TO:  COUNTY EXTENSION DIRECTORS AND AGENTS (VEGETABLES AND HORTICULTURE)  
AND OTHERS INTERESTED IN VEGETABLE CROPS IN FLORIDA  
FROM:  S. R. Kostewicz, Assistant Vegetable Crops Specialist  

VEGETARIAN NEWSLETTER 72-6  

IN THIS ISSUE:  

I. COMMERCIAL VEGETABLE PRODUCTION  
A. Formalizing Custom Applicator - Vegetable Grower Agreements  
B. Indexed Seed for Lettuce Mosaic Control  
C. "Plug-Mix" Seeding Method for Vegetable Crops  
D. Downy Mildew on Watermelons (Follow-up)  
E. Soluble Salts and Water Uptake  

II. VEGETABLE GARDENING  
A. Caged Tomatoes  
B. Spinach Seed Shape  
C. Know Your Vegetables - Strawberries  

NOTE:  Anyone is free to use the information in this newsletter.  Whenever possible, please give credit to the authors.
I. COMMERCIAL VEGETABLE PRODUCTION

A. Formalizing Custom Applicator - Vegetable Grower Agreements

On many occasions during a growing season, we are called on by vegetable growers to investigate "problems" related to services rendered by custom applicators. Most common of these complaints is the "actual or imagined" appearance of injury to the crop shortly after application of a pesticide or fertilizer materials. This type of complaint is registered with the Extension Service almost immediately. The atmosphere for everyone involved in such situations is very uncomfortable as the threat of legal action is always present even before all of the real facts can be gathered in a neutral way.

Complaints may be registered following custom application at any time up to harvest where it is felt that the desired results were not obtained. Although the problem cannot always be completely resolved to everyone's satisfaction, the investigation should be made as thorough as possible under the most objective conditions.

Growers often resort to legal actions before all the facts can be obtained and before any serious attempts are made at discussion and negotiation between the two parties. The ensuing court cases can drag on for years with the result that neither party really ever wins.

We believe that both parties should make every attempt to avoid the development of such situations. A very simple solution would be a formal agreement between the custom applicator and the vegetable grower. The agreement should specify:

1. Materials - common names, trade names, formulations, etc.
2. Amounts - of actual material per acre as well as diluents used.
3. Time of day - should be spelled out according to best estimate possible.
4. Techniques of application - to include distance from plants, depth, weather conditions and other items which may be related to success.
5. Signature - obtain grower approval with signature on document recording above information.

If what is to be done is explained to a grower and he is given an opportunity to make any changes he desires, the chances of eliminating misunderstanding will certainly be greatly enhanced. In this way only can a vegetable grower maintain complete control of management of his crop.

B. Indexed Seed for Lettuce Mosaic Control

One of the most serious problems encountered in lettuce production in Florida is lettuce mosaic according to Dr. Tom Zitter, the Plant Pathologist
at the Agricultural Research and Education Center, Belle Glade, who is doing considerable research on this problem. It is one of the few virus diseases of vegetable crops which is transmitted through infected seed. Secondary infection from plants grown from infected seed can be spread by aphids to other plants in a field often times resulting in total crop failure.

The seriousness of the problem may be considerably lessened in Florida by exclusion of infected seed. In the two major lettuce producing areas of Zellwood-Sanford and Belle Glade, an attempt will be made to accomplish this by a seed regulation to be administered by the Florida Department of Agriculture. Until the seed regulation becomes fully effective in a year or two, it may not be possible for growers to find indexed seed of all types and varieties desired. Whenever they can be obtained, they should be planted.

For the information of the grower, indexed lettuce seed is labeled as MT (0 in 10,000 seeds) and MTO (0 in 30,000 seeds). The MTO seed (0 in 30,000 seeds) is the most desirable, but if it is not available, MT (0 in 10,000 seeds) should be used. The MT indicates mosaic tested, and often the place of indexing is listed, too.

Seed companies are working hard to give growers lettuce seed free of mosaic virus. Within a few years, this type of seed should be commonplace. Coupled with use of clean seed, growers are, also, advised to destroy crop residues as soon as final harvest is completed. Prompt elimination of crop residues destroys the source of inoculum which can be spread by aphids to clean, young lettuce plantings.

