TO: COUNTY EXTENSION DIRECTORS AND AGENTS (VEGETABLES AND HORTICULTURE) AND OTHERS INTERESTED IN VEGETABLE CROPS IN FLORIDA
FROM: James Montelaro, Vegetable Crops Specialist

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I. Commercial Vegetable Production

A. Potato Seed Quality

The Extension Vegetable Specialists are often called on to survey a problem in a potato field that is subsequently determined to have been caused by poor seed stock. This type of problem can be prevented and economic losses avoided by a simple inspection of the seed by the grower at the time he takes possession of it.
The grower, with a few years of experience in potato production, can quickly determine whether the potato seed stock is satisfactory or not. Briefly, the following is a simple check list that a grower may wish to follow in checking potato seed quality.

1. Check the exterior of bags for indications of dampness, condensed moisture and stains (indication of rotted potatoes). Suspicious bags should be opened and carefully inspected.

2. Check for physical injury including shatter bruising, cuts, surface bruises, peeling, cold injury, etc.

3. Check for size, varietal characteristics, etc.

4. Check for diseases including late blight, Fusarium, corky ring spot, nematodes, etc.

If he is not satisfied, the grower has the following recourse available to him:

1. Problems with seed related to diseases, insects and nematodes are covered by the Potato Seed Regulation administered by the Plant Industry Division of the Florida Department of Agriculture.

2. Problems related to grade, size, bruises, etc., are covered by contractual agreements and/or Federal-State Inspection Division grade standards.

If there are any doubts about potato seed quality, growers should consult local representatives of the proper agency listed above.

B. Biological Control of Cabbage Looper

The cabbage looper and closely related worms attack many vegetable crops in Florida. They can injure the growing plant and render edible plant parts and fruit unsalable from excessive punctures. The cabbage looper has been the most troublesome worm to control in many vegetable crops for a number of years.

There are now some new materials which offer considerable promise for the control of loopers in Florida. The most interesting new material is a bacterium (Bacillus thuringiensis), which invades loopers and kills them. It is a biological control method that does not leave a dangerous residue and is completely harmless to humans, wildlife and fish.

The Bacillus strains now on the market are many times more potent than the originals introduced a few years ago. In most cases, Bacillus treatment can be combined or alternated with an insecticide if so desired.

There are three commercial brands of Bacillus thuringiensis on the market. They are Biotrol XK, Dipel and Thuricide HPC. Growers having problems with loopers should try one of these products.
Recent research has also shown that some of the insecticides presently recommended for looper control are not doing the job satisfactorily. However, some of the newer insecticides are showing considerable promise for looper control. They are Lannate (Methomyl), Fundal and Galecron and all have been approved for use on cabbage. Check the label for approval before using on other vegetable crops.

(C) Soil Fumigation for Cabbage

Dr. D. P. Weingartner, working at the Agricultural Research Center, Hastings, Florida, recently completed some interesting research on fumigation of soils for cabbage. The results are only for one season and must be interpreted on that basis.

His objectives were two-fold: (1) to determine if nematodes decrease yields of cabbage harvested near midseason in the Hastings area, and (2) to study efficacy of various nematicides under Hastings conditions.

The plots were harvested on February 15, 1971. Results of the study on approved nematicides are presented in the following table.

Results of 1970-71 Cabbage Nematode Test - Hastings, Florida

<table>
<thead>
<tr>
<th>Treatment and Rate1/</th>
<th>Mean Head Weight (Lbs.)</th>
<th>Yield (Ton/Acre)</th>
<th>Nematodes2/ in 100cc Soil</th>
<th>Increase3/ in Crop Value ($)/Acre</th>
<th>Cost of3/ Chemical ($/Acre)</th>
<th>Added3/ Cost to Market ($/Acre)</th>
<th>Net3/ Return ($/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Fumigants</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telone 5 GPA</td>
<td>1.73</td>
<td>8.8</td>
<td>22.4</td>
<td>18</td>
<td>11.00</td>
<td>10.37</td>
<td>-3.37</td>
</tr>
<tr>
<td>Telone 7 GPA</td>
<td>1.91</td>
<td>11.3</td>
<td>5.2</td>
<td>168</td>
<td>15.40</td>
<td>96.77</td>
<td>56.83</td>
</tr>
<tr>
<td>D-D 10 GPA</td>
<td>2.08</td>
<td>10.7</td>
<td>8.2</td>
<td>132</td>
<td>17.00</td>
<td>76.13</td>
<td>38.88</td>
</tr>
<tr>
<td>Vorlex 7 GPA</td>
<td>2.20</td>
<td>10.8</td>
<td>1.8</td>
<td>138</td>
<td>50.40</td>
<td>79.49</td>
<td>8.11</td>
</tr>
<tr>
<td>Fumazone 86</td>
<td>0.8 GPA4/</td>
<td>1.83</td>
<td>25.8</td>
<td>84</td>
<td>9.76</td>
<td>48.38</td>
<td>27.86</td>
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<tr>
<td>Fumazone 86</td>
<td>2.5 GPA</td>
<td>1.78</td>
<td>9.8</td>
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<tr>
<td>Control</td>
<td>1.80</td>
<td>9.1</td>
<td>52.4</td>
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<td>--</td>
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</tr>
<tr>
<td>Control</td>
<td>1.63</td>
<td>7.8</td>
<td>62.4</td>
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</tr>
</tbody>
</table>

