May 5, 1978

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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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VEGETARIAN NEWSLETTER 78-5

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I. NOTES OF INTEREST

A. Commercial Production Guides

A significant portion of our printing budget continues to be used up in the premature reprinting of commercial production guides which are printed in quantities sufficient to last for several years. For some crops enough copies are printed to supply every commercial grower with several hundred copies, if needed. It is apparent that these publications are being used for general distribution to the public. Besides being wasteful, this exposes amateurs to pesticide recommendations which are not appropriate to their needs or capabilities. Furthermore, the dollars used to reprint these publications are taken from priority new publications -- especially in the home gardening area. Many counties have removed commercial guides from their distribution racks and have been able to maintain their supplies. We encourage others to follow suit. For those who have depleted their supplies of Circulars 97 (Sweet Potato), 98 (Tomato), 99 (Sweet Corn), 100 (Bean), 101 (Cucumber), 102 (Pepper), 118 (Potato), 175 (Okra), 176 (Onion), it may be necessary to do some publication trading with other counties. We have no more in Gainesville.

Circular 104 and the Gardening Fact Sheets should meet the needs of home gardeners even without the availability of specific crop coverage. Specific coverage is available on cucumbers, strawberries and tomatoes.

(Kelly)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Fertilizer Placement for Watermelons in North Florida

Correct placement of fertilizer can reduce root injury of young vegetable seedlings caused by excess soluble salts. Watermelon seedlings grow best when fertilizer salts are maintained between 1000 and 1500 ppm. After the plant is established, soluble salt concentrations can be increased to 2500 - 3500 ppm when grown under optimum and relatively uniform soil moisture. Based on numerous research results and extension/grower experiences, preplant fertilizer should be broadcast in a 4 to 5 foot wide band before forming beds.

As a part of our north Florida watermelon program we are monitoring soluble salt concentrations and other production components in six demonstration plots. Jefferson County Extension Director Larry Halsey is comparing fertilizer placement as a modified broadcast treatment versus a broad band 6 to 8 inches wide under the

1Extension Vegetable Crops Production Guide. Note: Soils Department Extension Mimeo #1-12-69 entitled, "The 'Intensity and Balance' Method of Soil Testing in Florida" in SOIL TEST INTERPRETATIONS, p. 10.
seed. Note in the table, the soluble salt ranges of 4250 - 4810 ppm in the 
banded treatments versus 890 - 1720 ppm in the broadcast plots. Poor germination 
or slow growing plants were observed where the fertilizer band was located directly 
under the drill row.

**SOLUBLE SALT CONCENTRATIONS FROM WATERMELON DEMONSTRATION**
**PLOT IN JEFFERSON COUNTY, APRIL, 1978**

<table>
<thead>
<tr>
<th>Row number and sample location</th>
<th>Fertilizer Application Method</th>
<th>Banded (6 to 8 in under seed) ppm</th>
<th>Modified Broadcast ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Center</td>
<td>a/</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td>2-Center</td>
<td>4810</td>
<td>920</td>
<td></td>
</tr>
<tr>
<td>3-Center</td>
<td>4250 Mean</td>
<td>970 Mean</td>
<td>1720b/ 1080</td>
</tr>
<tr>
<td>4-Center</td>
<td>4470 4510 Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder</td>
<td>125</td>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>

aFertilizer was applied in this plot several days prior to the others and was 
leached by rainfall.

bPlot is located on a clay knoll. Therefore, movement of fertilizer salts may 
be restricted.

In Jackson County, Extension Agent Charles Brasher is monitoring four 
demonstration plots where moderate to high amounts of fertilizer were side-banded 
3 - 5 inches to the side of the drill row and one plot where the fertilizer was 
applied near the seed with a bumper applicator. Soluble salts in the drill row 
ranged from 125 - 250 ppm when the fertilizer was banded to each side of the drill 
row. However, 3500 ppm was measured 3 inches to either side. Watermelon yields 
from research plots have been greater where the fertilizer was banded to the side 
of the drill row rather than placed under the seed. However, consistently high 
yields have been measured with modified broadcast applications of fertilizer. 
In Washington County, Agents Lenzy Scott and Red Davis are measuring pH after liming 
the field. So far, limed fields have a pH of 6.2 - 6.3, whereas an unlimed field 
has a pH of 5.7.

Based on these results and previous information, growers should consider 
broadcasting a fertilizer containing a third to half of the required nitrogen 
and potassium, all the phosphorus, and adequate micronutrients in a 4 - 5 foot 
wide swath over the row before bedding. Future observations pertaining to 
irrigation, subsoiling, quality and economic implications will be summarized in 
the Vegetarian.

