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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I. COMMERCIAL VEGETABLE PRODUCTION

A. Chisel Spacing and Fumigant-type Nematicides in Vegetables

Fumigant-type nematicides used in vegetable crops must be placed correctly in the soil if effective control in the desired area is to be expected. Previous articles in this newsletter have stressed the criteria necessary to provide the proper action of the materials in the soil. Soil preparation, organic matter, moisture status, surface-sealing measures, and others have been emphasized. Dr. Don Dickson (Assistant Nematologist, Department of Entomology and Nematology, Gainesville) reminds us that chisel spacing and arrangement are equally important and points out that recommendations usually are given for specific arrangements and distances.

A fumigant-type nematicide spreads by diffusion through the soil from its point of injection in all directions. Under optimal conditions, control can be relied upon for a certain distance in all directions from this point. This is illustrated in Figure 1 and is labeled zone of control. This situation is representative of what occurs on a single chisel, row application used in many vegetable crops. In this instance, the crop is planted or the row corresponds to the treated strip in the field.

It is important to consider that the fumigant-type nematicides give a "kill" of nematodes while they are in the soil. Once the treated area has been aerated and/or through a lapse of time the material has dissipated, no residue of the material is left to prevent reinfestation of the treated area. This reinfestation can come from the "untreated" soil areas, from infested plants placed in the treated area, or regrowth of the nematode population in the treated area.

Figure 2 illustrates a situation in which the chisels are too widely separated and points out the areas where the nematodes are "uncontrolled" and can, subsequently, readily serve as sources of infestation for the "treated" areas. If the planted row corresponds to the uncontrolled areas, as in the figure, nematode problems will occur. Two-chisel application is occasionally utilized in unbedded single-row cultural situations, but is more frequently used where bedding is practiced. The exact spacing under both these conditions will vary with the material used, and generally will be somewhere between 8 and 12 inches. The important point is to obtain an overlap of the control zones so that control is effected.

Figure 3 represents the desired situation in a broadcast or overall application in which very little of the area is left "uncontrolled." This figure illustrates the desired overlap and resulting control area referred to in the previous paragraph. Figure 4 represents a full-bed mulch cover application in which a multi-purpose fumigant might be used.

Nematicides generally provide control in the treated area which will be sufficient to prevent nematodes from being a problem during the early portion of the crop cycle. Once the crop has become firmly established, regrowth of the nematode population will not be lethal to the plants. Many factors, some of which were mentioned previously, affect the activity of
fumigant-type nematicides in the soil. However, it is equally important to place the materials in the soil correctly, thus, permitting the maximum benefit from the materials to occur. Careful attention to recommendations for chisel spacing and evaluation of "in-field" application equipment while the material is being applied is important to insure the achievement of a good nematode control program.

Figure 1

Figure 2

Point of Injection

Zone of control

"uncontrolled" areas

Figure 3

Figure 4

B. Use of Clay to Lessen Sunburn of Tomato Fruits

"Sunburn" injury to the fruits of tomatoes, peppers, cucumbers, watermelons and other vegetable crops is quite common in Florida in late April, May and June. The injury lowers the packout from heavy cullage and in severe cases may even result in complete abandonment of a crop. Growers have used every means at their command to combat this problem with limited success in the past. Practices varied from lime paste painted by hand on watermelon fruit surface to limited suckering on staked tomatoes.

For two seasons, growers in south Florida have been applying finely-ground clay in a spray suspension to non-trellised tomatoes. Clay used for this purpose is the same material used as a diluent in the formulation of pesticides. It is an inert ingredient which is exempt from EPA residue tolerance. The clay residue on fruits appears to wash off easily in the packing house.
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Growers, who have experienced sunburn injury to their tomato crops for years, report that they are highly pleased with the protection afforded by the clay treatment. Some of the growers mix clay with pesticides in the spray tank. This, however, is not advised by the professional fieldmen who developed the technique. They advise applying clay in a separate operation to avoid stoppage of nozzles.

The first treatment is generally applied 7 to 10 days before the first harvest. This is the period when tomato plants normally start to "open up" and expose fruit to the sun. The plants are again treated after each harvest to protect exposed fruit during the picking operation.

