THE VEGEATARIAN 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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I. COMMERCIAL VEGETABLE PRODUCTION

A. Downy Mildew on Watermelons

A rather serious outbreak of downy mildew disease on watermelons in south Florida this season should serve as a warning to growers of this crop in central and north Florida. Unlike gummy stem blight and anthracnose, two other serious diseases of watermelons, downy mildew attacks the leaves only. During the early stages of development on leaves, downy mildew cannot be easily distinguished by visual inspection from the other two diseases. However, on severely attacked leaves, they characteristically curl inward toward the midrib.

Dr. J. M. Crall, Plant Pathologist at the Agricultural Research Center at Leesburg, warns that downy mildew can be a very devastating disease on a watermelon crop. He points out that the spores which spread the disease from plant to plant do not necessarily require rain, but can be spread by wind. An outbreak of downy mildew is hard to predict, and for that reason, protective fungicides should be used on a regular schedule.

Dr. R. S. Mullin, Extension Plant Pathologist, recommends the use of one or more of the following fungicides: (1) the Manebs, (2) Zineb, (3) the Manebs with ZnSO₄, (4) Difolatan and (5) Bravo 75. These fungicides, fortunately, will also control anthracnose and gummy stem blight. The important thing is the application of fungicides before downy mildew develops, obtaining good coverage and proper scheduling to cover new growth.

(Montelaro)

B. Complexity of Minor Element Nutrition

On many occasions, the writer has called attention to the problems involved in the fertilization of vegetable crops in Florida. These involve such things as soluble salts, specific crop requirements, pH and sources, rates, timing, placement of fertilizer materials. Most of the discussions have centered around the three major elements (nitrogen, phosphorus and potassium) and the two secondaries (Ca, Mg). Together with these five elements, close consideration must also be given to the minor elements—manganese, copper, iron, zinc and boron. Molybdenum, the fifth minor element, is seldom a problem in vegetable production.

Minor element availability to plants is affected by many factors in the soil environment including pH, soil type, organic matter, moisture, temperature, etc. In turn, these factors interact with other factors such as differences in crop requirements, fungicide programs, fertilizer sources, rainfall patterns, etc.

The interaction of so many factors creates a situation which is seldom static. A chemical analysis of the soil can be relied upon only for the determination of extremes in the deficient and excess ranges for the minor elements. Since it is almost impossible to determine exact needs for each crop situation, growers must base their decision on knowledge of soil chemistry, history of the land, crop requirements, experience and good, common sense.
It is not possible in the space available in this report to discuss all aspects of minor element fertilization in detail. However, a few "rules of thumb" presented here can certainly help growers to adjust their minor element programs to insure success in vegetable production.

(1) In the absence of previous history and experience on vegetable land, use a "shotgun" approach. A general guide for adequate minor elements is the addition of 0.3% MnO, 0.2% CuO, 0.3% Fe₂O₃, 0.2% ZnO and 0.2% B₂O₃ to the fertilizer mixture. Another good material containing these same elements is FTE 503 at 20 to 30 lbs. per acre.

(2) Increase or decrease amounts of minor elements known to be deficient or excessive based on past experience or soil tests.

(3) Increase or decrease amounts of specific minor elements in accordance with specific crop needs. Crops vary in their requirements. For instance, no one has observed iron deficiency in beans in Florida. Adequate boron, on the other hand, is a must for crucifers.

(4) Increase amounts of minor elements proportionately as pH increases to near neutral and above.

(5) Make special applications on certain newly cultivated soils and for certain crops to correct extreme deficiency. Examples of these are copper on new, flatwood soils for watermelons and copper on new organic soils for all vegetable crops.

(6) Increase the amount of minor elements proportionately as rates of fertilization are increased.

(7) Take into consideration the minor elements supplied in fungicides such as zineb, maneb, ferbam and basic coppers. The minor elements from these fungicides enter plant leaves and are used in nutrition of the plants. They can supply part or all of the needs for one or more of the minor elements depending on number of applications. In certain instances, the fungicides can actually cause toxicities from heavy absorption of the minor element found in the fungicide.

(8) When a condition is suspected to be a minor element deficiency, test by spraying selected plants with minor elements applied singly. Deficient minor elements will cause plants to green-up, whereas some of the others may cause the opposite reaction.

(9) Learn to identify specific symptoms for each minor element deficiency or toxicity on the plants grown.

(10) Do not over-supply the soil with minor elements. Excesses are harder to correct than deficiencies in a soil.

