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Prepared by Extension Vegetable Crops Specialists

D. N. Maynard
Chairman

R. F. Kasmire
Visiting Professor

R. K. Showalter
Professor

J. M. Stephens
Associate Professor

James Montelaro
Professor

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

FROM: James Montelaro, Professor and Extension Vegetable Specialist

VEGETARIAN NEWSLETTER 80-2

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I. NOTES OF INTEREST

A. Watermelon - Preliminary Report on Intended Acreage for 1980 Season

The Florida Crop & Livestock Reporting Service estimates that Florida Growers will plant 47,000 acres of watermelon in 1980. Breakdown of acreage distribution with comparisons for 1978 and 1979 are as follows:

<table>
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<tr>
<th>Areas</th>
<th>1978 Planted</th>
<th>1978 Harvested</th>
<th>1979 Planted</th>
<th>1979 Harvested</th>
<th>Intended</th>
<th>Percent of last year</th>
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</thead>
<tbody>
<tr>
<td>West</td>
<td>9,500</td>
<td>5,000</td>
<td>5,000</td>
<td>3,000</td>
<td>4,800</td>
<td>96</td>
</tr>
<tr>
<td>North</td>
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<td>31,000</td>
<td>31,000</td>
<td>27,500</td>
<td>28,000</td>
<td>90</td>
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<tr>
<td>Central</td>
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<td>7,400</td>
<td>8,500</td>
<td>97</td>
</tr>
<tr>
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<td>4,700</td>
<td>5,200</td>
<td>5,100</td>
<td>5,700</td>
<td>110</td>
</tr>
<tr>
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<td>50,000</td>
<td>50,000</td>
<td>43,000</td>
<td>47,000</td>
<td>94</td>
</tr>
</tbody>
</table>

The acreage projected, even though lower than last year, may still present problems in marketing, especially if transportation problems develop again. Growers are advised not to use the projection to increase their own acreage. It would be best to limit acreage and to use necessary inputs of adequate fertilizer, lime, irrigation and pesticides to produce watermelons as efficiently as possible.

(Montelaro)

B. Vegetable Field Day - Immokalee

Dr. Paul Everett and Dr. Dave Dougherty have announced preliminary plans for a Vegetable Field Day to be held at Immokalee. A program of items to be discussed will follow at a later date. In the meantime, place the following information on your calendar and make plans now to attend.

DATE: Wednesday, April 23, 1980
TIME: 1:00 pm to 4:00 pm
PLACE: Agricultural Research Center, Immokalee, Florida

(Montelaro)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Calcium Deficiency In Florida Cauliflower

Calcium deficiency has been identified on a number of Florida vegetable crops; blossom-end rot in tomatoes, peppers, and watermelons is the most common.
From time to time, however, we see other calcium-related problems including tipburn in lettuce and cabbage, blackheart of celery and brownheart of escarole. Two recent additions are cavity spot of carrots and tipburn in cauliflower. Cavity spot was discussed in the March 1978 issue of this Newsletter.

Tipburn in cauliflower was noted in two locations in Florida in the Fall of 1979. The name is very descriptive of the symptoms exhibited by cauliflower under calcium stress. New leaves (usually in the wrapper group) show marginal necrosis (dead tissue) and a slight inward cupping. The affected leaves are removed or topped at harvest so that appearance of the curd is not unattractive in the market, but additional labor may be required for trimming. In severe cases the curds may be watersoaked and subject to post harvest decay.

Calcium deficiency in cauliflower or other vegetable crops can be prevented in most cases. If it does develop in a crop, it can be corrected or, at least, lessened if proper measures are taken early enough. The factors associated with calcium deficiency are complex and must be understood for the management of a good calcium nutrition program.

Calcium deficiency has been attributed by many plant scientists to water imbalances in the soil. Most commonly, it is a deficiency of water but excess and fluctuation in levels have been implicated. Exactly how water-related stresses bring about calcium deficiency in plants has not been completely resolved. Transport of calcium from plant roots to shoots is via the transpiration stream. Therefore, calcium accumulates in the older, larger, rapidly transpiring leaves. Furthermore, calcium is not readily redistributed from old to new tissue as is the case with certain nutrient elements.