The professional fieldmen suggest using clay at a rate of 18 pounds per 100 gallons of water together with a suitable sticker-spreader. They suggest strong agitation in the spray tank to keep the clay from settling out.

Since the use of clay for sunburn protection has not been tested by scientists of the University of Florida, it cannot be fully recommended at this time. There is always a possibility of some unforeseen reaction resulting in injury to a crop. For that reason, growers are best advised to test the clay treatment on a limited basis.

(Montelaro)

C. Fertilizer Rates and Sources on Yield of Potatoes at Hastings

A 1972 study made by Dr. D. R. Hensel of the Agricultural Research Center at Hastings, Florida, is quite interesting because it demonstrates the relationships between rates and sources of fertilizers on yields of a crop. Dr. Hensel tested three rates of 6-8-8 fertilizer supplemented by different rates and sources of fertilizers as sidedressings on potatoes. Data on soluble salts are given in Table I and on yields in Table II.

Table I. Effect of sidedressing on soluble salt readings in soil with three levels of fertilizer.

<table>
<thead>
<tr>
<th>Sidedressing Treatments</th>
<th>Fertilizer applied at planting lbs. 6-8-8/A</th>
<th>ppm soluble salts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1250</td>
<td>1875</td>
</tr>
<tr>
<td>Check</td>
<td>1978</td>
<td>2293</td>
</tr>
<tr>
<td>20-0-20 NaNO₃ + KCl</td>
<td>2590*</td>
<td>3098</td>
</tr>
<tr>
<td>20-0-20 Ca(NO₃)₂ + K₂SO₄</td>
<td>2433*</td>
<td>2923</td>
</tr>
<tr>
<td>20-0-20 NH₄NO₃ + K₂SO₄</td>
<td>2450*</td>
<td>2940</td>
</tr>
<tr>
<td>40-0-40 NaNO₃ + KCl</td>
<td>2275*</td>
<td>3203</td>
</tr>
<tr>
<td>40-0-40 Ca(NO₃)₂ + K₂SO₄</td>
<td>2240*</td>
<td>2660</td>
</tr>
<tr>
<td>40-0-40 NH₄NO₃ + K₂SO₄</td>
<td>2640*</td>
<td>2765</td>
</tr>
</tbody>
</table>

*The treatments received two applications of sidedressings.
Table II. Yield of potatoes from different sidedressing and fertilizer combinations.

<table>
<thead>
<tr>
<th>Sidedressing Treatments</th>
<th>Fertilizer applied at planting lbs.</th>
<th>6-8-8/A</th>
<th>1250</th>
<th>1875</th>
<th>2500</th>
<th>Ave.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cwt/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Check</td>
<td></td>
<td>134</td>
<td>159</td>
<td>186</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>2. 20-0-20 NaNO₃ + KCl</td>
<td></td>
<td>145*</td>
<td>179</td>
<td>174</td>
<td>166</td>
<td></td>
</tr>
<tr>
<td>3. 20-0-20 Ca(NO₃)₂ + K₂SO₄</td>
<td></td>
<td>179*</td>
<td>185</td>
<td>174</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>4. 20-0-20 NH₄NO₃ + K₂SO₄</td>
<td></td>
<td>177*</td>
<td>189</td>
<td>179</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>5. 40-0-40 NaNO₃ + KCl</td>
<td></td>
<td>159*</td>
<td>180</td>
<td>161</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>6. 40-0-40 Ca(NO₃)₂ + K₂SO₄</td>
<td></td>
<td>177*</td>
<td>204</td>
<td>171</td>
<td>184</td>
<td></td>
</tr>
<tr>
<td>7. 40-0-40 NH₄NO₃ + K₂SO₄</td>
<td></td>
<td>179*</td>
<td>192</td>
<td>188</td>
<td>186</td>
<td></td>
</tr>
</tbody>
</table>

*The treatments received two applications of sidedressings.