(William)
D. Pollination by Insects in Eggplant, Tomato and Pepper

Eggplant, tomato and pepper are generally considered to be self-pollinated. Wind vibration of flowers normally causes adequate pollen to fall onto the stigma for good fruit set. Do insects play a significant role in the pollination on these crops? The question is asked most often in seasons when fruit set problems are common. The 1977-78 season was such a season. The weather was too hot in early fall and too cold and wet in winter and early spring. Fruits that did develop were small and malformed, especially in eggplant.

The answer to this question is not a simple one. A review of the literature might lead to any one of the three conclusions. They would be (1) yes, (2) no and (3) maybe. The third, which says "maybe," is probably the only conclusion one can make from the information available at the present time.

The literature on this subject is summarized in an excellent U.S. Department of Agriculture publication entitled "Insect Pollination of Cultivated Crops and Plants" (Ag. Handbook 496 by S. E. McGregor). Relative to eggplant, he states, "Workers dealing with this crop have tended to overlook the insect visitors, but the amount of crossing recorded by different ones indicates that insect visitation occurs in relative abundance." One researcher reported 0.7 to 15 percent crossing on the same plant (which is effectively selfing).

Cross-pollination has been studied in greater detail in tomato than either eggplant or pepper. Plant breeders, searching for inexpensive methods of producing hybrids, have made sufficient observations to conclude that cross-pollination by insects is definitely possible. C. M. Rick, in a study ("Rates of Natural Cross-pollination of Tomatoes in Various Localities in California as Measured by the Fruits and Seed Set on Male Sterile Plants," Amer. Soc. Hortic. Sci., Proc. 54:237-252), reported, "In proportion of flowers that set fruit, the observed values fluctuated 3.1 to 30.3 percent (in self-sterile plants); in terms of fertile-plant yield, from 5.9 to 65 percent." He attributed cross pollination to several species of solitary bees, especially Anthophora urbana Cressm. and a species of bumblebee.

Most growers of eggplant, tomato and pepper agree that under normal conditions fruit set in these crops is adequate. In fact, some complain on occasions that fruit set may be too heavy for best fruit size. Under less than ideal conditions of cold, wet weather which prevailed for weeks on end during the winter of 1977-78, insects might have had "some effect" on fruit-set. The amount and economic significance are not known. Therefore, the answer to the question asked earlier must remain "maybe" until more is learned. Growers are advised not to use bees in eggplant, tomato and pepper crops on a regular basis as it is felt to be uneconomical at the present time.

(Montelaro)
C. The Tiger, the Tapeworm, and IPM

Integrated pest management (IPM) is receiving a great deal of attention in the farm press. Some approaches reflect a defensive attitude, others go on the offense, and many just show an incomplete understanding of what IPM is and is not.

Most of us would agree that a hungry tiger could make things rapidly uncomfortable for its host. The tapeworm demands less of its host than the tiger and thus enjoys a more sustained relationship. One of the biggest differences between the pest control practices of 1950-1975 and the integrated pest management of today is one of effect-time and degree of elimination of pests.

IPM is not a new concept. IPM does not advocate the elimination of all pesticide use. IPM does not rely only on biological control or resistant varieties, or cultural control. IPM is not just a gimmick to please environmentalists.

IPM is designed to utilize all known pest control and crop management (thus the more appropriate use of the term Integrated Crop Management) procedures in the most effective, economically sound manner with the least damage to man and his environment. IPM, unlike the old style chemical control (which attempted to eliminate pests for as long as possible) allows for a tolerable number of pests to be present, if they are below the economic threshold for the crop. IPM does require continual and close appraisal of the pest situation in the field. IPM does advocate using chemicals only when needed.

Why is IPM inevitable? The following reasons have hastened the consideration of this integrated approach:

1. Many pests have developed resistance to pesticides.
2. Many pesticides are hazardous to humans, livestock, wildlife, and contaminate the environment.
3. Pesticide costs have increased.
4. There is a possibility that there will be only a limited number of pesticides available in the future due to regulations and the high cost of research and development of new materials.

The components of IPM are listed briefly. Methods of operation of an IPM system will be described in a future issue of the Vegetarian.

Physical and Cultural Control

Definition: Direct or indirect measures taken to create a less favorable environment for the pest or to reduce level of damage to the crop.
Examples: Production of crop before or after normal peak pest period (pest free period).

Destruction of alternate hosts (often weeds).

Rotation to non-host crops (starvation).

Skip or fallow culture (some pests migrate downward as soil dries).

Flooding, deep-plowing, destruction of crop remains (removal or elimination of pest or food supply).

Sticky traps, light traps or chemical attractant traps (primarily insects).