(Montelaro)
C. Pepper Weevil in Florida

For many years, pepper weevil has been recognized as a pest on pepper crops in Florida. In any season, some injury from this pest can be found in pepper fields in southwest Florida. Control measures commonly taken by growers have kept weevil in check well enough to prevent serious damage to pepper crops in the past. However, a significant outbreak of pepper weevil during the past season was noted in Palm Beach County, an area where it has not been a serious problem in previous years. Bill Genung, Associate Entomologist at Belle Glade, surveyed the problem in a number of fields. He was unable to pinpoint the exact reason for the unexpected outbreak.

Pepper weevil can be very damaging to a pepper crop. The grub (worm) usually feeds on the blossom buds and small pods. Although it may feed on the walls of the pod, it is usually found in the seed-core area. Blossom buds and small pods damaged by this pest often fall to the ground or develop into poor-looking, misshapened pods. The adults feed on the leaves as well as on blossom buds and young pods. It punctures the young pods and blossom buds where it lays its eggs, from which grubs hatch in 3 to 4 days.

Jim Brogdon, Extension Entomologist, reports that the situation is being studied closely in an effort to head off serious outbreaks in the future. In the meantime, he recommends using one to two pounds of actual toxaphene on a regular schedule. If growers note any undue problems in the control of pepper weevil anywhere in Florida, they are asked to call it to the attention of their County Agricultural Agents or other IFAS workers involved in vegetable insect control.

(Montelaro)

D. Pollination and Fruit Set

The most poorly understood aspect of crop production by many people is the importance of pollination on the development of the fruit portions of crops (tomatoes, cucumbers, melons, etc.). Pollination is defined as the transfer of pollen from the anther to the stigma of the same or another flower. A generalized interpretation is frequently utilized in which pollination refers to both the pollen transfer and sexual fertilization process. Once the pollen has been transferred, it must then germinate and develop in a manner to deliver its genetic material to the ovule and effect fertilization. The fertilization and subsequent embryo development stimulates the further development of tissues associated with the ovule or ovules which leads to the development of the "fruit."

The terms ovule and ovary need to be distinguished at this point. An ovule is defined as a structure composed of those tissues which, following fertilization, develop into the seed. The ovary is defined as the basal portion of the pistil which contains the ovules or seeds. There are simple types of fruits which have a single ovary which contains a relatively small number of ovules. In this case, a few pollen grains may effect fertilization and the fruit subsequently develops. However, there are more "complex"
fruits such as tomatoes and watermelons which have a single ovary but hundreds of ovules which have the potential to develop into seeds. In this instance, a great deal of pollen is needed to insure fertilization of the ovules and to develop the seed potential. The development of the seed potential (pollination and fertilization) is important to the grower in terms of the final fruit quality (size and shape in particular). The fertilized ovule (developing seed) exerts a physiological "sphere of influence" on the tissues surrounding it in the developing fruit. Usually in the flowers that have a large number of ovules, a certain number of them have to be fertilized or the flower will abort. When less than optimal or maximum pollination and fertilization occurs, the developing fruit may be misshaped due to the lack of development of the tissues surrounding the unfertilized ovules. "Bottle-neck" watermelon is a good example of this point. If the watermelon is sliced lengthwise, it will be seen that the misshapen area of the fruit does not contain "seeds." Lacking the stimulation from the fertilized ovules (developing seeds), the tissues did not develop to their expected potential in the affected area.

The term "fruit set" is used as a means of relating the success or failure of the processes leading up the visual appearance of the fruit. In the normal sequence of events, the fertilized ovules and their associated tissues will develop into the "fruit." If fertilization is not achieved, the unfertilized "flower" will wither and drop from the plant. There are situations which occur that result in fertilized "flowers" also dropping from the plant. The relative number of flowers that drop versus those that remain and develop into fruits is used to judge the "fruit set."

There are a number of factors which contribute to a poor fruit set or to the occurrence of misshapen fruit. Some of these are listed below:

I. Failure of the pollen to reach the stigma of the flower.

A. Insect pollinated crops. Example, vine crops (squash, cucumbers, melons).

1. Inadequate pollination yields misshapen fruits (gourd shaped melons and cukes). A hive of bees should be placed every 5 acres in vine crops.

2. Bees tend to be inactive at temperatures below 60° F. and pollen transfer is thus reduced.

3. Improper timing of pesticide applications may reduce the bee population. Apply pesticides at times of day when bees are not active.

