Vegetarian 87-04

April 17, 1987

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I. NOTES OF INTEREST

A. Vegetable Crops Calendar.

April 28 - 29, 1987. Weed Tour has been cancelled due to the late cold snap and to the large amounts of rain received.

May 5, 1987. Cucumber/Squash Variety Demonstration at AREC Leesburg has been cancelled due to frost damage.

May 7, 1987. Home Horticulture Agent In-Service Training has been cancelled due to shortage of training funds. The program has been rescheduled for May 26, 1988.

May 7, 1987. Field Day-Polk County Mined Lands Research/Demonstration Project, Bartow, Florida, has been cancelled due to flooding and frost.

May 12, 1987. Field Day - Tomato water and fertilizer management with drip irrigation. Artesian Farms, Ruskin. (Contact Rick Mitchell (Hillsborough County), Phyllis Gilreath (Manatee County) or George Hochmuth. R.S.V.P.)

May 20, 1987. Field Day - IFAS Gulf Coast Agric. Research Center, Bradenton. (Contact Dr. Will Waters).


B. Unit Name Changes.

Administrative consolidation of the Apopka, Leesburg, and Sanford Central Florida Research Units has resulted in need for establishment of a single name. Therefore, the name previously assigned to Sanford has been selected to encompass all three units, with the addition of the location at the end of the name, i.e., Central Florida Research and Education Center - Apopka, etc. In the process of reorganization, we have also made changes in mailing addresses and hours of operation. Therefore, the unit names, addresses, telephone numbers, and hours of operation are listed below:

Central Fla. REC - Apopka
2807 Binion Rd., Apopka, FL 32703
Phone: 305/889-4161
Hrs: 7:30 - 4:00

Central Fla. REC - Leesburg
5336 University Ave.
Leesburg, FL 32748
Phone: 904/787-3423
Hrs: 8:00 - 5:00

Central Fla. REC - Sanford
4700 Celery Ave.
Sanford, FL 32771
Phone: 305/322-4134
Hrs: 7:30 - 4:00

II. COMMERCIAL VEGETABLES

A. Summer squash varieties differ in susceptibility to powdery mildew.

Disease resistant varieties (cultivars) are recommended for use whenever they are horticulturally acceptable and that a particular disease is likely to threaten the crop. True disease resistance is generally lacking in summer - yellow straightneck, yellow crookneck, and zucchini - squash varieties. However, summer squash varieties do differ in susceptibility to diseases, and growers may wish to select those varieties for planting that are least susceptible. Varying degrees of susceptibility of summer squash varieties to powdery mildew have
been reported in Homestead (2) and in Texas (1). In the Homestead tests 'Cracker', a yellow crookneck, was found to be least susceptible, whereas 'Sundance' and 'Dixie' were most susceptible. In general, zucchini types were less susceptible than summer crookneck types; 'President', 'Richgreen', and 'Burpee Hybrid' were the least susceptible of the zucchinis evaluated.

Yellow crookneck varieties least susceptible to powdery mildew in the Texas trials were 'Enterprise', 'Golden Rebel' and 'Sunbeam'. 'Goldbar' was the least susceptible straightneck variety. 'ABCO', 'Arlesa', 'Classic', 'Diamate', 'Diplomat', 'Hyzini', 'Rapido', and 'Zucco' were the least susceptible zucchini varieties. Some experimental lines in each squash type had low susceptibility to powdery mildew.

Differences in susceptibility among summer squash types was also noted in the Texas trials as well as seasonal differences (Table 1).

Table 1. Susceptibility of summer squash types to powdery mildew in spring and fall crops.

| Squash Type         | Mildew Rating 1
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spring</td>
</tr>
<tr>
<td>Yellow Crookneck</td>
<td>2.5</td>
</tr>
<tr>
<td>Yellow Straightneck</td>
<td>2.0</td>
</tr>
<tr>
<td>Zucchini</td>
<td>1.6</td>
</tr>
<tr>
<td>Yellow Zucchini</td>
<td>1.4</td>
</tr>
</tbody>
</table>

1 = least susceptible, 5 = most susceptible.

