# Vegetarian Newsletter

## *A Vegetable Crops Extension Publication*

**University of Florida**
**Institute of Food and Agricultural Sciences**
**Cooperative Extension Service**

## Vegetarian 00-05

## May 2000

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**(Back to Index Page)**

### *VEGETABLE CROPS CALENDAR*

### *COMMERCIAL VEGETABLES*

- *ALERT - The Unseen Insect and the Phantom Blight*

## *VEGETABLE GARDENING*



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## Vegetable Crops Calender

**Aquatic Weed Control Short Course -** May 15 -19, 2000, Earn up to 26 CEU's, Fort Lauderdale Research and Education Center. For more information, contact Dr Vernon VanDiver at 954-475-4125.

**Methyl Bromide Update -** May 17, 2000, 5:30 - 7:30 PM, Impact of Restrictions and Proposed Ban of Methyl Bromide on Cropping Practices and Practical Considerations for Vegetable Growers Regarding Methyl Bromide Alternatives, Southwest Florida Research & Education Center, Immokalee. For more information, contact Gene McAvoy at 863-674-4092.

**Dedication of the new Research/Lab/Office and Education buldings at Mid Florida REC**- May 31, 10:00 AM, Apopka. Contact Marion White at 407-330-6735.

**Horticulture Field Day (PROGRAM) -**June 1, North Florida Research and Education Center, Quincy. Those who plan to attend should contact Charlene at (850) 875-7100 or e-mail her at accupp@gnv.ifas.ufl.edu before June 1 in order to determine how many people will be attending the luncheon. For more information, contact Steve Olson at 850-875-7144; FAX (850) 875-7148; email smo@gnv.ifas.ufl.edu.

**Florida Fertilizer & Agrichemical Association Convention**- July 19-21, Ritz Carlton, Amelia

Island. Contact Mary Hartney at 863-293-4827.

**FSHS and ASHS Meetings -** July 23-25. Disney Coronado Springs Resort, Lake Buena Vista. Contact Kathy Murphy at 407-673-7595 or go to the FSHS 2000 Annual Meeting site at http://valencia.lal.ufl.edu/jkbu/fshs/meeting%202000.html

**Tomato Institute** - Sept 6, 2000. For more information, contact Charlie Vavrina at 941-658-3400.

## Commercial Vegetable Production

## *ALERT - The Unseen Insect and the Phantom Blight*

Recently, on some seedless melons that have fruited, a mysterious "blight" occurred in several plants. After running the sample plants through the Quincy Lab and finding no disease, Dr. Steve Olson stated that he had observed melons that had swollen, yet brittle, and some broken stems before. These were found to be caused by injuries from the three corned alfalfa hopper, which feeds on several crops in Florida. The damage is usually done by the hopper perforations at or near the soil line of the plant, and if subsequent movement of the plant occurs such as wind or mechanical means, that plant will usually wilt. There is usually no sign of the insect, only the plant symptoms. There are two insecticides that are cleared on watermelons for this pest--Asana XL and Dimethoate 5 Pound. Both have "toxicity to bees" warnings, so the applicator will need to observe caution. For further information, contact your specialists.

***(Charles Brasher, Ext Agt III - Jackson County, Vegetarian, 00-05)***

## *TYLCV-Resistant Variety Trials*

Three variety trials were conducted during the fall of 1999 in west central Florida on 6 new Tomato Yellow Leaf Curl Virus (TYLCV)-resistant varieties. Two trials were for observation on grower farms in Manatee and Hillsborough Counties and one was conducted at the Gulf Coast Research and Education Center (GCREC) in Bradenton for yield as well as virus evaluation. A similar trial was conducted in Palm Beach County by Ken Shuler and one is currently underway in Immokalee with Gene McAvoy.

In the trial at the GCREC, in cooperation with Dr. Jane Polston, varieties evaluated included two lines from Peto, Ps 150535 and Px 150420, and 4 from Hazera, HA 3017A, 3017B, 3044 and 3048. Standard varieties were Sanibel and FL 47, with Leila also included in the Palm Beach trial. Since there was very little virus pressure in the Manatee/Hillsborough and Palm Beach trials, the main observations that could be made were based on yield data. In the Bradenton trial, there was no significant difference in early yield for any variety except Px 150420 which was lower than that of Ps 150535, Sanibel, FL 47 and HA3017B. Yields of extra large fruit from the first harvest ranged

from 456 cartons (25 lb.)/A (7200 lbf) for Px150420 to 683 cartons/A for HA3017B. Yields were comparable for other sizes and for total early marketable yield. When the 3 harvests were totaled, there was no significant difference in extra large fruit production. Total marketable yield was highest for HA 3017B at 2399 cartons/A, but was not significantly different from Sanibel or HA3017A.

