April 10, 1979

Prepared by Extension Vegetable Crops Specialists

C. B. Hall
Acting Chairman

R. D. William
Assistant Professor

J. M. Stephens
Associate Professor

R. K. Showalter
Professor

James Montelaro
Professor

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

FROM: R. D. William, Assistant Professor & Extension Vegetable Specialist

VEGETARIAN NEWSLETTER 79-4

IN THIS ISSUE:

I. NOTES OF INTEREST
   A. Vegetable Field Days Set - Second Announcement
   B. Herbicide Update

II. COMMERCIAL VEGETABLE PRODUCTION
   A. IPM - A Lesson in Vegetable Crop Management
   B. Crop Pollination and Bee Behavior

III. HARVESTING AND HANDLING
   A. Increasing Watermelon Consumption

IV. VEGETABLE GARDENING
   A. Pest Management in Home Vegetable Gardens
   B. Know Your Vegetables - Bean Sprouts

NOTE: Anyone is free to use the information in this newsletter. Whenever possible, please give credit to the authors.
A. Vegetable Field Days Set - Second Announcement

Put the following dates on your calendar and make plans to attend these vegetable field days. Detailed programs for these field days are being mailed. They are as follows:

1. Location: ARC, Hastings, Florida
   Date: April 19, 1979, 1:30 P.M.

2. Location: Belle Glade, Florida
   Date: May 10, 1979

3. Location: Bradenton, Florida
   Date: May 22, 1979

4. Location: FAMU, Tallahassee (Vegetable Gardening)
   Date: May 25, 1979, 9:00 A.M.

   (Montelaro)

B. Herbicide Update

The herbicides listed below have recently been registered for use in the following vegetable crops:

1) Row middles for full-bed plastic mulch.
   a) Tomatoes and peppers - chloramben (Amiben) 24(c) label in Florida only.
   b) Tomatoes and peppers - napropamide (Devrinol) 24(c) label for full-bed plastic mulch or conventional culture without plastic mulch in Florida only.
   c) Tomatoes - metribuzin (Sencor only) 24(c) label for established tomatoes as pre- or postemergence treatment in Florida only.

2) Other labels for vegetables.
   a) Carrots - linuron (Lorox) 24(c) label for preemergence weed control in Florida only.
b) Lettuce - paraquat 24(c) label for postemergence, directed, shielded application in Florida only.

c) Potatoes - metribuzin (Lexone and Sencor) for preemergence weed control.

d) English peas and edible beans - glyphosate (Roundup) for perennial weed control applied prior to field preparation and planting the crop.

e) Dry ditch banks and water furrows - glyphosate (Roundup) for general weed management when ditches or water furrows are dry.

(William)

II. COMMERCIAL VEGETABLE PRODUCTION

A. IPM - A Lesson in Vegetable Crop Management

Growers or their crop production managers should take a lesson from Integrated Pest Management. Periodic "scouting" for potential pests and the careful integration of this information into a workable pest management program is beginning to pay dividends for some vegetable growers in Florida. If nothing else, it has served to emphasize the value of careful monitoring in crop production management. Why not, then, incorporate this type of philosophy into other aspects of the crop management programs in vegetable production?

For instance, are production managers giving similar attention to irrigation and drainage needs, supplemental fertilization, weed control and cultivation, protection against the elements of nature, etc.? In many cases, the answer is no. An incipient moisture shortage or nutrient deficiency is not easy to detect. Yet, either stress can result in loss of potential yield and/or quality. Not only that, but the oversight or mistake can mean additional costs for materials which were not needed in the first place. Take the case where a grower sidedressed because a crop looked "hungry", only to find later that the condition worsened. A soil test to measure total soluble salts prior to sidedressing would have shown that the problem was not too little, but too much fertilizer. Instead of wasting money on more fertilizer with further crop injury, an effort should have been made to lessen the effects of salts present in the soil.

The technology available to manage most production practices is as advanced and just as applicable as it is in IPM. Inexpensive testing equipment is available which can be used with little time and effort. These include simple items like moisture, soluble salt and pH meters. The more technical laboratory tests cost only little more in time and money.
The most valuable ingredient in any management system is an understanding of the basic principles and the experience to interpret and integrate them into a good, workable program. Vegetable crop producers cannot afford to farm on a hit or miss basis and expect to remain in the business over the years.

(Montelaro)

B. Crop Pollination and Bee Behavior

Several vegetable crops, especially the vine crops such as watermelon, squash, cucumber and cantaloupe require insect pollination for fruit set and proper development of an attractive, uniform product. The most common pollinators for these crops are bees; honey bees being the most dependable when properly managed. In most situations where insect pollination is required, a thorough knowledge of bee behavior can improve the performance of these pollinators in your field.