A second mechanism affecting calcium absorption by plant roots is cation antagonism. Excessive concentrations of other cation, especially the monovalent elements like potassium, sodium, and ammonium can retard the absorption of calcium even in a calcium-saturated medium. For example, calcium deficiency can develop from excess soluble salts in the limestone soils of Homestead even though they are composed of 80% calcium carbonate.

Often a calcium deficiency is the result of nothing more than a simple inadequate supply in the soil. Application of limestone two or three months before planting can eliminate this problem.

Calcium deficiency can develop at almost any stage of development in plants. Rapid flushes of growth or leaching rains can result in a calcium deficiency in the plant. Soluble calcium applied to the soil after a deficiency is noted may or may not be absorbed by the crop in time to correct the problem. Foliar application of soluble calcium compounds, in the chloride or nitrate form, is the surest and quickest way to get results under these circumstances.

It is easier to avoid calcium deficiency problems than it is to correct them in a growing crop. Following are some suggestions for management of a good calcium nutrition program in vegetable crops:

1. Maintain an adequate supply of calcium in the soil. A pH of 6.0 to 6.5 is recommended for most vegetable crops.
2. Use low salt index fertilizer sources.

3. Do not use excessive and wasteful amounts of fertilizer.

4. Use split applications of fertilizer.

5. Under conditions of poor nitrification, supply part of the nitrogen in the nitrate form.

6. Avoid indiscriminate use of foliar fertilizers which can bring about nutrient imbalances (including calcium) in an otherwise normal plant.

Briefly summarizing, calcium deficiency is not an uncommon problem in vegetable production in Florida. It is a complex subject that requires the best of skills in management of a good program to prevent or correct the problem when it develops.

(Montelaro)

III. HARVESTING AND HANDLING

A. Developing County Extension Vegetable Marketing Programs: Product Temperature Management

Temperature, The Most Important Factor:

Temperature is the single most important factor in the total postharvest environment affecting quality of harvested produce and ornamentals. It directly affects the rates of respiration (and the production of vital heat), ripening (and the production of ethylene and other volatiles), moisture loss, development and spread of decay-producing organisms and thus, overall produce deterioration. Within the normal temperature range for produce, rates of many of these processes increase two to three times with each 18°F (10°C) increase in product temperature. Temperature also affects changes in the gas composition of the atmosphere (primarily oxygen and carbon dioxide levels) because of its influence on respiration rates. The effectiveness of applied ripening agents, modified atmospheres, packaging materials, and sanitation practices used are influenced by temperature. In turn, product temperature is influenced by ambient temperature, packaging materials, shipping containers, container stacking patterns, and air movement. Temperature management is thus the most important, most readily available, process for controlling the postharvest environment. Proper temperature management is vital from harvesting through consumption. It, therefore, requires the close attention of handlers in all postharvest operations.

Good product temperature management begins at harvest. Therefore, county Extension programs can be effective in helping growers and shippers right from the start to provide effective product temperature management. Recognizing undesirable temperature management practices is the first step. Some of the important factors to consider are:

1. Delay From Harvesting To Cooling:

Prolonged delays at high ambient temperatures between harvesting and cooling are a major cause of product quality loss. How long are "prolonged delays"
and how high are "high temperatures"? They vary with commodities, producing districts, seasons, and climatic conditions. The effect of a long delay is greatest at high ambient temperatures, low ambient relative humidity, and on the more perishable commodities. For example: A two-hour delay after harvest in cool, humid weather may only slightly reduce the market quality of strawberries, but a comparable delay in warm, dry weather reduces quality substantially. A six-hour delay for cool, early-morning harvested lettuce would not be noticeably harmful, but a comparable delay with afternoon harvested lettuce on a relatively warm day can cause serious deterioration.

