The VEGETARIAN Newsletter

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TO: COUNTY EXTENSION DIRECTORS AND AGENTS (VEGETABLES AND HORTICULTURE)  
AND OTHERS INTERESTED IN VEGETABLE CROPS IN FLORIDA

FROM: J. M. Stephens, Assistant Vegetable Crops Specialist

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I. COMMERCIAL VEGETABLE PRODUCTION

A. Common Mistakes in Use of Pesticides

In a recent newsletter to State Extension Specialists, Dr. L. C. Gibbs, Program Leader in Pesticides with the Extension Service of the USDA in Washington, D. C., outlined ten common mistakes in the use of pesticides.

1. Failure to read and follow instructions on pesticide labels
2. Carelessness in storage, handling and mixing pesticides
3. Inaccurate or infrequent calibration of pesticide application equipment and mistake in calculating dosages
4. Eating, drinking and smoking while handling pesticides
5. Failure to wear proper protective clothing and safety equipment
6. Use of more pesticides than needed for a specific job
7. Use of pesticides as an insurance measure
8. Applying pesticides when wind velocity is too high and drift becomes a problem
9. Failure to keep adequate records of pesticide use
10. Failure to observe safeguards for protection of the environment--people, bees, wildlife, water, etc.

Growers should study these carefully, then check their own operation and make corrections where needed. It would be advisable to post the list in prominent places such as equipment and storage sheds, offices, etc. The posted list would serve as a constant reminder of the dangers involved in the use of pesticides.

Mr. James Brogdon, Extension Entomologist with the University of Florida, feels that care in the use of pesticides cannot be over-emphasized. He urges all growers to exert every effort possible toward the development and maintenance of a safe and sound pesticide management program.

(Montelaro)

B. Bed-Shape, Fertilizer Rates and Placement for Two-Row Peppers Grown with Full-Bed Mulch

Seedling loss in late summer and early fall is probably the most serious problem encountered under full-bed mulch culture. This newsletter recently recommended the use of top-watering based on research conducted by Mr. N. C. Hayslip at ARC, Ft. Pierce. Experiment Station researchers are continuing their efforts to solve this problem as demonstrated by an excellent study reported by Dr. Paul Everett, Soils Chemist at the ARC, Immokalee.

Dr. Everett tested five bed shapes, three fertilizer rates and two fertilizer placements on two-row peppers with full-bed mulch. The test was conducted in the fall of 1972 under severe conditions where only 0.75 inch of rain fell during the first 40 days of the test. Plant beds were 6 feet on center with a 10-inch in-row spacing. The two pepper rows were 18 inches apart on each bed. Pepper plants were approximately 9 inches from fertilizer bands in all treatments. All plots were seep irrigated.
The treatments are explained together with the results obtained on seedling loss in the tables presented below.

Table I. Effects of bed shape on stem-girdling of pepper.

<table>
<thead>
<tr>
<th>Bed shape no.</th>
<th>Bed shape</th>
<th>Girdled plants-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N. side higher than S. side</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Crowned (convexed) center</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Flat</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Depressed (concaved) center</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>S. side higher than N. side</td>
<td>9</td>
</tr>
</tbody>
</table>

Table II. Effects of fertilizer rate on stem-girdling of pepper.

<table>
<thead>
<tr>
<th>Fert. rate</th>
<th>18-0-25</th>
<th>Girdled plants-%</th>
<th>Total used N-P2O5-K2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>278</td>
<td>9</td>
<td>75-140-110</td>
</tr>
<tr>
<td>Medium</td>
<td>1,111</td>
<td>12</td>
<td>225-140-278</td>
</tr>
<tr>
<td>High</td>
<td>2,361</td>
<td>17</td>
<td>450-140-630</td>
</tr>
</tbody>
</table>

*Each treatment received 500 lbs. of 5-8-8-2 + minor elements and 500 lbs. of superphosphate broadcase and disked in prior to preparing the plant beds. Amount of 18-0-25 banded on the surface is shown in the table. Total N-P2O5-K2O is also shown there.

Table III. Effects of fertilizer placement on stem-girdling of pepper.

<table>
<thead>
<tr>
<th>Fertilizer placement</th>
<th>Girdled plants-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 band</td>
<td>12</td>
</tr>
<tr>
<td>3 bands</td>
<td>13</td>
</tr>
</tbody>
</table>

Dr. Everett noted that "stem-girdling" was the major cause of reduction in plant stand. He stated that "stem-girdling, as used here, is believed to be caused by high concentrations of soluble salts (mainly fertilizer salts) which accumulate in the planting hole in full-bed mulch." His results shown that bed shape and fertilizer rates had a greater effect on seedling loss than did fertilizer placement. The flat-top bed, now commonly used, appears to be one of the best bed shapes.