B. Wind pollinated crops. Example, tomatoes.

Under greenhouse conditions, pollination is a serious problem. Puffy and catfaced fruit often result from poor pollination. Mechanical methods (electric vibrators, paddle sticks, etc.) are used to shake the clusters and improve pollination.
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II. Failure to achieve fertilization.

A. Pollen "shed" may not correspond to the "receptive" time of the ovary.

B. Pollen could be sterile or not viable,
   1. Low temperatures reduce the growth of pollen on the stigma.
   2. Certain nutritional and physiological conditions can render the pollen produced not viable. (Low boron, for example.)

C. Environmental conditions.
   1. Excessive rainfall can wash pollen off of the stigma or cause pollen to rupture due to osmotic potential differences.
   2. Temperature extremes can damage either the pollen grains or the ovaries, or both.
   3. High humidity can hinder the shedding ability of pollen.

III. Fertilization is achieved, but the "flowers" drop.

A. Mechanical and physical damage to the flower by such items as hail, spray burn, and bruising can cause the flower to abort from the plant.

B. Physiological imbalance due to a nutritional problem or a carbohydrate reserve problem can also cause flower abortion.

It is important to consider that some of the conditions mentioned can be manipulated by the grower. A grower can set out bee hives to insure adequate pollen transfer, for example. Some conditions, primarily those relating to weather conditions, cannot be controlled by the grower and generally affect only those clusters undergoing pollination at that particular time. By maintaining bee hives (where needed), following recommended fertilization practices, and using proper cultural practices, the grower can influence those factors which affect the crop over the entire crop cycle.

(Kostewicz)
II. VEGETABLE GARDENING

A. Stakeless - New Tomato Variety from Delaware

A promising new tomato variety for Florida home gardens has been released recently by the Delaware Agricultural Experiment Station. The new determinate (bush type) tomato is called Stakeless. It is the result of a hybridization and selection program involving crosses among the varieties Lakeland, Rutgers, Delaware 3, Delsher and Epoch.

The plants of Stakeless are somewhat unique in that they have potato-type leaves, extremely thick stems, short internodes, and the fruit are borne very close to the stems. These characteristics make the plant an attractive ornamental and permit it to support the fruit above ground. It has been said to need no staking, but my observations of Stakeless indicate some slight support is needed to prevent toppling.

The plant grows to a height of 24 to 30 inches and has dense foliage to reduce sun burn. It is resistant to Fusarium wilt (race 1) and tolerant to early blight. Stakeless is late maturing.

B. Marigolds and Nematodes

Recent publicity has been given to the planting of marigolds as a control for nematodes in home vegetable gardens. A great deal of misunderstanding has resulted, with a lot more credit given the marigold than it truthfully deserves. Many gardeners have heard or even observed that vegetables planted adjacent to or intermingled with marigolds were seldom bothered by nematodes.

According to nematologists, the true story on marigolds runs about like this: (1) A few kinds of nematodes do not thrive on marigold roots; therefore, populations of these nematodes will be reduced where marigolds are broadcast-seeded as a cover crop over a garden plot prior to planting the vegetables. (2) Several other nematodes which cause problems to vegetables do thrive on marigolds, so actually may be increased by a marigold cover crop. (3) Marigolds do not appear to repel nematodes from adjacent vegetables, so little good in this respect actually comes from interplanting marigolds in the vegetable row.

C. Mulches and Nematodes

Like marigolds, much credit has been given to a garden mulch in controlling nematodes. Again, some misunderstanding is involved. Nematologists say that instead of reducing nematode populations under the mulch, what really happens is that above ground, observable symptoms are minimized due to optimized growing conditions in the soil environment. Healthy, vigorously growing plants tend to withstand nematode injury to a greater degree than unmulched plants.
D. Know Your Vegetables - Florence Fennel

Florence Fennel (Foeniculum vulgare) is found in many gardens throughout Florida, although not commonly grown in most. The plant is an annual which is grown for the thickened bulb-like base of the leaf stems. These make a swollen, bulb-like structure just above the ground, up to 3 or 4 inches long, and somewhat oval in shape. Some gardeners pull soil up around the developing bulbous base to blanch (whiten) it. They have a very aromatic, distinctive anise-like flavor and odor, and are generally used as a boiled vegetable. Sometimes, it is used raw in salads or as flavoring for other vegetables. Plants grow about 3 feet tall, with the foliage dense and thread-like, reminding one of dog fennel. In general habit, florence fennel is somewhat similar to celery. From seeding to harvest is about 4 months. Cool weather is best for growth of fennel.

Other names for Florence Fennel are Finocchio, Sweet Fennel, Sweet Anise, and Fetticus.

(Stephens)