The biological, chemical, and physical process involved in increase product deterioration rates during prolonged delays from harvesting to cooling are briefly as follows:

Respiration rates increase with product temperatures. If delays occur at high temperatures, high respiration rates consume more of the stored products, speeding up the ultimate death of plant cells. Ripening and softening rates are increased. Sugars, so important to the flavor quality of many fruits and sweet corn, are rapidly lost at high temperatures. With some fruits a delay of two hours at 90°F can cause as much deterioration as one day at 40°F.

Decay causing organisms also develop faster at high ambient temperatures often prevailing during delays prior to cooling. Longer delays enhance development and increase loss.

Water loss from products can be substantial during long delays, especially at high ambient temperatures. There is always a greater concentration of water vapor in healthy plant tissues than in the ambient atmosphere, unless, of course, the atmosphere is saturated. When this difference between the water vapor in plant tissues and the surrounding atmosphere is great, a substantial amount of water will be lost by the products, resulting in wilting and shriveling. At the same relative humidity water loss is much greater at high temperatures.

A few commodities, such as head lettuce and cut flowers, are damaged by relatively brief exposures to ethylene gas, a product of internal combustion engines (e.g. trucks, forklifts) that are commonly used around holding areas where prolonged delays may occur. Ethylene is also produced by many fruits and melons in sufficient quantities to damage lettuce and flowers in the same room, truck, or home refrigerator.

In summary prolonged delays can be damaging to most commodities, especially when they occur at high temperatures and low ambient relative humidities. Shippers and other handlers must be knowledgeable about the relative perishability of each of their products during such delays. Much of this knowledge is gained only from experience, because quantitative information is lacking for many commodities. This suggests an area of needed research.

2. Time of day harvest:

Fruits and vegetables are coolest just before sunrise, and cooler in the morning than in the afternoon. When possible, harvesting should be done in the coolest part of the day or night. Cooling times should be adjusted to initial product temperatures (before cooling). This results in shorter cooling cycles for early harvested products and longer cooling of afternoon harvested products. Better cooling and considerable savings can be realized from adjusting cooling
cycles to initial product temperatures. Another, little recognized, fact is
that early harvested fruits and vegetables are more turgid, firmer, and actually
larger than afternoon harvested products.

3. Cooling methods used for different commodities:

Effective product temperature management starts with effective, thorough,
and uniform cooling to near desired transit or storage temperatures. When planning
for cooling facilities probably the most common question asked is "Which cooling
method should be used?" Methods used for precooling (cooling products before
loading in transit vehicles or before storage) are room cooling and modifications
(ceiling-jet cooling, bay-cooling) forced-air cooling, hydrocooling (cooling with
cold water) package-or-body-icing (putting ice inside shipping containers with
packed produce) vacuum-cooling and its modification called Hydro-Vac cooling.

The best cooling method for a given commodity depends upon the following
factors including; the relative perishability of the specific commodity to be
cooled and its ability to be safely cooled by any given cooling method. The
most perishable products require fast cooling methods like hydrocooling, package-icing,
vacuum cooling, or forced-air cooling. However, many highly perishable commodities
such as strawberries, grapes, some tree-fruits, vine-ripe tomatoes, summer squashes,
and cut flowers could be badly damaged by hydro-cooling or by contact with
package-ice. Therefore, these commodities are best cooled by forced-air cooling,
as are all fruit-type vegetables (peppers, eggplants, cucumbers, squashes, melons,
okra) roots, tubers, and bulbs cooled and stored in bulk, and for bulk cabbage
and celo-wrapped cauliflower.

a. Hydro-cooling rapidly cools commodities not damaged by the force of
the water showering down on them. It is effectively used for cooling sweet corn,
celery, carrots, asparagus, cantaloupes, and some tree fruits. Hydrocooling causes
physical damage to leafy vegetables and some tree fruits unless the height that
the water falls onto the product is 6 inches or less.

b. Package-icing (and liquid-icing) are limited to those commodities
requiring fast cooling and that can tolerate direct contact with ice. They are
commonly used for cooling sweet corn, carrots, broccoli, brussels sprouts,
and to some extent, cantaloupes. Important problems with package-icing are
the higher cost of water-tolerant shipping containers (wood crates or wax-treated
cartons) and the reduced net product weight that can be hauled (because of the
weight of the package-ice) in truck shipments.