Pollen and nectar are the sole sources of food for bees. Pollen provides food for young bee larvae and protein for the adults. Carbohydrates or energy are obtained from nectar which can be stored as honey. Bees pollinate the flowers while collecting nectar or when they are deliberately foraging for pollen. According to research conducted at Leesburg ARC, pollination of vine crops is improved when bees visit the female flower 8 or more times.

Bees tend to collect either pollen or nectar primarily from a single type of flower that is abundant, attractive to the bee, and relatively near the hive. Because flowers of vine crops are not particularly attractive to bees, hives should be placed around the perimeter of the field when the crop begins to bloom. Generally, one active hive per 5 acres of vine crops is considered a minimum requirement for adequate pollination. For best production of watermelons or cucumbers, one hive per three acres is recommended. If crop flowering and the placement of hives in the field do not coincide (or if crop flowering is interrupted), bees will begin foraging neighboring wild plants and may not return to the crop.

Bees also require water for daily survival to dilute honey when consumed for food or to cool the hive. Consequently, bee efficiency can be increased by providing a source of water near the hive. Because bees will not drink from pails or drums, dripping or a shallow water source should be provided.

Bee activity begins in the morning when temperatures warm up to about 60°F and the dew or free moisture from rainfall or irrigation evaporate from the leaves and flowers of the crop. By mid-afternoon, bee activity diminishes.
Insecticides, therefore, should be applied in the late afternoon or evening to minimize bee kills. If there is any chance of poisoning the bees, be certain to cover and protect the hives. Choose insecticides that are less harmful to bees, avoiding or restricting the use of carbaryl (Sevin), methomyl (Lannate or Nudrin), parathion, and others, while bees are actively pollinating the crop.

Although the beekeeper will undoubtedly check the hives frequently, the grower may wish to evaluate bee activity. A practical method is to walk into the field on a clear day and count the bees observed in a 30 ft. diameter. If fewer than 30-40 bees are counted, the grower may wish to consult the beekeeper to determine if enough hives are present, whether the hives are overcrowded, whether the bees are pollinating the crop or foraging elsewhere. Then both the beekeeper and the grower can agree to needed solutions such as: adding frames to the hives or adding more hives. Also, hives can be moved within or between fields to increase pollination of the crop and maintain healthy bees.

For more information, growers may purchase a copy of USDA Agriculture Handbook No. 496 entitled "Insect Pollination of Cultivated Crop Plants".

(William, Johnson* & Harris)

*F. A. Johnson is Ext. Entomologist and C. L. Harris is a graduate of the Entomology and Nematology Department who provided assistance and gained experience in our Vegetable Crops Extension programs.

III. HARVESTING AND HANDLING

A. Increasing Watermelon Consumption

April is the month when another Florida watermelon harvesting season starts and growers are looking for improved marketing conditions after relatively depressed prices during the last three seasons. In the January 1979 Vegetarian Newsletter, over-production was blamed for the recent disastrous marketing seasons. In the October 1978 Bulletin of the National Watermelon Association, it was reported that several weaknesses exist in the total watermelon production and marketing program and adjustments were needed to soften the drastic risks. Low prices have been blamed on cold weather up north and lack of transportation, but it was stated that the greatest problem was too many acres of watermelons.

Supply of watermelons does influence prices as indicated by the relatively high prices during April and May when supplies from South Florida are limited. Prices decline as more northern areas and other states begin harvesting. On a yearly basis, average prices were much lower in 1972 and 1976 when planted acreage in Florida exceeded 61,000 acres compared with prices in 1975 from 47,000 acres of watermelons.
Much importance has been placed on the supply and price relationship, but consumer demand and consumption trends are also important for successful production. Per capita consumption of watermelons has declined for many years from 20 pounds to a present level of 12 to 13 pounds per person. In the decade of the 70's, total vegetable consumption has increased, particularly the consumption of raw vegetables. Vegetables vary in their appeal to the food-buying public, and consumption of salad vegetables has increased with the proliferation of salad bars, away-from-home eating and an increasingly calorie-conscious public.

The characteristics of a good watermelon make it universally popular, especially in hot weather, for its sweetness, juiciness, red color and crisp texture. It makes a quicky prepared, no cooking, dessert or snack that can be served in several ways in any place that meals are served, or it is well adapted for out-door eating without table service. Watermelon's chief contribution is enjoyment rather than a heavy quota of nutrients, since they have 93% water and only 26 calories per 100 grams compared with 600 to 700 calories in high energy foods. This melon is a good source of vitamin A and a fair source of vitamin C, plus variable amounts of sugar.