F values of all data are significant at 1%.

1/ Rates = material applied/row/acre (13070 ft.).
2/ Populations of sting, stunt, and stubby root nematodes are added together to give a single value. Sample was taken at midseason. Nematodes separated via sucrose centrifugation method.
3/ Crop value calculated on basis of: $1.50/bag or $0.03/lb. Chemical costs are based on distributor's prices March 17, 1971. Marketing costs = $.864/50 lb. and are taken from Ag. Econ. Report 15. Costs and Returns from Vegetable Crops in Florida Season 1969-70 with comparisons. Page 3.
4/ Fumazone 86 0.8 GPA applied at planting.
The results look quite promising. It must be remembered that this data is for one season only and, therefore, does not constitute a recommendation. Growers, in areas where nematode injury is suspected, are well advised to try fumigation for cabbage on a small scale in the beginning to determine whether or not the practice would be economical under the conditions tested.

(Montelaro)

II. Harvesting and Handling

A. Harvest at Proper Maturity

A understanding of maturity is necessary for successful marketing of fresh vegetables. Maturity, like quality, may have different meanings to different people. The physiologist sees maturation as a part of an irreversible process beginning at the time of inception of the plant structure and continuing until its death. The horticulturist says a vegetable is mature when the edible plant structure possesses the physical and biochemical attributes prerequisite to harvest. A produce buyer considers that a vegetable has reached commercial maturity when the harvested product is capable of carrying to market in satisfactory condition. Consumers consider some fully mature vegetables to be the best quality, but wholesalers and retailers are reluctant to handle them because of the risk of spoilage.

(1) Length of harvest period - The relative lengths of time that different vegetables remain in an acceptable maturity stage vary greatly depending upon:

a. The part of the plant used as food
b. Weather conditions (high or low temperature).

When the leaves are used as food, such as escarole and lettuce, or the underground portions such as potatoes, carrots and radishes, the marketable maturity period is relatively long except in hot weather. When the flower parts of broccoli and cauliflower are eaten, the heads may be harvested through a wide range of sizes, but always before the buds open. Among vegetables grown for their fruits some are eaten immature such as snap beans, cucumbers, squash, peppers and eggplants. Their marketable maturity period is relatively short and is judged largely by size development. Sweet corn has a very short harvest period, particularly in hot weather. Tomato and watermelon fruits are harvested when they are ripe (suitable for consumption), or when they are mature and then ripened after detachment from the plant. Since maturation occurs only before harvest, it is imperative that these fruit vegetables be mature at harvest and either possess or be capable of developing those characteristics suitable for consumption.

(2) Factors affecting maturity at harvest

a. Yield. Most vegetables continue to increase in size during the period of desirable harvest, and a delay in harvesting may increase the total yield very materially although the quality has declined.

b. Market prices. High prices encourage harvesting before or after optimum maturity.
c. Mechanical harvesting. Once-over single harvesting of many vegetables combines many stages of development. Until some method of uniform plant development and maturation can be evolved, selections for acceptable maturity will have to be made after harvest. If the maturity range is not extended too far in either direction and physical damage can be controlled, the produce industry should be able to adjust to mechanization.

(Hicks, Showalter, Gull)

III. Vegetable Gardening

A. Saving Vegetable Seed from the Garden

While it is true that garden vegetable seed are readily obtained most of the time from either the garden supply store or the seed catalog, many gardeners like to save seed for various reasons. Therefore, it might be useful to have information on hand pertaining to saving one's own vegetable seed.

Advantages

(1) Saving one's own seed may be the only source of supply.
(2) In some cases, a gardener may be able to give his vegetable seed greater care than those on the open market receive.
(3) Cost of seed is reduced.
(4) The plants selected are the ones which succeed best under the local environment.

Disadvantages

(1) Seed-borne diseases
(2) Unsuitable climate
(3) Length of time crops occupy garden space
(4) Crossing of varieties
(5) Seed must be stored
(6) Many varieties are hybrids, and seeds of hybrids should not be saved, as they do not produce plants that are true to desired type.