c. Vacuum-cooling and Hydro-Vac cooling are used primarily for cooling
commodities with a large surface-to-weight ratio (e.g. lettuce, celery, cabbage,
spinach and cauliflower) and for cooling some sweet corn. Some water loss occurs
during vacuum cooling (about 1% of the product's weight for every 10° to 11°F
cooled). Vacuum cooling is also used to partially cool bell (sweet) peppers,
but primarily to dry the cut stems which prevents, or reduces, stem-end decay.
Hydro-Vac cooling prevents water loss during vacuum cooling, but requires use of
more costly water-tolerant shipping containers.

d. Room-cooling and modifications of it are older, conventional cooling
methods that are still used. Cooling rates are slow and cooling is quite variable.
Too often product temperatures measured in top layer or exposed stacks (to the room's
cold air) containers are interpreted as being average temperatures for loads in rooms. Such is rarely true. When first introduced, room cooling was considered the "ultimate cooling method", and it probably was. However, with the development of faster, more effective cooling methods now commonly used commercially, room cooling is obsolete for many, if not most, commodities. Many room coolers can be modified for forced-air cooling.

**e. Forced-air cooling involves cooling with air forced or pulled through packed shipping containers by creating a difference in air pressure across the containers. Conventional cold rooms can be modified readily for forced-air cooling. This method is adaptable to cooling all commodities but less so for leafy vegetables.**

Cold storage rooms are an essential part of any cooling facility with every cooling method used. They aid in product temperature management by permitting products to be cooled shortly after harvest and then stored at optimum temperatures while awaiting shipment to markets. Recognition of the importance of cold storage rooms as part of cooling facilities is demonstrated by the construction of cold rooms adjacent to, or in conjunction with, hydrocoolers, vacuum coolers, and package-icing facilities.

Check the cooling methods used for various commodities. Are they the best methods to use? Is product damage occurring? Are the products being adequately cooled?

**4. Thoroughness and uniformity of cooling:**

This is often a major problem in precooling operations. Too often operators take for granted that cooling is standard, i.e. that products are always cooled to the same post-cooling temperature range. This doesn't happen unless cooling operations are closely monitored and coolers are carefully maintained and operated. During the past two months I have visited numerous produce cooling operations in Florida vegetable growing areas. Here are shortcomings that I observed.

**Vacuum cooling:** Product temperatures were measured after cooling at only two coolers. (How do the operators know how effectively they are cooling products if they don't measure after-cooling temperatures?) Absolute pressure gauges were used at only three coolers. These gauges provide the best measure of the air temperature inside a vacuum tube. At most coolers product temperature during cooling was determined with an electrical resistance thermometer inserted into a product unit. This method can be misleading if the probe is roughly inserted into the product, causing wetting of the probe and resulting in rapid evaporation of moisture from the probe (wet-bulb effect) during evacuation of the vacuum tube. This results in a lower than actual reading of the product temperature.

**Hydrocooling:** Considerable product temperature variability was observed at the outlet end of tunnel-type hydrocoolers. The variability was caused by plugging of holes in the overhead shower pan, or plugged nozzles. Cold water must shower down uniformly over all the product for hydrocooling to be effective. This problem can be corrected with daily cleaning of all debris in shower pans and nozzles. Most hydrocoolers only were cleaned every 7 to 10 days. This is courting a decay problem and exposes shippers to marketing losses during transit and distribution.
A few hydrocoolers had inadequate water circulation rates (less than 15 gpm/ft² of cooler shower pan area). The water temperature of several coolers was above the final product temperature desired. It is impossible to hydrocool products to temperatures lower than that of the cooling water.

Room-cooling: Air temperatures in most rooms were too high, and in some were unknown because thermometers were not present. In-and-out traffic, especially with gas-powered lift trucks, adds a lot of heat to cold rooms. Room air temperatures need to be low enough to compensate for this additional heat. Product stacking in some rooms was so tight that any additional cooling sought in the cold room was virtually precluded.