With these excellent possibilities for high consumer demand, why do Florida growers have difficulty selling watermelons at a profit when the volume increases? Improved quality and additional merchandising and promotion have increased sales of other fruits and vegetables. The Florida Department of Agriculture and Consumer Services surveyed terminal market watermelon receivers several years ago and found that 33% wanted better quality, 14% wanted better shipping practices and 11% wanted better sizing. Fifty-six percent of the respondents mentioned bruising and 25% listed cracking as primary problems. So, improvements are needed in grading, sizing, and shipping. Rough handling and carelessness in harvesting and transporting cause internal breakdown of the flesh that results in dumping the melons into the garbage at the store or home when they are cut.

Improved handling, packaging and transportation were main topics discussed at the March meeting of the National Watermelon Association in Jacksonville. A new conveyorized handling system was described that transfers melons from field trailers into transport trucks in less time and with less melon damage than present methods. Another system of unloading field trucks had mechanical weighing and counting to provide greater uniformity among loads.

Stores are able to sell large numbers of watermelons through special promotions and advance advertising during periods of heavy production which often occurs in June. Before planning these promotions, retailers need information 7 to 10 days in advance concerning the prospective supply, quality and melon size. Growers with small acreage need to sell through a shipping organization, state farmers market or an experienced broker who is familiar with shipping point and terminal market procedures. The detailed nature of store
orders and advertised prices make advance specifications necessary. For example, a buyer who ordered truckloads of melons averaging 22 pounds, anticipated 1600 melons per load and advertised them at $1.19. One truck making a direct store delivery arrived with 1250 melons averaging 28 pounds, and the load was rejected because the store price could not be increased to compensate for the reduced number and larger size.

Produce buyers are very influential in marketing melons, but consumers make the final decision on what looks and tastes best. Judging the quality of a watermelon is very difficult unless it is cut, and the sale of halves, quarters and slices now dominates sales in many stores. Watermelon eating quality is influenced by variety, maturity and handling practices, but shoppers make their purchasing selections on the basis of appearance, color and freedom from blemishes. People prefer to eat food that looks good and slices of red-ripe watermelon can have an appearance that tempts customers and increases sales.

New U.S. Standards for grading watermelons become effective January 15, 1978, with two levels of optional internal quality to indicate "good" and "very good" sweetness levels. Florida growers and shippers have mostly discontinued using the U.S. or any grade standards that indicate consumer qualities or maturity. The industry grading system is a marketing tool that aids in faster and more efficient pricing based on size, diseases, insects and external damage. Everyone talks about quality, but harvesting and marketing decisions for melons shipped to distant markets are not always controlled by those factors which persuade consumers to buy more watermelons.

The National Watermelon Association raised nearly $69,000 for promoting sales this year, but the Florida Avocado and Lime Commissions have budgeted $350,000 and the Florida Citrus Commission $3,500,000 for promoting their products. Watermelon growers who think they have over-produced may find some answers in terms of under-demand by joining together to improve consumer quality and selling strength.

(Showalter)

IV VEGETABLE GARDENING

A. Pest Management in Home Vegetable Gardens

Integrated pest management (IPM) is a relatively new concept in commercial crop pest control. However, home vegetable gardeners and commercial growers have long used the basic principles of IPM in one form or another. Successful gardeners have employed every trick in their bag and at their disposal to eliminate or reduce pest problems, and should continue to do so.

Keywords have been prevention - through proper planning, choice of varieties, site selection, cultural practices; early detection - through constant monitoring; and combative action - through safe use of pesticides.
Here are some of the common sense techniques which have been combined (integrated) into an orderly and managed system to eliminate pest problems from the gardening experience.

1. Use of resistant varieties.
2. Selection of pest-free site.
3. Planting early, thus avoiding peak pest periods.
4. Rotating garden sites and crops.
5. Early soil preparation so soil vegetation has sufficient time to rot.
6. Planting seed and cuttings from disease-free plants.
7. Selecting pest-free transplants.
8. Mulching to avoid fruit rots, reduce weed growth, and minimize nematode effects.
9. Placement of cardboard or tinfoil collars around transplant stems to reduce injury from cutworms and soil blight.
10. Controlling weeds, both in and around the garden.
11. Cleaning up crop refuse early.
12. Summer fallowing (clean cultivation).
13. Summer flooding, where soil type permits.
14. Careful and constant monitoring for pest infestation.
15. Hand-picking insects and weeds.
17. Timely watering to avoid pest build-up.
18. Soil sterilization, through baking, etc.
19. Use of sterile soil media.
20. Use of resistant cover crops where available.
21. Use of natural predators where available.
22. Harvesting early or at right stage or maturity to avoid pest damage.
23. Quick use of good portions of pest damaged produce, and grading out rotten vegetables to reduce further contamination.
24. Proper storage - in clean containers at best temperature and humidity.
25. Use of safe pesticides where necessary.

While the utilization of these and other practices in a planned and orderly fashion would result in an effective pest management system in home gardens, the article does not imply that all successful gardeners, if any, use these steps completely. How thoroughly and effectively these practices are integrated into a pest management system is dictated by such factors as pest pressure; gardener experience, ability and motivation; and availability of resources.