The following are examples of how seed of some of the different crops might be saved.

Group A -- Annuals, the seed of which are eaten

1. Beans and Southern Peas - Select the best plants, mark them, and allow the pods to dry. Pull the pods and dry in an airy, dry place. Shell the seeds and dry in a similar manner.

2. Sweet Corn - The best seed can be obtained by allowing it to ripen on the plant. Select the best and earliest ear by stripping down the husks to examine the grain and to remove any worms, then fold back and tie with an elastic band or string. After the kernels have matured, remove the husk and place the ears in a dry, airy place to cure.
Group B -- Annuals, the fruits of which are eaten

A fruit which develops from a blossom consists of the seed and its enclosing parts. It is a simple matter to save seeds of these vegetable fruits. The fruits should be allowed to ripen, and the seeds removed and cleaned. Some vegetables in this group are cucumber, eggplant, cantaloupe, okra, pepper, squash, tomato and watermelon.

1. Cucumber - Select the plant desired and allow fruit to remain on plant until ripe. Ripeness is usually indicated by development of pale yellow or golden color. Open the fruit, remove pulp and seed, and wash the seed clean. Spread the seed to dry in bright sunshine.

2. Watermelon - The seed of watermelon is ready for harvest at the time the fruit reaches edible maturity. Seed should be scraped out, washed, and spread to dry. Otherwise, they are similar to cucumbers.

3. Tomatoes - Select a desirable plant having good characteristics and uniformly good fruit. Tag the desirable fruits and allow to ripen past edible stage. Before they rot, pick the fruits, cut in half and squeeze out the seed pulp. Place pulp and seeds into a soft cloth bag and massage the bag gently under water, forcing the pulp out the bag in this manner. When clean, spread seeds to dry in airy place.

Group C -- Annuals, the stems or leaves of which are eaten

Examples are lettuce, endive, and mustard.

1. Lettuce - After the selected plant nears edible maturity, the seed stalk emerges and grows slowly. Lettuce seed is usually mature about 12 days after full bloom. When the first seed heads open so there is danger of loss of seed from shattering, pull the plants and put them, roots up, in a paper bag. Hang the bags in a dry, airy place until the seed is ripened and dry. Using a flail of some sort, thresh out the seed, clean and store.

Group D -- Biennials (plants which require a winter rest before seeding) the stems or leaves of which are eaten

Examples are Brussels sprouts, cabbage, cauliflower, celery, collard, endive, kale, kohlrabi, leek, onion, parsley, potato, and spinach.

1. Cabbage - The first year cabbage heads up; during the second year the stem elongates and branches considerably. The fruit is called a pod, and contains 12 to 20 seeds. Harvest seed pods when they have turned yellow. Spread the pods out in a dry, airy place on sheets of paper to ripen and cure. When the seeds are hard (do not crush easily between the fingers) beat them out of the pods and spread to dry.

2. Onion - The onion stem elongates during the second year, and sends up a flower stalk. As the seed pods open, the seeds will turn black and begin to ripen. Cut the seed stalks with about 1 foot of stem attached to pods and stack on paper. Expose them to the sun and dry; then rub out the seed.
Group E -- Biennials, the roots of which are eaten

This group has all the root vegetables except early radishes.

1. Beets - The leaves and fleshy taproot are normally produced the first year. The second year, branched seed stalks develop from the top of the root (crown). These may reach a height of several feet. The beet seed, as usually purchased, is really a fruit containing several seeds. Allow "seeds" to turn brown, then harvest, clean, and store. (Stephens)

B. Know Your Vegetables

This item will appear each month, discussing a little-known vegetable.

Cardoon (Cynara cardunculus) is another form of the Globe Artichoke. However, with cardoon the young tender leaves and undeveloped tender flower stalks are eaten rather than the flower bud. The thistle-like cardoon plant grows to a height of 3 to 5 feet and spreads over an area of 6 feet in diameter.

Our Florida summers are rather warm for cardoon to grow properly; therefore, it should be started in the fall or winter so that it develops in the cooler months similarly to the lettuce crops. It should be noted, however, that freezing temperatures below 28° F. may kill the above ground parts.

Propagation is by seeds, suckers or root division. A rich soil or abundant fertilizer and plenty of water are the requirements of the cardoon. Space the plants about 6 feet apart.

Usually, blanching of the stalks is desired. This is accomplished by tying up the outer branches a foot or so from the top of the plant and piling soil up around them as the plant grows. Do not cover the leaves with soil.

There are several uses for cardoon. The most popular is as a green, that is, with the leaves and tender stalks cooked. It may also be eaten fresh and uncooked in salads. Some say it has gentle laxative values. (Stephens)