 Marketable yield of pepper for harvests and total marketable yield are shown in the three following tables. Discussions and summary are taken from Dr. Everett's reports.
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Table IV. Effects of bed shape on pepper yield.

<table>
<thead>
<tr>
<th>Bed shape no.</th>
<th>Harvests</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>505</td>
<td>149</td>
<td>181</td>
<td>191</td>
<td>144</td>
<td>1170</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>484</td>
<td>124</td>
<td>159</td>
<td>283</td>
<td>195</td>
<td>1245</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>423</td>
<td>170</td>
<td>347</td>
<td>261</td>
<td>93</td>
<td>1294</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>439</td>
<td>193</td>
<td>228</td>
<td>192</td>
<td>165</td>
<td>1217</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>531</td>
<td>136</td>
<td>239</td>
<td>909</td>
<td>164</td>
<td>1297</td>
</tr>
</tbody>
</table>

See Table I for bed shapes.

The effect of bed shape on total marketable yield was not significant, although it did have a significant effect on yield of some of the individual harvests.

Table V. Effects of fertilizer rate on pepper yield.

<table>
<thead>
<tr>
<th>Fertilizer rate</th>
<th>Harvests</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-0-25</td>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>278</td>
<td>519</td>
<td>170</td>
<td>200</td>
<td>156</td>
<td>121</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>1,111</td>
<td>487</td>
<td>160</td>
<td>255</td>
<td>272</td>
<td>170</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>2,361</td>
<td>424</td>
<td>133</td>
<td>237</td>
<td>254</td>
<td>166</td>
</tr>
</tbody>
</table>

The medium fertilizer rate resulted in the best total yield. There was no significant difference in total yield between the low and high rates of fertilizer. If only the first three harvests are considered, there was no significant difference in yield between the low and medium rates, and both of these were better than the high rate.

Fertilizer rates did not affect fruit size until the 5th harvest when the medium and high rates had larger fruit than the low rate. However, for the combined yield from the 5 harvests, the low rate had larger fruit than the high rate.

Table VI. Effects of fertilizer placement on pepper yield.

<table>
<thead>
<tr>
<th>Fertilizer placement</th>
<th>Harvests</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 band</td>
<td></td>
<td>464</td>
<td>147</td>
<td>218</td>
<td>199</td>
<td>132</td>
<td>1160</td>
</tr>
<tr>
<td>3 bands</td>
<td></td>
<td>489</td>
<td>162</td>
<td>243</td>
<td>257</td>
<td>173</td>
<td>1324</td>
</tr>
</tbody>
</table>

Pepper yields were higher with the 3-band placement than with the 1-band placement. The yield differences were significant at the 4th and 5th harvests and for the total yield.
Summary: The results from this test, conducted under full-bed mulch during a dry season with sub-irrigation (no overhead irrigation), indicate that for a short harvest season (1 to 3 pickings) the low fertilizer rate, 3-band placement and flat bed would be adequate. However, until more research data are available, it would be advisable to use the medium rate of fertilizer as shown in Table II.

C. Dodder

Several instances of severe dodder infestation have come to our attention during the past several months. Dodder is a major noxious weed problem in the United States and in that regard, most state seed laws have provisions which limit the percentage of dodder seed that can be found in crop seeds offered for sale. Control measures should begin when the weed is first noticed to prevent it from becoming a serious problem.

There are 44 species of dodder reported in the United States; of these, perhaps 6 are the most damaging. Some species are very specific in terms of what plants they feed on while some have a wide range of host plants including wild weeds, shrubs and herbs. Thus, control of dodder (used collectively to refer to any species) in border areas, fence rows, waste areas, etc., is important to prevent a source of infestation to the cropped areas.

Dodder is an annual that reproduces by seed. The seed germinates in the soil and produces a leafless shoot which emerges from the soil. The shoot then "locates" a host plant and begins to climb and encircle it as it grows. When the shoot comes into intimate contact with the stem of the host plant, "suckers" are produced which penetrate the stem and allow the dodder to extract "food" materials from the host. Once this process is established, the basal part of the dodder plant may wither and the dodder becomes a parasite surviving on the host plant itself. The dodder then can grow and become a dense network or mat of leafless shoots.

Flowers are produced under favorable weather conditions from spring until frost. Under certain conditions, the dodder can overwinter in the vegetative state if protected from cold; however, the usual overwintering stage is by seed. The seeds that are produced can germinate shortly after falling to the ground or they may lie dormant for years.