Furthermore, the article does not attempt to minimize, simplify, or explain the concept of IPM as it applies to commercial crop production. Commercially, IPM is broader, more involved, and a great deal more complicated than the random, non-systemized use of practices outlined here.

(Stephens)
B. Know Your Vegetables - Bean Sprouts

While various kinds of legumes may be eaten as sprouts, the two most common are the mung bean (Phaseolus aureus R.) and the soybean (Glycine max M.) (see VC Extension Report 17-1978 "Know Your Minor Vegetables", page 26 and 19, respectively). Mung bean is the most commonly used and preferred bean for sprouting.

Until recently, the use of mung bean sprouts in America has been restricted to so-called Chinese dishes. Lately, however, they have become increasingly popular in U.S. kitchens, particularly to health enthusiasts because sprouts are rich in vitamins and low in carbohydrates.

Methods of Sprouting

Many methods have been used in sprouting mung beans. In Oriental countries, the beans are usually soaked in water for about eight hours and then placed in tubs or crockery jars provided with adequate drainage and darkness. Then they are sprinkled with water at room temperature about three times a day. The sprouts are usually ready for use in about 4 to 6 days, depending on the room temperature.

Chinese masters of the art of sprouting modify the procedures somewhat, but the general principles of soaking and sprinkling are the same everywhere. For example, many cooks place a wet, absorbent towel over the top of the container, and then soak the cloth two or three times a day. Experience is necessary to determine just when to soak the cloth for best quality sprouts. To keep sprouts short and plump, a clean bag of sand has been placed over the sprouts instead of the towels.

Simple Technique for Sprouting at Home

The simplest method for doing it yourself right in your own kitchen is to use the "wide-mouth jar" technique. A one quart (or larger) jar with lid is fine.

First, punch 8 or 10 holes in the lid so that it will drain easily and allow the heat of sprouting to escape. Then measure out 1/3 cup of mung beans for each quart of sprouts desired. Wash the beans thoroughly, and sort out any discolored or bad ones.

Place the beans in the jar, cover them with water, and let them soak overnight in a dark place. Sprouting in light allows a green color to develop. Most people prefer white sprouts.

The next morning, drain off the water by turning the jar upside down. Shake the beans on to the side of the jar and place the jar with this side down in a dark cabinet.
Each day rinse the beans and developing sprouts with water, pouring off the excess water each time.

By the fourth day of rinsing, the sprouts should be at least an inch long and ready for using.

When the sprouts reach the desired state of development, place them in cold water and wash to remove seed coats, fibrous roots, and other undesirable residue. The sprouts are best eaten soon after washing, but can be stored for several days at 40-45°F.

Commercial Production of Bean Sprouts

Again the methods used by different producers are quite varied, yet the principles are the same.

In most instances, according to Beeskow (Michigan State), the beans are soaked in water at 70°F for eight hours and then transferred to large uncovered metal tanks in quantity to produce a depth of about 12 inches of beans. Tanks may be 90 feet long, 4 feet wide, and 3 feet deep. A mechanical sprinkling device waters the sprouts. The sprinkler moves from one end of the tank to the other once every 4 hours.

The waterings hold the sprouts at a moderate temperature, wash out accumulated carbon dioxide and the other wastes, and replenish the oxygen supply. Under these conditions the hypocotyl (sprout) emerges from the seed coat during the first day of germination. Growth is rapid, with the sprouts reaching the desired size in about 5 days. The best sprouts are considered to be 3-1/2 inches long with a diameter of 1/8 inch. Under the conditions just outlined, considerable non-uniformity in size and shape has been encountered.

Nutritional Aspects

Nutrient composition tables (Cal. Ag. Bul. 788) show the following for 1-1/8 cups or 100 grams of mung bean sprouts: 0 refuse; 25 calories; 92 g water; 2.7 g protein; 0.1 g fat; 3.5 g carbohydrates; 25 I.U. Vit. A; 0.11 mg thiamine; 0.03 mg riboflavin; 6 mg niacin; 20 mg calcium; 6 mg iron; 16 mg magnesium; 35 mg phosphorus; 130 mg potassium; and 2 mg sodium.

The vitamin C content of mung bean sprouts has been studied from a nutritional standpoint. In one report, the vitamin C content ranged from 0.06 mg per gram of dried beans up to 0.346 mg per gram of fresh sprouts. Maximum vitamin C was reached during the second day of germination. However, at this stage, the sprouts were quite small.

Uses

Bean sprouts may be used either raw or cooked. They may be used in stews and soups; they may take the place of onions or mushrooms in fried or roasted dishes; or they may be eaten raw as a salad. Most bean sprouts
produced commercially are canned before reaching the market. Obviously, the most palatable sprouts are those produced and eaten fresh.

(Stephens)