In the Palm Beach trial, the highest yield of extra large fruit at first harvest was obtained with Ps 150535 [206 cartons/A (7920 lbf)], but it was not significantly different from Sanibel or FL47. The same was true for total early yield. When the four harvests were totaled, the highest extra large frui yield was with Sanibel, but it was not significantly different from Ps 150535. The same was true for total marketable yield, with 2120 cartons/A for Sanibel. In both trials, the highest yielding varieties all had acceptable horticultural characteristics.

In a similar trial in Immokalee with Gene McAvoy and Phil Stansley, preliminary observations based on plants which have been in the field approximately 5 weeks are exciting. A number of the varieties are already 100% infected, including the two standard cultivars, with symptoms appearing after three weeks. Virus pressure is very heavy as plots were actually inoculated by putting infected plants in between each treatment. Plants will be harvested and evaluated for yield and horticultural characteristics.

Of the varieties tested, Ps 150520 is now commercially available and is being evaluated in some areas. Although it performed well in this trial, Peto feels it is actually more suited as a spring tomato. Ps150420 is still in pre-commercial status. Contact your Peto representative for additional availability information. In talking with the Hazera representative, they have one line, HA3057, that is currently in initial commercial introduction. Although not one of the lines evaluated in these trials, HA3057 is very similar horticulturally to the 3017 lines with reportedly an even higher level of resistance. Modest quantities are available for growers to trial. For additional information or seed availability, please contact Glenn Kaufman at 561-221-0653. (P. Gilreath, K. Shuler)

***(Phyllis Gilreath, Ext Agt IV - Manatee County, Vegetarian 00-05)***

## *Diquat and Rain*

Granted, it doesn’t rain much during the potato-harvesting season in SW Florida. In fact, rain is generally only a problem for the industry early in the October planting schedule. Our rains essentially diminish through November and December and dry weather prevails from January through April or May. But there is always the threat of rain and during such events a 1-inch rain is not unusual. Rain can disrupt harvesting schedules, increase post harvest spoilage, and complicate vine desiccation.

Vine desiccation is an integral part of the harvesting process on the 4,000 + acres in SW Florida. Our predominantly red potato market insists on intact skins for top quality and good skin set depends, in part, on adequate vine desiccation.

The process goes something like this:

- The soon to be harvested potato block is sprayed with Diquat at 1.6 pts/A plus surfactant.
- Potato vines desiccate usually within hours depending on sunlight intensity.
- Sometimes a second Diquat application is necessary if coverage is poor or if vines are particularly rank.
- Skin set or curing is allowed to continue in the ground for a period of 21 - 28 days.
- Harvest

The harvest season in SW Florida begins in mid-February and continues through early April.

Diquat, as you know, requires photosynthesis and hence sunlight to drive it's herbicidal activity. Winter/spring mornings in Florida are often foggy, with fog sometimes not lifting completely until after ten in the morning. This alone can delay the onset of Diquat activity. But *what if* rain occurs within an hour of vine desiccant application or worse yet within ½ hour of application? This question arose during the present season and we undertook an experiment to find the answer.

`Red La Soda' potato tubers were planted in one-gallon pots of soil taken from the field at the SW Florida Research and Education Center in Immokalee, FL. The plants were raised for eight weeks under a liquid fertilization scheme that produced a compact canopy, which essentially covered the surface area of the pot. Diquat was applied at slightly higher than label recommendations (2 pts/A + surfactant) at seven in the morning. Several pots were then subjected to a one-inch rain event at intervals of ½, 1, 3, 5, and 7 hours following herbicide application via a rain simulator (Fig. 1). Approximately 48 hours later plants were rated for percent desiccation based on the time course of rain application. The trial was repeated twice.

A one-inch rain event within ½ hour of Diquat application was sufficient to reduce herbicidal efficacy 66 – 83% (Fig. 2), even with a surfactant (0.25%) present. The morning of Trial #1 was foggy and overcast lending to a 17% desiccation rate compared to Trial #2, under clear sky conditions, which resulted in a 34% desiccation rate. A one-hour delay in rain still reduced Diquat efficacy approximately 25%. However, if rain was delayed for three hours following herbicide application full Diquat activity was realized.

This information may be useful to tomato growers as well, as Diquat is the only material presently labeled for tomato vine kill. Rain certainly seems to complicate the herbicide driven vine desiccation process especially if the event occurs within an hour of application. So it may pay to watch your local weather report before applying vine desiccants in the future.