The information in Table I is interesting in that it shows in a general way the effects of rates and sources of fertilizer materials on soluble salts. The sodium nitrate (NaNO₃) + potassium chloride (KCl) source tended to increase soluble levels more than the other sources of nitrogen and potash. As rates of fertilizer application increased, soluble salts generally increased, also.

The data in Table II show that yield of potatoes was generally lower in the NaNO₃ + KCl plots than in plots receiving the other two sidedress combinations. In addition, as the rate of fertilization increased above certain levels, yields failed to go up correspondingly.

Since the study is not completed, the results shown here are not to be construed as recommendations. However, they are valuable in that the general principles demonstrated can be applied to modify fertilizer programs for many crops when supported by experience and basic knowledge.

(Montelaro)

D. Index for the 1972-73 Vegetarian Newsletter

The index for the Vegetarian Newsletters issued during the 1972-73 production season is included with this issue. For referral purposes, the index should be placed in a folder with the twelve issues it covers. Each issue of the newsletter is indexed by year and month of issue. For example, the 72-11 issue was published in November of 1972. Anyone wanting any back issues of the newsletter can obtain them by writing this office.

(Montelaro)
II. VEGETABLE GARDENING

A. Cucurbit Classification

The following orderly grouping of the many kinds and varieties of vegetables which we collectively call cucurbits is offered to ease some of the difficulty in determining the relationship of one type with another. Generally, groupings are made based on reproductive and vegetative botanical characteristics. Since probably most confusing of the groups are the pumpkins and squashes, these have been further detailed with respect to their probable occurrence in Florida. Please note - This outline does not necessarily agree with all classifications made by taxonomists, as some differences of opinion have established conflicting groupings.

**Cucurbitaceae** (Plant family usually called the Cucurbits has five tribes (groupings) of which Cucurbiteae will be outlined further.)

- Tribe I. Fevilleae (few, if any, vegetables)
- Tribe II. Melothrieae (few, if any, vegetables)
- Tribe III. Cucurbiteae (many important vegetables)
- Tribe IV. Sicyoideae (only chayote of which is important)
- Tribe V. Cyclanthereae (only one Peruvian variety worthy of note)

Cucurbiteae (Tribe III which includes many important vegetables)

- Genus A. Trichosanthes (About 50 species known, one mentioned here)
  - Species 1. *Trichosanthes anguina* - Snake gourd

- Genus B. Lagenaria (Only one species known)
  - Species 1. *Lagenaria siceraria* - White flowered, assorted shapes and sizes of most of the club, bottle and other gourds.

- Genus C. Momordica (Contains over 60 species, only two mentioned here)
  - Species 1. *Momordica balsamina* - Balsam apple
  - Species 2. *Momordica charantia* - Balsam pear

- Genus D. Luffa (Eight species known, one mentioned here, others not too important)
  - Species 1. *Luffa cylindrica* - Rag gourd

- Genus E. Benincasa (Only one species known)
  - Species 1. *Benincasa hispida* - Chinese melon or wax gourd

- Genus F. Citrullus (Has only four species, but only the following important)
  - Species 1. *Citrullus vulgaris* - Watermelon
    - *Citrullus vulgaris var. citroides* - Citron
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Genus G. Cucumis (Has nearly 40 species)

Species 1. Cucumis anguria - Burgherkin
Species 2. Cucumis sativus - Cucumber
Species 3. Cucumis dipsaceus - Teasel gourd
Species 4. Cucumis melo - Melons, including cantaloupes, Persian melons, nutmeg melons, honeydews, cassabas, snake melon and mango melon

Genus H. Sicana (Has only one well-known species)

Species 1. Sicana odifera - Curuba or cassabanana

Genus I. Cucurbita (Has several species, but only the three major ones are mentioned here)

Species 1. Cucurbita moschata

Pumpkin Varieties or Types

Cushaws (large, about 15 pounds, colors range from white, to golden, to green-white striped, crooknecked, sometimes seen in Florida fairs)

Japanese Pie (deep green, crooknecked, 10 pounds, vining, not popular)

Large Cheese (often seen in Florida fairs, 10 pounds, round fruits flattened and ribbed, buff colored, vining)

Tennessee Sweet Potato (creamy white, bell shaped, not common, vining)

