VEGETARIAN NEWSLETTER

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TO: COUNTY EXTENSION DIRECTORS AND AGENTS (VEGETABLE AND HORTICULTURE)

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COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, STATE OF FLORIDA, IFAS, UNIVERSITY OF FLORIDA, U.S. DEPARTMENT OF AGRICULTURE, AND BOARDS OF COUNTY COMMISSIONERS COOPERATING
THE VEGETARIAN NEWSLETTER

I. COMMERCIAL VEGETABLE PRODUCTION

A. Factors Affecting The Replanting Of Cold Damaged Crops

The January freeze has damaged much of the vegetables in production in the state. Unfortunately, and/or fortunately, depending on which way you look at it, we do have experience from the January 1977 freeze on replanting decisions and choices that the growers must make.

The first and foremost caution is do not overplant and cause a market glut. In the southern portion of the state it is too late to direct-seed and produce tomatoes, peppers and eggplant for a timely market. The mad scramble for transplants is now probably over with growers looking for other choices.

Choice 1: Procure transplants from other states or Mexico. Historically, this is not the best choice. The transplants coming from other states and especially Mexico have to be inspected before entering the state. The Florida Department of Agriculture and Consumer Services, Division of Plant Inspection is responsible for this function.

For information on inspection procedures from different areas or to set up inspections contact:

North Florida: Richard Clark (904)372-3505, Gainesville
Central Florida: Bob Griffith (305)886-4375, Apopka
South Florida: Curt Dowling (305)251-9540 or 238-6561, Miami
State Office: Ralf King or Earl Graham (904)372-3505, Gainesville

Choice 2: Plant alternate crops. This is an excellent way to use the fertilizer and cultural expenditures already invested. The big caution here is to check on whether there will be a market for the crop at the time of harvest. A few growers found to their sorrow after the "77" freeze that the alternate crop they chose to grow either could not be harvested due to lack of labor or could not be sold due to a lack of a market caused both by a glut and in other cases no demand and lastly, lack of transportation.

Other growers were able to recoup their losses and make a profit on alternate crops sold nationally and locally.

Choice 3: "Suckering" to produce at least partial crops. After the 1977 freeze this method worked surprisingly well. The methods followed were based on the degree of damage to the plant and consisted of hand pruning, mowing plants back to a stump and in a few cases leaving plants untouched. Eggplants responded more uniformly than did tomatoes or peppers, producing higher quality fruit. In tomatoes, 'Flora-Dade' and 'MH-1' sized fruit a little better than 'Walter'. In
pepper, plants recovered satisfactorily but did not produce the blocky, "crown-pick" type of fruit. They did grade out with a high percentage of fancy fruit however.

In areas where crops were completely destroyed and replanting or reseeding of the same crop or alternate crops can be made there are several factors that should be kept in mind:

1. **Fertility (Rates and Placement)**

   Refertilization may raise the soluble salt levels in a field to an excess and cause damage to the young seedlings.

2. **Herbicides**

   Here again be careful not to overdo it. Also, in planting alternate crops check the tolerance of the crop to previously applied herbicides. Alternately, herbicides applied to the alternate crop may not be compatible with pesticides such as nematicides applied to the first crop.

3. **Crop and Variety Selection**

   Don't plant any old crop just because seed or transplants are available. Check for marketability and suitability for the area before planting.

4. **To Plant or Not to Plant**

   The winter isn't over yet and there are possibilities for other frosts and freezes, as experienced by the weather last March.

   A decision should be made by each grower, depending on his situation, whether the investment output is worth the gamble in replanting. In many cases where all the grower's plantings were not destroyed, it may be more efficient and a wiser choice to protect the remaining crop, which should be assured a decent market price, than to replant and possibly over extend himself and lose both.

   Another problem could blossom, if you'll forgive the pun, from the extended cold period.

   This is the vernalization of many cool season crops. Vernalization is the specific promotion of flower initiation by a previous cold treatment. The vernalization requirements of each crop vary with the number of hours below a certain temperature, the stage of maturity of the crop and in some cases the day length. Vernalization requirements also vary among cultivars within a crop. An example of this is the
early cultivars of celery being prone to bolting. The newer cultivars have been selected in many cases to have a higher tolerance.

Lettuce will probably bolt more rapidly when the temperatures begin to warm, now that it has had an exposure to long cold period. On the other hand, some crops could be de-vernalized by a significant temperature increase.

Growers of celery, cabbage and other crucifers, lettuce, carrots, etc. should be aware of the possibility of their crop being vernalized and thereby keep an eye on it during its development.

(Stall)

II. HARVESTING AND HANDLING

A. Cold Weather Causes Freezing and Chilling Injury Problems

Vegetable handlers may have to deal with freezing and chilling injuries after the record breaking cold spell in Florida. Freezing injury occurs at temperatures below 32°F (0°C) and involves the formation of ice within plant tissues. In contrast, chilling injury occurs at temperatures above 32°C (0°C) and does not involve ice formation within plant tissues. Generally, symptoms of freezing injury appear rapidly, but symptoms of chilling injury are slow to develop and may even require a period of time at warm temperature to appear.