Infestations of dodder in growing crops cannot be controlled on a selective basis without damage to the crop to which the dodder is attached. However, in scattered infestations within the field, spot treatment to destroy the vegetation in that area (both dodder and affected crop plants) can serve to prevent a buildup of seed which would be produced by the dodder.

In vegetable fields, dodder has not been a serious problem due to the use of herbicides, cultivation, and good cultural techniques. The problems lately encountered have been related primarily to plant beds and outbreaks of infestations from neighboring areas such as ditch banks, fence rows, etc.
Control in plant-bed operations is relatively easy if good preparation of the beds is practiced. What this essentially means is to utilize a multi-purpose soil fumigant to kill the seeds of dodder as well as many other weeds prior to or during their germination. These materials can serve to control weeds as well as soil insects. Multi-purpose soil fumigants were discussed in a previous article in this newsletter (see Vegetarian 72-11). Using one of these materials in a plant-bed operation will give excellent control of dodder.

In non-crop areas, the problem spots can be handled by using a knock-down material to top-kill all the vegetation in the affected spot and thereby eliminate plants which host the dodder. In certain cases, this treatment can be followed by a material which can be active on the "new crop" of germinating seeds. Many non-herbicide materials and methods can be tried in this type of situation; for example (1) cutting and burning the vegetation in the area, and (2) flame weeding the area. Chemical materials which could be tried are (1) aromatic oils, (2) dinitro compounds, and (3) paraquat, and other materials which will give a quick "chemical mowing" of the vegetation. Use practices to prevent drift and observe label cautions as to soil types, rates and environmental conditions.

In sodded areas or in some crop conditions, a preemergence herbicide such as DCPA (dacthal) can be utilized to help prevent germination of the dodder seeds. CDEC (Vegadex) and CIPC (Furloe-CIPC) are also reported to give a preemergence control of dodder. However, these materials should be utilized in accordance with the label. CIPC is a sprout-inhibiting material and for that reason should not be used in or around potato fields.

(Kostewicz)
A. Packinghouse Sanitation

A large portion of Florida's vegetables is transported for rather long distances before they are offered for retail sales to the consuming public. There are local instances where a particular commodity may show undue deterioration and decay during transit, even though transit conditions may be adequate. These instances are usually associated with climatic (or other) conditions which cause field infestations of certain microorganisms. When a fruit or vegetable is contaminated with rot organisms in the field, there is little that can be done at the packinghouse except to prevent spread of the decay organism to healthy fruits and vegetables. Since rotten produce is culled during the grading operation, it is often the contamination which occurs during harvesting and packing that produces the problems found after storage and/or transport. There are a number of things which will reduce the spread of decay and should be practiced routinely. Although most of these sanitation practices can be initiated in existing packinghouses, they will be more efficient if used in a facility designed or modified for these particular operations.

1. Field culling - As much culling as possible should be done in the field. With machine-harvested crops, this would be impractical if not impossible. However, where crops are harvested by hand, an effort should be made to eliminate rotten fruit before going to the packinghouse. Grading at the packinghouse should be done as soon in the operation as possible to prevent contamination of belts, rollers, etc., and thus decrease the chance of spreading the decay organisms.

2. Prompt and proper disposal of all culls, trimmings, etc., from the packinghouse - If this material is left on floors, in corners, under pallets and in machinery, it will provide an excellent breeding media for rot organisms. Material on the floor can create a hazard for workers, and decaying produce will certainly contribute to unpleasant working conditions. Cleanup of spilled and discarded produce should be practiced outside the packinghouse as well as inside.

3. Periodic and thorough cleanup (with suitable disinfectant) of all facilities - This is particularly important for grading belts, rollers, sizers and any surface which has direct contact with the produce during harvesting and packing operations. Field containers including picking buckets, bins, boxes, trucks and trailers are often neglected during cleanup operations and can provide excellent sources for inoculation.

4. Water treatment - All water which comes into direct contact with the produce should be chlorinated to prevent the water from carrying rot organisms to healthy fruits and vegetables. Even where water may be used only once--as in some washing operations--chlorine treatment can be helpful in preventing spread through wet belts, etc. If the water is to be recirculated or reused as in a number of wash operations, dump tanks and hydrocoolers, it is essential that the water be chlorinated. Even when chlorine is added to the water, it is necessary to change water and clean out the tanks periodically. This will remove organic matter which can tie-up and reduce the effectiveness of chlorine, and it will often result in a cleaner commodity.

(Hicks and Showalter)
A. Water Culture for the Hobbyist

For various reasons, there are those who wish to grow vegetables by the water culture method. This method is particularly popular with the science fair crowd and adult hobbyists.