In the absence of disease resistance, differences in susceptibility to powdery mildew can be used by growers in areas where the disease is particularly troublesome on a regular basis.

References


(Maynard, Veg. 87-04)


The following information is from a report by M. J. Ceponis, research pathologist, ARS, USDA.

Thousands of fresh fruit and vegetable shipments are examined on the New York market each year by trained inspectors of the USDA. These inspections are paid for by receivers or shippers who request the service. Most inspections are conducted on fresh produce shipments whose condition for acceptability is being questioned.

About 70,000 metric tons of fresh tomatoes are delivered annually to metropolitan New York, placing the commodity among the top 10 volume leaders of fresh fruits and vegetables. Florida supplies about 45% each year and California supplies about 25%; the remainder comes mainly from Mexico, Puerto Rico, southeastern states, New York, and neighboring states. During the period from 1972 to 1984, over 9,000 shipments of fresh tomatoes were inspected on the New York market and the results certified. These inspected shipments made up about 11% of all tomato arrivals on the New York market. During this same 8
year period, 2729 shipments from Florida were inspected.

Diseases that originate in the field were not common, although late blight rot and Phytophthora rot were reported in fairly substantial numbers, considering all shipments, but the number of shipments affected from Florida was less than 1% for each of the two rots.

Postharvest diseases, disorders, and injuries constitute the major deviation from normal. Historically, buyers and handlers have contended that Florida products are more perishable and nonuniform in pack compared to products from other production areas. Certified inspection of tomatoes at the New York market does not totally support this assertion. Listed are the percent occurrences of the various abnormalities found by USDA inspectors, for ALL tomato shipments inspected (over 9,000) compared to occurrences on the 2729 Florida shipments, shown in parenthesis ():

Diseases: Sour/watery rot 35 (39), gray mold rot 28 (26), bacterial soft rot 25 (25), decays, unidentified 24 (25), Alternaria rot 8 (9), Rhizopus soft rot 2 (2).

Disorders: Soft fruit 66 (60), sunken discoloration 37 (47), misshapen/cat face 28 (32), growth cracks 12 (15).

Injuries: Shoulder scars 37 (38), grade defects 16 (44), bruise damage 14 (16).

There is no question that our pack could be improved, especially in view of "grade defects", but in view of extreme variables in weather during our production season, arrival condition of our tomatoes is comparable to those shipped from other locations.

Recently there have been unconfirmed reports from terminal markets of an increased incidence of watery rot and gray mold rot on tomatoes from Florida. Watery rot can best be controlled by careful handling to avoid mechanical injury and reducing the temperature of the fruit down to 55-60°F after ripening has been initiated. Gray mold rot generally is not a major problem but is most prevalent in fruit harvested from old vines during periods of cool weather, such as we have experienced during the past few weeks.

(Gull, Veg. 87-04)

C. Carbon monoxide poisoning in the vegetable industry?

Recently, national attention has been directed to planned cases of carbon monoxide (CO) poisoning, but is it possible that accidental CO poisoning might occur in the vegetable industry?

A County Health Department in south Florida is investigating a case in which forklift operators were hospitalized and the cause was suspected to be CO poisoning. A high concentration of CO was found in the cold rooms where sweet corn was being stored. Although doors to the cold rooms are open during loading and unloading, these openings are covered by over-lapping plastic strips.

Concentration of CO in the rooms did not appear to be sufficiently high to cause illness but unanswered questions are (1) was the measurement of CO accurate, (2) were there emissions from the corn that intensified the action of CO (prevents hemoglobin from taking up oxygen and thus deprives the body of the needed oxygen), or (3) was the high respiration rate of the corn sufficient to cause a sub-optimum level of oxygen in the room. The increased level of CO in the rooms resulted from partial oxidation of hydrocarbon gases (incomplete combustion).