Although the points above contrast chilling and freezing injury, they do have a number of features in common.

1. Extent of injury is time and temperature dependent. That is, longer times and lower temperatures are more likely to cause injury.

2. Species vary greatly in their susceptibility to injury. Table 1 adapted from Agriculture Handbook 66, "The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks", groups crops according to their susceptibility to freezing injury.

Not all vegetables are affected by chilling injury. Generally, those that had their origin in the tropics or subtropics are susceptible. Table 2 groups crops according to their susceptibility to chilling injury.
### Table 1. Susceptibility of Fresh Vegetables to Freezing Injury

<table>
<thead>
<tr>
<th>Most Susceptible</th>
<th>Moderately Susceptible</th>
<th>Least Susceptible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans, snap</td>
<td>Broccoli, sprouting</td>
<td>Beets&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Corn, Sweet&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Cabbage</td>
<td>Kale</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>Carrots</td>
<td>Kohlrabi</td>
</tr>
<tr>
<td>Eggplant</td>
<td>Cauliflower</td>
<td>Parsnips</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Celery</td>
<td>Rutabagas</td>
</tr>
<tr>
<td>Okra</td>
<td>Onions (dry)</td>
<td>Turnips&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Peppers, sweet</td>
<td>Parsley</td>
<td></td>
</tr>
<tr>
<td>Squash, summer</td>
<td>Radishes&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Squash, winter</td>
<td></td>
</tr>
<tr>
<td>Watermelons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<sup>2</sup> Most susceptible, those that are likely to be injured by even one light freezing; Moderately susceptible, those that will recover from one or two light freezings; Least susceptible, those that can be lightly frozen several times without serious damage.

<sup>3</sup> Without tops.

<sup>4</sup> Due to husk damage.
Table 2. Susceptibility of Various Vegetables to Chilling Injury

<table>
<thead>
<tr>
<th>Low²</th>
<th>Moderate²</th>
<th>High²</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Below 5°C(41°F))</td>
<td>(Between 5°C &amp; 10°C(50°F))</td>
<td>(Above 10°C)</td>
</tr>
<tr>
<td>Snap beans</td>
<td>Okra</td>
<td>Cucumber</td>
</tr>
<tr>
<td>Summer Squash</td>
<td>Bell Pepper</td>
<td>Eggplant</td>
</tr>
<tr>
<td>Tomato, ripe</td>
<td>Winter Squash</td>
<td>Sweet Potato</td>
</tr>
<tr>
<td>Muskmelon</td>
<td>Watermelon</td>
<td>Tomato, mature green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yam</td>
</tr>
</tbody>
</table>

1Adapted from Ryall, A.L. and W.J. Lipton. 1979. Handling, Transportation and Storage of Fruits and Vegetables, Volume 1, 2nd Ed.

2Temperatures approximate upper limits for induction of chilling injury. Susceptibility may vary with cultivar, maturity, growing season, and length of storage.

3. Both types of injury show cumulative effects. This refers to the fact that induction conditions can occur in the field, storage, transport, and at destination and their effects can be additive. There is little that can be done about induction conditions in the field, but steps should be taken during handling to insure against further injury (i.e. maintain the product at temperature above susceptible level).

4. Both types of injury can result in product dessication (water loss).

5. Both injuries shorten the storage life and lower the quality of the product.

Freezing Symptoms:

Freeze-damaged vegetables are characterized by a water-soaked appearance. Formation of ice within the tissues causes the rupture and destruction of the individual cells. Therefore, freeze-damaged tissues do not have their normal rigidity and become mushy when thawed. Damaged areas lose water quickly and are extremely susceptible to decay.

Chilling Injury Symptoms:

Visible symptoms of chilling injury may not be evident while the vegetable is held at chilling temperatures but they often become apparent after transfer to higher temperatures. Symptoms depend on
vegetable involved but may include one or more of the following: decay, discoloration, pitting, and abnormal ripening. Decay is almost universally observed because the product is in a weakened condition. Discoloration can occur both internally and externally. Russeting of snap beans is an example of external discoloration; eggplant may develop tan, brown, or black internal discolorations. Pitting is another common symptom of chilling injury and is especially noticeable on peppers, cucumbers, and watermelons. Abnormal ripening is a symptom of vegetables that are ripened postharvest. Chilling injured mature-green tomatoes may color unevenly, fail to soften, and never develop good eating quality. In tomatoes, sensitivity to chilling injury decreases as they ripen. Pink fruits are more tolerant of low temperatures than mature-green fruits and red ripe tomatoes are more chilling tolerant than pinks.

Losses are already extensive from the freeze. Further losses can be avoided by not harvesting and shipping freeze-damaged vegetables. Chilling injury is difficult to detect, but over the next few weeks as chilling symptoms develop, steps should be taken to eliminate injured products on the grading line. Careful grading will help to cut additional losses resulting from the cold spell.