In a water culture method, the vegetable plant is grown in a container of nutrient solution. The stem and upper parts of the plant are held above the solution while the roots are growing down in the solution.

There are at least two main considerations with this system. First, a way must be found to suspend the plant above the water and keep it anchored upright. And next, an air (oxygen) supply must be provided the roots of the plant in the water.

There are many kinds of containers that might be used, such as a cement or wooden trough, glass jars, earthenware crocks, or metal containers. Of course, they all must be leak-proof. Glass containers should be painted dark to prevent buildup of algae. Leave a narrow strip down the side unpainted so the level of the solution can be checked. Metal containers should be well-painted on the inside with an asphalt-base paint to avoid corrosion.

Containers should be fairly shallow, about six inches deep, and narrow, less than three feet wide.

A "platform" will be needed for planting into and supporting the plants as they grow. This is sometimes called a "litter bearer." It is made up of a chicken wire or hardware cloth base on which is placed about three inches of wood shavings, excelsior, or similar material called litter. The metal wire should be painted with asphalt-base paint. It should completely cover the container.

Plant roots must have oxygen to live, so a way must be provided to supply it. One way is to leave enough air space between the platform and the solution with an opening from this space to the outside air. Propping up the platform a little to let air in usually works. This may not be enough air for some plants particularly as they become large, so an aquarium air pump should be employed. After selecting the containers and locating them in a sunny or well-lighted place, fill them with nutrient solution. Use either a purchased, ready-mixed solution (follow the label directions), or one made with available chemicals and fertilizers (see Vegetarian 71-10 for a sample solution).

Place the litter on the platform and keep it moistened. Transplanting into the litter is the best way to get plants started. Work the roots through the support netting into the nutrient solution. Then, build up the litter around it for support. Such plants as tomatoes and lettuce transplant easily, and are suggested to try the first time.
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Seeds also may be planted in the litter. Cucumbers may be started in this way. When the little plants start to grow, keep the nutrient solution close enough to the platform so that the roots can reach it, yet still leave a small air space.

Empty the tanks every two weeks and renew the solution. While doing this, do not let the roots dry out. (Stephens)

B. Know Your Vegetables - Rhubarb

Rhubarb (Rheum rhabonticum) is a perennial plant which forms large fleshy rhizomes and large leaves. The thick succulent leaf stalks (petioles) having attractive red color are the edible parts. The rhizomes and crown persist for many years in areas where rhubarb can be grown. Leaf blades are up to a foot or more in width and length. Petioles are up to 18 inches long, one to two inches in diameter, and generally somewhat hemispherical in cross section.

Rhubarb, the "pie plant," is a very successfully-grown and popular perennial vegetable in many parts of the country, but is not well adapted to Florida. It has been said that it does not thrive and is rarely grown where the summer mean temperature is much above 75°F. and the winter mean is much above 40°F. Thus, Florida gardeners should not expect much luck with this crop as a perennial, as both our summers and winters are warmer than this.

In Florida, we have no periods cool enough to send the crowns into a rest period; therefore, the plant continues to grow through the winter to a certain extent. Upon the arrival of spring when we would expect an abundant flourish of leaf stalks, we find only a continuance of the old growth.

Seeds are easier to obtain than crowns, but plants arising from them show a great deal of variation in color and form. However, it is possible to sow seed in a seedbed or seed flat and select the most uniform and desirable plants to set in the garden. It is questionable whether or not sufficient growth can be obtained in one year following planting for this method to be practical.

Victoria is an old variety that produces large but poorly-colored stems (deep pink to red is desired). Burgess' Colossal is also large but produces pale green stalks. Canada Red, MacDonald, and Ruby are popular red-stalked varieties. It is not certain which varieties are best adapted to Florida.

It is suggested that rhubarb be grown in Florida as an annual, either from seed or from crowns. If from crowns, there is a possibility of three methods: (1) Crowns may be purchased from northern seed companies as early in the spring as is possible to obtain crowns whose rest periods have been broken. (2) Crowns may be obtained from the north in late summer, placed in cold storage (freeze them solid for 6 weeks) to fulfill rest requirements, and planted in the fall or early winter. (3) Winter forcing is a third method using crowns. It is a common commercial practice in the north, and may be of some value to home gardeners in Florida. Roots which are 2 to 3 years old and which have had a rest period are placed under more or less artificial conditions where they will sprout and produce stalks.
In south Florida, where temperatures seldom drop below 32°F (rhubarb will withstand temperatures down to this), seed might be planted in September in a seed flat, transplanted in the garden in October, and harvest begun by about February. In a trial at Zellwood, on muck soil, seeds planted December 12 produced marketable petioles by May 26.

(Stephens)