Winter Squash Varieties or Types

Butternut (common in Florida, buff colored, bell shaped, vining)

Species 2. Cucurbita maxima

Pumpkin Varieties or Types

Mammoth (very large type for exhibition, vining)

Big Max (very large, orange skinned, slightly ribbed, vining)

Winter Squash Varieties or Types

Banana (long, banana shaped, grows on a vine)

Boston marrow (top shaped, 8 pounds, vining)

Buttercup (bowl shaped, green color, with blue navel, vining)

Delicious (top shaped, 8 pounds, orange, vining)

Hubbard (large, 15 pounds, pointed, warted, vining)

Turban (bowl shaped, warted, gray striped, button, vining)
Species 3. *Cucurbita pepo*

Pumpkin Varieties or Types

Cheyenne Bush (3 pounds, orange, pie pumpkin, bush)
Connecticut Field (large, jack-o-lantern, 10-15 pounds, vining)
Dickinson (often seen in Florida fairs, buff colored, ribbed, smooth, long watermelon shaped, vining)
Small Sugar (pie pumpkin, flat, ribbed, bright orange, vining)
Winter Luxury (like Small Sugar, but has netting, vining)

Summer Squashes

Caserta (vegetable marrow type, long, green splotched, bush)
Cocozele (striped, dark-light green, marrow, bush)
Cozini (black-green, long, marrow, bush)
Zucchini (popular, black-green, gray, smooth, marrow, bush)
Crookneck (popular, yellow, smooth, but warty when mature, bush)
Straightneck (popular, yellow, smooth straightneck, bush)
Scallop (popular, round, flat, scalloped, white, bush)

Winter Squashes

Fordhook Vine (cream colored, ridged, tapers to stem end, small, vining)
Spaghetti (tan, oblong, 2 pound novelty, inside looks like spaghetti, vining)
Acorn (Table Queen, widely grown, acorn shaped, ribbed, vining)

(Stephens)

B. Know Your Vegetables - Cocoyams

Cocoyam is a general name applying to several species of *Xanthosoma*. This vegetable is similar to the dasheen (taro) in many ways, yet its differences are distinct.

Cocoyam is widely grown and used in the tropics. In southern Florida, it has been grown in small patches for many years, and on a limited commercial scale since 1963 to meet the needs of Latin Americans living here.

It is known by many other names, the most common being yautia and malanga.

Description - Generally, cocoyam resembles elephant-ear plants, with large green leaves about 2 feet wide by 2½ feet long. The upper leaf surface is rather smooth and sometimes waxy, with the lower surface being ribbed. The main difference in leaf shape between dasheen and cocoyam is that the dasheen's petiole (leaf stem) joins the leaf blade away from the edge of the leaf, whereas the cocoyam's petiole attaches at the notched edge of the leaf much like in the "V" of a heart. The plant may attain a height of 5 feet or more.
Edible tubers are formed in the soil at the base of the leaf stems. Usually a central large tuber is formed, with a protrusion of grayish-brown to black lateral tubers around it.

**Culture** - In Florida, the crop should be started in the spring as the crop matures in 9 to 10 months. It is injured by frosts. It can be propagated by planting the (1) plant top (head), (2) whole main tuber, (3) main tuber cut into pieces, or (4) individual secondary tubers. Tubers or pieces should be set 3 to 5 inches below the surface. In Florida, plantings have been successful on low-lying marl and rockland soils. Other soil types might also be utilized as long as the moisture requirement, along with good drainage, is met.

**Storage** - Harvested cocoyams can be kept in good condition at room temperature (79°F) and humidity (76%) for 9 weeks. They remain in good condition for 18 weeks or more if refrigerated at 45°F.

**Use** - Tender cocoyams are washed and peeled before cooking. Some are so hard that cooking is required before peeling. They may be baked, mashed, fried or otherwise used as potatoes. Leaves are also eaten as greens.

**NOTE** - This summarizes the detailed report on cocoyams given by Julia F. Morton (University of Miami), Proceedings of the Florida State Horticultural Society, Volume 85, 1972.

(Stephens)