Toxic symptoms of CO are headaches, mental dullness, dizziness, weakness, nausea, vomiting, loss of muscular control,
inadequate, adequate, or abundant (LaMotte) and low, medium, or high (Plant Check). The Quant test is semi-quantitative. It involves dipping a test strip into the plant sap and reading a color development intensity on the strip against a calibrated color chart. Usually a dilution of plant sap is required and the time from dipping to reading is critical. The test is only semi-quantitative because the calibration chart is graduated in fairly large intervals. One advantage of this test is that it is very quick; it only requires a few minutes.

The Hach tests were the most quantitative tests that we evaluated. They rely on the same

colorimetric chemistry and are fast. The hand-held colorimeter seems to be a suitable alternative to the more expensive, but very versatile spectrophotometer. The last 3 tests are used widely for water quality determinations and we adapted them to do plant sap. Their accuracy will be compared to standard laboratory tests. The data from the comparisons of the last 3 tests appears in Table 1. All 3 tests detected an increase in plant sap nitrates corresponding to an increase in applied nitrogen. The Quant test reads a little lower than the Hach tests, and the hand-held colorimeter reads slightly higher than the spectrophotometer.

We plan to continue the comparisons of the last 3 tests and to compare the results to those obtained with standard laboratory tests. Using final yield data, we hope to calibrate at least one of these tests so that it can be used to make on-the-spot decisions regarding nitrogen injections via drip irrigation.

(Hochmuth, Veg. 87-04)

Table 1. Comparison of plant fresh sap nitrate-N content from 3 “quick tests”.

<table>
<thead>
<tr>
<th>N treatment lb/acre</th>
<th>Test</th>
<th>Test</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hach spec.</td>
<td>Hach hand-held ppm sap NO₃-N</td>
<td>Quant</td>
</tr>
<tr>
<td>150</td>
<td>1023²</td>
<td>1036</td>
<td>968</td>
</tr>
<tr>
<td>225</td>
<td>1345</td>
<td>1490</td>
<td>1074</td>
</tr>
<tr>
<td>300</td>
<td>1380</td>
<td>1516</td>
<td>1300</td>
</tr>
</tbody>
</table>

²avg. across 2 water treatments and 3 reps.

III. PESTICIDE UPDATE

A. Weed Tour Cancelled.

Do to the late cold snap and to the large amounts of rain received, the horticultural weed tour has been cancelled this year.

The plots in the southern part of the state have to be replanted due to water damage. Substituting the tour to other areas was impossible due to the late freeze and a 7 inch rain received in those areas.

We apologize for having to cancel, but will plan on having a bigger and better tour next year.

(Stall, Veg. 87-04)
IV. VEGETABLE GARDENING

A. Protecting garden vegetables from frosts.

April Fool's Day is usually the day when people play tricks on people, but April 1, 1987 will be remembered also, throughout the South, at least, as the day Mother Nature played a cruel trick on gardeners and others growing vegetables, fruits, and other tender plants. On two consecutive nights of April 1 and April 2, temperatures dipped below 35°F all across North Florida, bringing heavy frost to some areas and light patches of frost to others.

Most vegetable gardens around the state had been planted, except in areas where heavy rainfall in March had kept the soil too wet to plant. Newly-emerged seedlings and recently planted transplants of such warm-season crops as tomato, pepper, eggplant, cucumber, squash, beans, and sweet corn were either killed outright, heavily damaged, or lightly singed, depending on local variations in severity of the cold snap.

Now, it is not unusual for gardeners to plant in the month of March, but it is unusual for such low temperatures in the twenties and thirties to occur so late in the spring. Records of low temperatures were set all across the South as the upper air currents dipped almost straight down from the artic region to Florida.

Unfortunately, there is no definite time-table for the arrival of spring in the South. This is because of the gradual way that one season develops into the next in southern latitudes. While spring in the North is a fairly regular visitor, arriving late but with little threat of recurring cold, southern spring is anything but regular. Here, it is so gradual that freezing weather may be expected sometimes for as long as six weeks after the average date of last killing frost. Even so, this year's April-Fool's Day trick took most of us by surprise.