(Montelaro)

C. "Plug-Mix" Seeding Method for Vegetable Crops

The "plug-mix" seeding method developed by Professor Hayslip of the Agricultural Research Center at Fort Pierce is one of the most promising research developments the writer has seen over the past few years. Plug-mix seeding refers "to the incorporation of crop seeds and water into a scientifically blended growing medium which is then placed in the field at rates of 1/8 to 1/4 cup of loose mixture per hill" according to Mr. Hayslip. This technique has been used in the Fort Pierce area on several thousand acres of tomatoes and peppers between 1970 and 1972.

What makes plug-mix seeding so promising now is the recent development of a mechanical seeder for hill seeding under plastic or open culture. The seeder can be adjusted for hill spacings of 10, 12, 15, 20, 30 and 60 inches. The machine can also be adjusted for depth of seeding.

Detailed information on the materials and methods for the use of plug-mix is available in a mimeo report prepared by Mr. Hayslip. Anyone wanting a copy of the report can request one from this office.

(Montelaro)

D. Downy Mildew on Watermelons (Follow-up)

The May, 1972 issue of the Vegetarian Newsletter carried a warning to growers on "Downy Mildew on Watermelons." The outbreak of this disease
actually proved to be much more serious than was anticipated by the specialists. The article is reprinted again here in its entirety.

"A rather serious outbreak of downy mildew disease on watermelons in south Florida this season should serve as a warning to growers of this crop in central and north Florida. Unlike gummy stem blight and anthracnose, two other serious diseases of watermelons, downy mildew attacks the leaves only. During the early stages of development on leaves, downy mildew cannot be easily distinguished by visual inspection from the other two diseases. However, on severely attacked leaves, they characteristically curl inward toward the midrib.

Dr. J. M. Crall, Plant Pathologist at the Agricultural Research Center at Leesburg, warns that downy mildew can be a very devastating disease on a watermelon crop. He points out that the spores which spread the disease from plant to plant do not necessarily require rain, but can be spread by wind. An outbreak of downy mildew is hard to predict, and for that reason, protective fungicides should be used on a regular schedule.

Dr. R. S. Mullin, Extension Plant Pathologist, recommends the use of one or more of the following fungicides: (1) the manebs, (2) zineb, (3) the manebs with ZnSO4, (4) Difolatan and (5) Bravo 75. These fungicides, fortunately, will also control anthracnose and gummy stem blight. The important thing is the application of fungicides before downy mildew develops, obtaining good coverage and proper scheduling to cover new growth."

Benomyl (Benlate), a new fungicide recently approved for watermelons, does not control downy mildew of watermelons, but will control gummy stem blight, anthracnose and powdery mildew. In the recommendations above, (1) the manebs should be combined with (2) zineb in the tank. Difolatan, although excellent for gummy stem blight and anthracnose is not as good for downy mildew control as the manebs and Bravo according to Dr. Crall.

(Montelaro)

E. Soluble Salts and Water Uptake

Some of the most frequent questions asked when soluble salts are discussed are those which relate to the basic concepts involved in understanding the effects of soluble salts on water relationships.

The soil solution serves as a source of both water per se, and for the nutrient elements which are dissolved in it. The soil solution contains dissolved material from various sources. Some of the materials are from added fertilizer, some from naturally occurring materials, and some from extraneously added materials utilized in various cultural practices. Soil testing by the Intensity and Balance method (referred to as I & B) gives an indication of what the soluble salt level is in the soil and the relative proportions of the
salts present. The intensity phase of the test functions by measuring the charged particles (ions) which normally result when salts go into solution. In the intensity test, no precise distinction can be made between ions from fertilizer materials and those from other sources. The intensity reading is, thus, a measure of all the soluble salts of the extract solution from the soil sample.

Soluble salts are important when one considers the water-nutrient uptake relationship between the soil and the plant. There are many theories which attempt to define the exact mechanism of nutrient and water uptake by plants. However, it is a fact that a great deal of water can be evaporated and transpired from the aerial plant surfaces when proper environmental conditions exist. The water lost to the atmosphere by the plant, as well as that used in normal growth, must be replenished by taking water from the soil.

The movement of water in a very generalized scheme occurs from areas of high concentration of water to areas of lesser concentration. When water is evapo-transpired from a plant, a concentration gradient exists between the top and the root portions of the plant. Water moves from the roots of the plant to the top, thus, overcoming the deficit in the top. In a sequel manner, water moves into the root from the soil.