Packaging material barriers: Not enough extra cooling time was used to adequately cool prepackaged products at some coolers. Packaging materials are barriers around products that interfere with all methods of cooling. The amount of interference increases directly with the amount, tightness, and thickness of the packaging materials used. It is easier to cool naked, unwrapped or non-packaged product than wrapped or packaged produce. You can see the difference by measuring after-cooling temperatures of comparable products that are naked vs. wrapped or packaged. Here are some examples of the effects of packaging materials on cooling rates obtained in tests in commercial cooling facilities: Forced-air cooled sleeve-wrapped celery required 7 times longer to cool than naked celery. The cooling time for Honey Dew melons was 5.5 times longer with non-slotted dividers in cartons than with slotted dividers. Iceberg lettuce wrapped in non-perforated film had 2°F higher temperatures than naked lettuce after vacuum cooling.

County Agents can help improve product temperature management operations by knowing cooling requirements and recognizing potential problems. To do so, you will need an accurate pulp thermometer to measure temperatures and you will need to use it correctly. A good bimetallic probe thermometer with an easy-to-read dial that can be calibrated costs from $10 to $20. Rapid reading, electronic thermometers are needed if you plan to conduct extensive product temperature studies but they are more expensive (present price is about $100 to $300). There are many makes and models. Shop around before you buy one.

In summary, County Agents can help their vegetable industries by knowing product temperature management needs and problems, studying them, and demonstrating the value of better management.

(Kasmire)

IV. VEGETABLE GARDENING

A. Bird and Animal Pest Control in the Garden

Insect and disease pests are not the only unwelcome visitors in many home vegetable gardens around the state. Birds, field mice, moles, rabbits, raccoons, deer and other animals can be a problem in the garden from time to time.

There are several techniques and devices that offer some degree of relief from the ravages of these large pest forms. The particular method of control selected will depend on the size and location of the garden plot, and the kinds of animal pests to be controlled. Here are a number of control devices that gardeners might consider for their own use:
a. Poultry-wire fence - When placed around the garden, such a fence becomes an effective barrier against rabbits, chickens, dogs and larger animals. Make sure the wire-holes are sufficiently small to keep out small rabbits.

b. Hog-wire fence (also chain link) - This type fencing is an excellent barrier to children, chickens, dogs, horses, cattle and other large animals.

c. Electric fence - These single or double wire fences are easy to install. A single strand of wire is connected to a 12-volt rechargeable battery and passed through insulators mounted at every support post. A single wire strung about six inches above the ground will keep out raccoons. For larger animals, an additional wire placed another eighteen inches above this will suffice. Electric fencing kits are available at many farm and garden supply stores. The electric fence is safe to use around children due to the relatively low electrical charge of the system.

d. Bird netting - Cheesecloth and netting is manufactured and sold specifically for keeping birds away from such crops as strawberries. Such netting is perhaps the best bird control method available, but is difficult to use over the entire garden. Rabbits and other pests may also be deterred by such netting.

e. Scarecrows and similar devices - Scarecrows are constructed by gardeners in any number of conceivable shapes and styles. Most are man-like, but others utilize flashy, clattering hanging ornaments to scare birds. Some gardeners claim them to be quite effective, while others say scarecrows are merely symbolic. Mock owls and inflatable snakes are championed by some as certain ways to keep birds scared away.

f. Repellents - A variety of repellents are marketed through gardening magazines, catalogs and supply stores. Each usually specific for an individual pest. Also, there are many home-made repellents advocated by gardeners. In general, most repellents are questionable in effectiveness, except for those which are applied directly to seeds to repel birds and mice. However, a horticultural researcher in Alabama has just reported an effective repellent for keeping deer and rabbits out of the garden or away from fruit trees. He suggests hanging a nylon or dacron bag containing about 6 ounces of human hair at intervals around the garden. For deer, hang a bag every 20 feet, or even as close as one bag in each fruit tree. For rabbits, closer spacing is suggested. Hang a bag 6 inches off the ground at 5 to 10 feet intervals. The hair repellents have been shown to work under heavy deer and rabbit infestations for over one year.

