those grown later in the spring. Small roots usually have better color than the largest roots.

(Stephens)
B. Know Your Vegetables - Bamboo

Bamboo is useful in many ways, but its value as a "vegetable" should at least be briefly mentioned. Bamboos are woody stemmed perennial grasses, usually evergreen where adapted. There are 700 or more species of bamboo, ranging in height from a foot to 100 feet or more. In the U. S., only two species occur naturally (Arundinaria gigantea and A. tecta). Neither of these two are used for human food.

A bamboo plant consists of two somewhat distinct parts: aboveground jointed stem (called a culm), and the underground jointed rhizome bearing true roots.

Propagation is almost entirely done by vegetative means, generally by cuttings made from the underground rhizomes. Make cuttings 12 inches long, plant end-to-end 6 inches deep. Do not let the rhizomes dry out. Plant January to March.

The young sprouts, or undeveloped stem shoots, of the hardy Chinese and Japanese bamboos (genus Phyllostachys) are practically all edible. The sprouting season is usually short (3 to 4 weeks). Sprouts are crisp in texture and without pronounced flavor. Some kinds taste bitter, but bitterness is usually removed by boiling in water twice. To get good edible bamboo shoots, try mounding up soil over the base of the clumps to exclude sunlight from the young sprouts.

A typical food sprout properly dug is somewhat cylindrical in shape, resembling an ear of sweet corn in configuration. It has a small, rooted, woody basal part, increasing in diameter upward for a short distance to a point, and is covered with an enveloping sheath. Shoots should be dug when the tips are just emerging from the surface of the soil or very soon thereafter. Tissues at the base become increasingly woody as the shoots elongate after emergence.

To prepare the shoots for cooking: (a) remove the sheath covering, (b) cut off and discard tough basal part, (c) cut up tender middle and upper parts into thin slices or according to recipe.

Bamboo sprouts are used with good results as an ingredient in many ordinary dishes of various vegetables and meats. Sometimes they are served alone after boiling for about 20 minutes. Also, the most tender parts of non-bitter shoots can be used raw in mixed salads.

(Stephens)