(Sherman)


The freeze of January 13, 14, 1981 did not produce uniform damage throughout the state, nor was the affect on labor demand uniform. Some areas were devastated while other areas not too distant were virtually untouched. While the physical damage to citrus, for example, was widespread, the impact on labor was to increase the demand for labor in the short and intermediate run. In other areas, particularly vegetable producing areas, the impact was to reduce the demand for labor after a one to three week period of salvage and replanting operations.

Three vegetable producing areas were hit quite badly by the freeze. These were: Collier-Hendry County (Immokalee area), Eastern Palm Beach-Broward County area, and Dade County (Homestead area). The Immokalee area sustained the most severe damage of any area in the state.

Interviews with growers, county agents and others indicate that roughly 5,000 jobs would be lost in the Immokalee area within about a week after the freeze, and it would be another five or six weeks before production was back to a point where there would be a demand for this harvest labor.

Estimates for the East Palm Beach-Broward County area indicate that as many as 2,000 harvesting jobs were eliminated by the freeze.
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Interestingly, the Glades area of Palm Beach County was spared extensive damage and growers indicated it is "business as usual" in the Glades area.

Observers in the Homestead area indicated that growers are already engaged in replanting operations and the demand for farm labor may stay relatively strong for two to three weeks. Following this short-run period of replanting and salvage operations, estimates indicate that about 2,500 jobs will be eliminated for five to six weeks while the new crop is maturing.

(C.D. Covey)
(Food and Resource Economics Department)

C. Effect of the Florida Freeze on the Transportation Situation

The effects of the freeze on Florida fruits and vegetables are continuing to be documented. The freeze damaged both fruits and vegetables and will at a minimum decrease shipments for a time from our state. Concerns have been expressed over the effect of the freeze on the transportation system and whether an adequate supply of trucks will be shipping from Florida when we attain a more normal production level later in the spring. Early indications are that a surplus of trucks are in the state now as a result of the freeze and that adequate numbers will be on hand when produce becomes more available.

The normal situation which exists for producers is to sell their produce for market and to schedule shipments through truck brokers. Truckers consist of two major groups, independent truckers who haul primarily produce and fleet truckers who haul Florida produce on a backhaul after delivering some product to the state of Florida.

During the winter months Florida, southern California, Arizona and south Texas are the primary areas for shipping produce. Because of this limited market there is normally a surplus of truckers. A freeze in Florida which restricts shipments will cause an even greater surplus of trucks to exist here. Because of this surplus a possibility of declining truck rates exists for the next few weeks, although it is doubtful that rates will decline substantially. Early indications (January 20, Federal-State Market News Service) are that truck rates have not as yet changed. They could decline some, however, in the weeks to come.

Given normal conditions in the weeks to come, adequate numbers of trucks should exist for our produce. Those producers able to ship produce may be able to save transportation costs because of the increased competition to haul their produce. There does not seem to be
any reason to fear a truck shortage later in the season. Should we, however, have another freeze later in the year the situation could change.

(J.T. VanSickle)
(Food and Resource Economics Department)

III. HOME VEGETABLE GARDENING

A. Effects of January Freeze On Florida Vegetable Gardens

Many thousands of winter gardens were in all stages of production throughout Florida when the extremely low temperatures hit the state. Most of the crops growing in north and central Florida were the cool season vegetables, but south Florida gardens contained a mixture of warm season crops along with the cool season types.

Premature seeding (bolting) may now be a problem with some vegetables like celery and Chinese cabbage. Seed stalk development will occur fastest on those plants which were older, larger, and more vigorously growing when exposed to temperatures below 40°F for two weeks or more.

With all these crops, the amount of injury which occurred varied considerably with stage of growth and location around the state. In most cases, however, the assessment remains that cool season vegetables were injured but not destroyed.

Warm season vegetables in south central and south Florida gardens did receive considerable damage. Again, the injury varied from a total loss to such items as tomatoes, cucumbers, squash, pepper, beans, and sweet corn in more northern areas to relatively light injury in other less severely hit areas. Many gardeners did successfully attempt to protect their tender vegetables from temperatures that fell only slightly below freezing.

From this point on, gardeners should trim away old damaged leaves and the most severely scarred fruits. Fruits of cucumber will show whitish, slightly depressed areas of injury. Bell pepper pods will have black discoloration, and may be distorted in shape. Tomato fruits may be windscarred and have whitish, discolored shoulders. However, unless very severe, all these fruits are edible, and should be left on the plant to mature further. Tomato fruits may have suffered chilling injury and likely will not ripen properly. Even though they do not develop their characteristic deep red color, they are still edible.
Severely damaged plants of tomato, pepper, and eggplant should be pruned back to sound plant material. The resulting regrowth will produce satisfactory yields providing good weather continues.

Should prices of fresh produce rise due to the loss of commercial crops and subsequent reduction in supplies, any remaining garden produce will be even more valuable and certainly worth the effort to keep growing.

(Stephens)