In the aftermath of the two-day cold snap, I observed the vivid results of gardeners' attempts to protect tender vegetables from the killing effects of the frost. These observations prove once more that those who understand some of the preliminary facts about frosts, and who take the necessary steps, can provide adequate protection in many instances, especially in small plots.

Frost occurs most often on cold, clear nights, preceded by a day or two of clear skies. On a clear day, the sun heats up the soil. If that heat, or a portion of it, could be saved until about 7:00 in the morning when temperatures are lowest, then plants might be saved. The problem is how to save it.

During the day, some of the heat from the sun is reflected back to the atmosphere and lost. Some of it is lost in the evaporation process of soil water. The heat that is useful to gardeners is the heat that is conducted downward through the soil to depths of four to ten inches. The most heat is stored if the soil is bare, if it is reasonably compact, and is fairly moist. The idea is for the stored heat to be conducted upward to the surface where it can keep the air and plants warmer.

The soil around plants must be bare so that the sun shines directly on it. Any shading or mulching material will intercept the heat above ground and liberate it to the air, so it has little effect on soil temperature. Thus, mulching actually increases the risk of freezing injury.

Also, a loose soil surface such as produced by cultivation or hoeing should be avoided. This causes the
soil surface to dry out more quickly, and the looseness itself reduces the conductivity of the soil's heat. Cultivation just before a frost occurs may result in more crop damage.

Irrigation in advance is the most effective way to increase the amount of heat stored in the soil, first because some small amount of heat is added due to the temperature of the water. Second, irrigation compacts the soil and firms loose structure that may have been caused by cultivation.

Third, watering increases the heat storage capacity of a given volume of soil. It has been estimated that adding 10% of moisture to the top six inches of soil will increase the "heat holding" capacity by 50%.

But the fourth and probably the most important effect is that moist soil is a much better conductor of heat than dry soil. Check out this principle with a wet pot-holder sometime, and you'll see that wet things conduct heat readily. Better conductivity means that heat will be conducted deeper into the soil during the day, and faster and further upward during the cold period at night. Thus, a greater volume of soil can be used for heat storage and more heat can be liberated when it will do the most good. When a frost is forecast, turn on your irrigation to moisten the soil before the bright sunshine has passed on the day previous to the frost, so as to store up as much heat as possible.

So far, we have been talking about ways to increase the amount of heat stored in the soil, and then move that heat into the plant zone during the danger periods. Now my final point is to mention ways to trap that heat for a long enough period of time to reduce damage or injury from frost. In most cases the best way to do this is to cover the plants, using one or more of several commonly available materials.

Hotcaps are manufactured and sold for the purpose of frost protection. Usually cone-shaped and made of paper that allows passage of sun-rays into the protected area, they do not allow the long-rays to escape. Place over the plants (generally one hot-cap per plant or hill) during the clear day preceding the expected frost.

Boxes, paper bags, plastic pots, and such similar devices should be placed over the plants in the late evening to trap the heat stored in the soil. Remove after the frost period the next morning to allow the sun to strike the soil for generation of more heat. Be sure the bottom of the covering device is in contact with the soil so that the heat cannot readily escape at the bottom.

Cloth materials, such as towels and old blankets, are good items for throwing over tender vegetables at a quick notice. Again, completely cover the entire plant, late in the evening after the sun has warmed the soil during the day.

Plastic tarps make excellent protective coverings because they allow the soil to warm up beneath and then they hold the heat during the danger periods.

Leaves, pine straw, hay, and even soil may be used to cover the plants for two or three days. Keep the materials dry so as to better insulate the heat from leaving the soil and air below and around the plant. Be sure to scratch out the seedlings as soon as the danger of frost has passed.

In summary, gardeners can reduce the amount of damage and plant injury that might occur during late spring frosts by first understanding how frosts happen, and then taking a few precautionary measures. Help the sun warm up the soil, trap the stored heat, then allow the heat to move into the area
around the plant. The next time
Mother Nature tries to play an April
Fools Day trick on you, be ready!

(Stephens, Veg. 87-04)

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