Advantages: These methods cause very few unfavorable side effects to the environment, they are generally low cost practices, and they may reduce pest levels but seldom eradicate the pests.

Disadvantages: These practices usually provide temporary but important contributions to a total pest management program.

Biological Control

Definition: Biological control involves the reduction of the pest level by the action of parasites or predators on the pest complex (diseases, nematodes, insects, or weeds). Nearly every pest of cultivated crops has natural enemies. Biological control is one of the oldest, most successful methods known.

Examples: Contributions to the biological control of aphids by the braconid wasp, of tomato leaf miner by the earwigs, of the celery leaf miner by small wasps and of various lepidopterous larvae by Bacillus thuringiensis are well known. Nematode-trapping fungi and living organisms which destroy fungi, bacteria, and viruses are less well known. Knowledge is very scant in many areas of this complex system.

Advantages: Biological control is relatively permanent once established. It causes little or no hazard to other crops, to man, or to the environment. The cost of natural enemy control is much less than the imported enemy method or the method of rearing and releasing natural enemies.

Disadvantages: As yet biological control (by itself) has not provided adequate protection for large scale commercial vegetable production. At present this method is generally considered supplementary, but in the future greater reliance on biological control may be in order as our understanding of its dynamics widens.
Resistant Varieties

Definition: Plants inherently less damaged by such factors as diseases, insects, nematodes, or drought than others under the same conditions are said to be resistant. The resistance may be due to tolerance, non-preference, or immunity, but immunity is quite rare. Some wild plants may show varying degrees of resistance but lack desirable horticultural characteristics.

Examples: Breeding for resistance to the various plant diseases has received far greater attention than breeding vegetables for resistance to insects, nematodes, or drought. Many vegetable varieties have multiple disease resistance. The Walter tomato for example is resistant to fusarium wilt (Races 1 and 2), leaf mold, and gray leaf spot.

Advantages: Resistant varieties may provide specific relief from a pest condition. The results may be fairly permanent and the effect may help to reduce the pest presence in a cumulative way with continual use of resistant varieties. The change to resistant varieties is usually not costly. Damage to the environment, hazard to the applicator, and the problem of toxic residues are essentially eliminated.

Disadvantages: The development of resistant varieties with desirable horticultural characteristics is an expensive, slow process.

Chemical Control

Definition: The immediate and temporary reduction or prevention of certain diseases, insects, nematodes, and weeds by the application of chemicals is well known.

Examples: The application of natural materials such as the pyrethrins, inorganic materials such as copper, and organic chemicals such as the carbamates to control vegetable crop pests have become integral parts of modern day pest control.

Advantages: Chemicals have become the first line of defense in world-wide pest management of food crops. They are generally highly effective, relatively inexpensive and can be quickly applied. One or more pests may be controlled with a single chemical.
Disadvantages: A great deal of publicity (favorable and unfavorable) has been given to the chemicals used in pest control. Many of the chemicals are hazardous to humans; do leave toxic residues; do create undesirable side effects on wildlife; and do encourage the development of resistant strains of pests. In spite of these "legitimate" disadvantages, it would be irresponsible to propose the elimination of all chemical pesticides in large scale food production systems.

Another serious disadvantage is the damage to non-target organisms which may play a vital, supplementary role in total pest management programs. Sometimes the high-percentage kill of the target pest starves the natural enemies, further aggravating the imbalance in the system. After the pesticide influence has worn-off, the target pest can quickly recover, unregulated by it's natural enemies.

In summary, IPM (or ICM) utilizes the best features of each control method to assist in pest management strategies. IPM is basically an information technology. The careful use of pesticides is advocated on the basis of demonstrated need in relation to the total crop system rather than on regular intervals regardless of pest densities.

(Marlowe)

III. HARVESTING AND HANDLING

A. Temperatures for Handling Watermelons

Just because watermelons are good to eat when served ice-cold do not assume they should be held at low temperatures during shipping and marketing. Several vegetables, including watermelons and others of tropical origin, develop adverse reactions to temperatures between 32 and 50°F which is known as chilling injury. This is quite different from freezing injury which is seldom a problem with harvested watermelons.

Watermelons should be consumed within 2 to 3 weeks after harvest because of rapid changes in quality. At high temperatures they are subject to decay and breakdown in flesh texture from overmaturity. At temperatures between 32 and 50°F, watermelons develop pits in the rind, they decrease in pigment content and redness, the flesh loses its crisp texture, juice is lost after slicing and an objectionable flavor develops. Internal color will improve after harvest in melons that are harvested pink or pale red if they are held without refrigeration. IFAS research has shown much increase in red pigment at temperatures of 70-90°F. This increase in redness is particularly beneficial in watermelons harvested before they are fully ripe so they can be shipped to distant U.S. and foreign markets.