g. Poisonous baits - Poison peanuts and other food items laced with poisons give only fair to poor results with such rodents as moles and rats. They are somewhat dangerous to use as larger animals, pets and children sometimes get to them by mistake. For this reason, extreme caution should go along with any use made of them.

h. Insecticides - Although not a direct method for controlling animal pests, insecticides may be used to control the insects that some animals feed upon. For example, moles make tunnels below the roots of vegetables in search of insects like wireworms and white grubs which feed on the vegetable roots. Controlling these soil-inhabitating insects reduces the activity of the moles in the garden.
i. Noise devices - Primarily used for bird control, these devices produce a loud noise (boom) at timed intervals. Most of these work by electronic or compressed air means. Typically, these devices are used by commercial growers since home gardeners run the risk of violating local noise ordinances or irritating neighbors.

j. Distress calls - These are the taped cries of animals or birds in distress or trouble. Gardeners may purchase such tapes and play them continuously to discourage similar birds or animals from entering the garden. Such devices are of doubtful value.

k. Shooting - When animals become a special nuisance, particularly in larger rural gardens, owners may have to resort to shooting or trapping. A BB gun or other small caliber rodent gun is effective but gardeners should be familiar with all the local rules and ordinances governing this approach before using a firearm for this purpose.

l. Trapping - Traps offer the best means of control for moles, and have some usefulness for other animals, such as raccoons. The mole traps with the wire loop snares are particularly effective when used as directed. The steel spiking devices are also useful. The steel trap with spring-loaded jaws has caught many a-coon in past years, and still is one of the most effective ways to catching these corn-stealers. However, this method is dangerous and should be used only by the most experienced, cautious gardeners who can control conditions sufficiently to prevent children, pets, and others from being injured.

B. Know Your Minor Vegetables - Welsh Onion

The Welsh onion (Allium fistulosum) is also known as spring onion, ciboule (French), Zwiebel (German), Negi, Chibol, sybie, sybow, and stone leek. The word "Welsh" is a corruption of the German "Walsch" meaning "foreign" and has no reference to Wales. The onion originated in Siberia, and is very popular in the East where it is known as Japanese leek. A variety of this is referred to as Japanese bunching onion or Nebuka. There is also a Perennial Welsh onion (A. lusitanicum). The ordinary type may be propagated from seeds as well as root divisions, while the perennial produces no seeds.

The leaves of Welsh onion are almost circular in cross section (round) and are hollow and inflated the entire length of 6-20 inches. The flower stalk (scape) is also hollow. The plant has only slightly enlarged bulbs which are very long and are covered with dry membraneous, onion-like scales for some distance above ground. The color ranges from white to pink. The black, angular seeds are similar to regular onion seeds.

Welsh onion is hardy to frost, but will not withstand a severe freeze. Varieties that are adapted to northern areas lose their leaves during the winter months. The crop may be grown under a broad range of soil moisture conditions. While the Welsh onion is not a popular Florida vegetable garden item, it appears likely that it would grow and produce well in all areas of the state.

When to plant - Plant in the fall, winter, or spring.
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How to Plant - Plant by seeds, or division (transplants). Plants multiply by producing side shoots which can be divided and reset.

Spacing - Set the divisions or sow the seeds in rows one foot apart. Space plants six inches apart in the row (by thinning or initial setting). Use a mulch for weed control.

Harvesting - The thick leaves and leaf bases may be harvested as an entire plant (pulled like a green onion as early as when three to four inches high), or leaf portions may be snipped off as needed for flavoring. If pulled as a green onion, 4 to 5 months are required from seeding to harvesting.

Uses - Welsh onions may be used as a green onion. The whole plant can be eaten as a leek. Parts of the leaves and leaf bases may be used in a variety of ways. The protein content of the leaf is 1.2-1.9%.

Seed availability - Seeds are listed in some major catalogs as Evergreen bunching (Nebuka) or Japanese bunching.

(Stephens)