Avoiding a detailed discussion of the physiological specifics, it can be visualized along the following lines. The root tissues will have a certain water status which will be a function of the nutrient, water, and biological materials present at any given point in time. The soil solution water status will be a function mainly of the amount of water present and dissolved salts (soluble salts) per given volume of soil water. Normally, the relative difference in water status between the two will be sufficient to allow adequate movement of water into the root tissues. The water status of each of these (soil solution and root tissues) is not static, but in a dynamic state with fluctuations in both, over given points in time.

As the soluble salt content per given volume of soil solution increases, the relative difference in water status between root and soil generally becomes less. The movement of water from the soil solution to the root can then decrease. Indeed, if the soluble salt level becomes high enough in the soil solution, it is possible to have the roots losing water to the soil solution with resulting injury to the plant. The injury may be exhibited in various forms and exerted with varying degrees of intensity. Under moderate soluble salt levels, a general unhealthy appearance of the plant may be exhibited. It often may be confused or interpreted as a nutrient shortage condition when, in fact, it is the opposite. Under more severe soluble salt conditions, a "burning" or dessication of the leaves of the plant may be exhibited. This stresses the fact that soluble salt injury is not restricted to the root tissues alone, but can, indeed, affect other parts of the plant.

It is possible to increase the soluble salt content of the soil solution by having an increase in the actual quantity of salts present. It is also
possible to increase the soluble salt concentration by having a decrease in the amount of soil water. Evaporation and uptake of water can decrease the volume of water allowing the same quantity of salt to be dissolved in a lesser amount of water. In this manner, the roots can then be exposed to an increasing soluble salt concentration.

Under normal soil and growing conditions, the soluble salt content does not present a serious problem. However, in certain instances throughout the state, soluble salt problems do exist and are serious threats to the future production potential of those areas.

A discussion of what means can be used to minimize the possibility of soluble salt injury in production practices was given in the January issue of the Vegetarian Newsletter. It may be worthwhile to review these procedures.

(Kostewicz)
A. Caged Tomatoes (Do not confuse with Japanese Tomato Ring)

Here is a method of growing tomatoes which could be of practical value for Florida home gardeners.

The technique calls for placing a wire cage around each individual tomato plant.

Do not confuse this method with the Japanese Ring Culture which was described in the August, 1971 issue of the Vegetarian Newsletter. In Ring Culture, the wire cage is placed around a compost pile and the tomato plants are planted around the outside of the ring.

By caging his tomatoes, a gardener can grow an indeterminate, staking variety, such as Floradel, without having to stake and periodically tie them. In fact, suckering could be reduced to a minimum, if so desired. Easy plant support is the main advantage.

Cages - C. R. O'Dell, VPI, in Extension Publication 420, describes how to make the cages using concrete reinforcing mesh wire. Holes (mesh) must be large enough to insert the hand to pick the fruit. Six-inch squares are suggested.

Cages are cylindrical in shape, $3\frac{1}{2}$ to 5 feet tall, and 18 to 24 inches in diameter. Unrolled, about $5\frac{1}{2}$ feet of mesh wire is needed to make one cage. The horizontal bottom rung is snipped off so that the vertical wires can be pushed into the soil to a depth of 6 inches for anchoring purposes.

The tomato plants are planted about 3 feet apart in rows. Leave 4 to 5 feet between row centers.

Place the cage over the plant while the plant is small. The plant grows up through the cage, with some leaves and stems sticking through the wire, helping to support the plant. No tying is necessary.

Pruning may still be performed through the mesh if desired. However, it is suggested that gardeners try this caging plants without suckering them.

(Stephens)

B. Spinach Seed Shape

This item is meant to clear up some general confusion brought to my attention regarding the shape of spinach seed. Agents teaching seed identification as part of their 4-H club program should keep in mind that some common spinach
varieties have smooth, round seed and some varieties of the same type have prickly seed. Generally, spinach varieties have been grouped based on leaf shape (either smooth or savoy) and shape of seed.

(Stephens)

C. Know Your Vegetables - Strawberries

While not a vegetable by any accepted classification system, the strawberry is grown in Florida fields and gardens much as an annual vegetable. Therefore, it is grouped with vegetables for production information purposes.

This month's "Know Your Vegetables" item is presented as an attached mimeo on strawberries for the home garden.

(Stephens)