Although the effects of improper temperature may require some time before they are apparent, sunburn develops rapidly particularly with dark colored rinds and exposure of the bottom side to the hot sun. Melons should be moved from the sun to the shade as soon as possible after cutting from the vine. Since watermelons are hauled from the field and usually trucked to market in bulk loads, air circulation...
among the melons is important in maintaining temperature control. Although prevention of bruising requires padding beneath the load, straw or other cushioning material should never be placed between the layers of melons, because it blocks air circulation.

Many vegetables are precooled before shipping to shorten the period of rapid quality deterioration at high temperatures. However, watermelon precooling is not recommended because their size would make cooling extremely slow, and the temperatures of properly harvested melons are usually not far from optimum. Watermelons have been held for several months and even a year at room temperatures with little external evidence of internal deterioration. Last year a terminal market receiver stored a load of melons at 42°F to wait for higher prices and lost the whole load because of chilling injury. He concluded that melons can be stored for a maximum of two weeks even though they continue to look good on the outside.

The U. S. Department of Agriculture recommends transit temperatures of 55-70°F with ventilation for watermelons, although refrigeration is not required for normal transit periods. In actual practice most watermelons are transported from Florida in many types of open and closed trucks and trailers that have no refrigeration equipment. Although refrigerated trucks and van containers are more costly to own and operate, there are times when their use for watermelons is very justified. During periods of peak production and shipping, shortages of transportation occur when any available trucks are sought. Truckers hauling refrigerated foods into Florida may want back-haul loads of watermelons. If these refrigerated trucks can set their thermostats for the desired temperature range for watermelons and circulate air throughout the load, they provide very adequate transportation.

Refrigerated van containers carried aboard ships are normally used to transport perishables overseas. Recent U.S.D.A. research has shown that using sea air as a cooling medium rather than mechanical refrigeration could save up to 35% in shipping costs. The cooling system that pulls cool sea air across the cargo has been used to ship watermelons and other produce to European markets. Tests indicate that the system keeps produce at satisfactory temperatures.

The importance of internal quality of watermelons is very important in the market place, and the influence of temperature in maintaining this quality too often is neglected.

(Showalter)

IV. VEGETABLE GARDENING

A. Potato Problem -- Blind Tubers

A Florida gardener planted Irish potato seed pieces early in the spring as directed. After several discouraging days of seeing no visible signs of plant emergence, he scratched into the soil and examined the seed pieces. The seed pieces had sprouted, but at the end of the short, 2 to 3-inch long sprouts were small, young tubers. There was no leafy top growth, just these smooth round small tubers which would never reach useful size.
This problem probably occurs quite often in home gardens around the state. The condition is called sprout tubers, blind tubers, or potatoes without tops. It is a non-parasitic trouble which apparently is due to an abnormally high concentration of cell sap in the seed piece.

The unusual amount of cell sap is brought on by storing seed potatoes in a warm dark place, accompanied by removal of sprouts. When seed pieces stored and treated in such a manner are planted in a cool dry soil, the blind tuber condition results.

Once the condition is noticed, there is little if anything the gardener can do short of replanting to improve the situation.

Seed potatoes should be stored in a cool dark place to prevent sprout development. However, if sprouting does occur due to higher than desired temperatures, the sprouts should not be removed. Then, of course, the seedpieces should be planted in warm, moist soil.

Similar symptoms of blind tuber development results from planting potato tubers that were treated with a sprout inhibitor. Gardeners who purchase table stock potatoes from the grocery shelf to plant in the garden may run into this trouble.

(B. Stephens)

B. Know Your Vegetables -- Tree Onion

Tree onion (Allium cepa bulbiferum) is also known as Egyptian onion, Egyptian tree, top onion or perennial onion. A variety grown in Florida is sold in the seed catalog as Red Egyptian Topset.

As the names imply, the top bears the bulb, or bulblets, instead of flowers and seeds. No bulb forms but several offsets are produced at the base of the stem. The tree onion plant is similar to a green onion plant, or more closely to a shallot.

The plants are best grown as annuals. Best results will be obtained if started in the fall, but winter and spring planting give fair results.

Space rows 1 foot apart and plants 3 to 6 inches apart within each row.

Start the plants using either the top bulblets or the lower offsets. The lower offsets are used most often. Prepare the soil and plant the sets just as for regular onions. Just cover the tops of the sets with soil.

Both the base of the stem and the top bulblets can be used. The plant can be pulled and the base of the stem used before the bulb forms. The top bulb may be used as soon as it develops to an edible stage. Top bulblets are most often pickled, but may be used as green scallions.

(B. Stephens)
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