**Fig. 1. Rain simulator for Diquat experiment.**

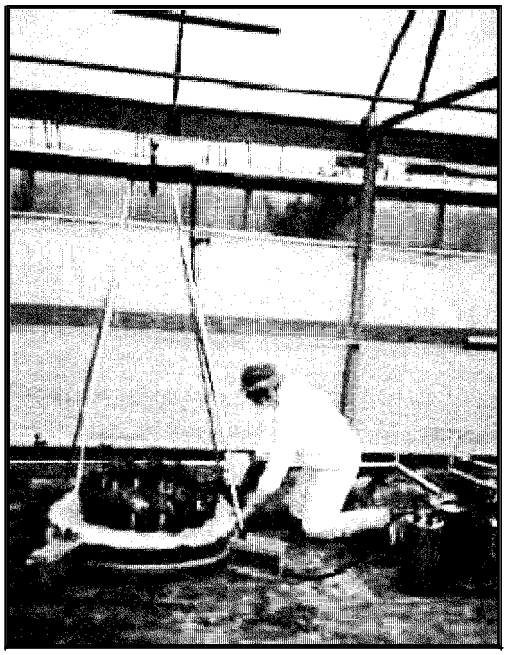
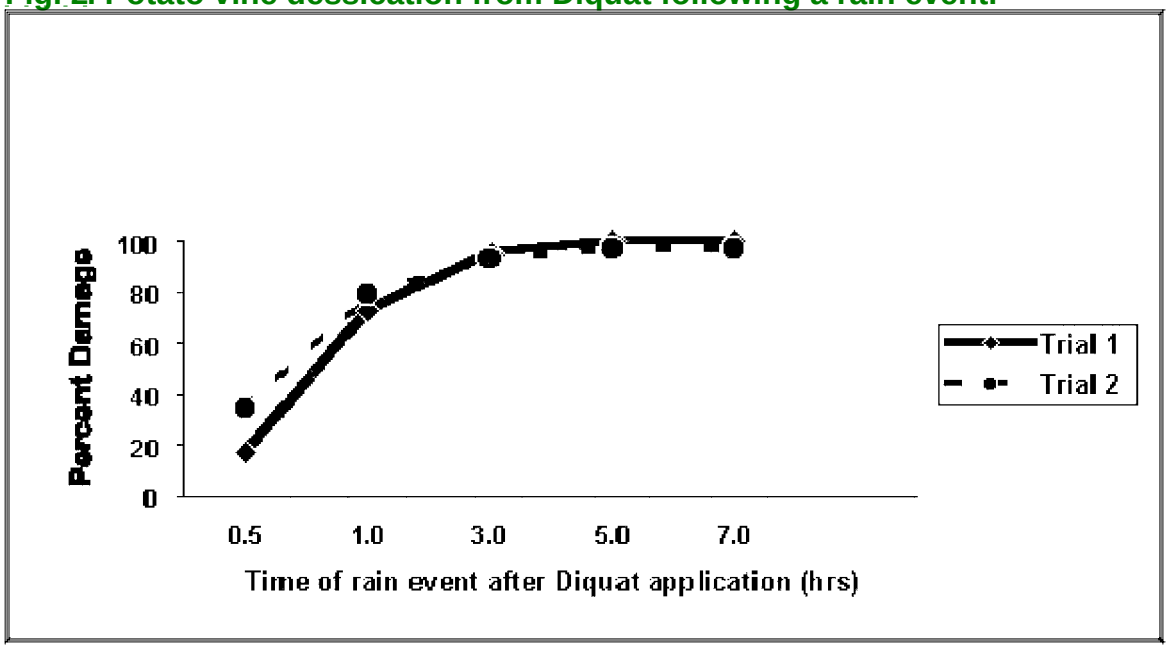


**Fig. 2. Potato vine dessication from Diquat following a rain event.**




***(Vavrina, Vegetarian 00-05)***

## *Fresh Fruits and Vegetables May be Irradiated Sooner Than You Think*

Until now, fresh produce has not been routinely irradiated in the United States for several reasons. However, the safety of this process for consumers is not in question. Growing concerns over food safety have reinvigorated the potential of this process to be employed for sanitizing a wide range of foods, including fruits and vegetables. The Centers for Disease Control (CDC) estimates that 5,000 Americans die each year due to complications from foodborne illnesses. The CDC also made the following statement with regard to the safety of food irradiation. "CDC has stated that food irradiation is a promising new application of an established technology. It holds great potential for preventing many important foodborne diseases that are transmitted through meat, poultry, fresh produce and other foods. An overwhelming body of scientific evidence demonstrates that irradiation does not harm the nutritional value of food, nor does it make the food unsafe to eat. Just as for the pasteurization of milk, it will be most effective when irradiation is coupled to careful sanitation programs. Consumer confidence will depend on making food clean first, and then using irradiation or pasteurization to make it safe. Food irradiation is a logical next step to reducing the burden of foodborne disease in the United States." ( - frequently asked questions about food irradiation)

Last October the Food and Agriculture Organization of the United Nations co-sponsored an international meeting in Turkey where professionals reviewed the current status of food irradiation and where it should be going in the future. According to the Food & Environmental Protection Newsletter of FAO (Dec. 1999; www.fao.org), the group concluded:

1. food irradiated below and above the currently permitted 10 kiloGrays maximum limit has been clearly shown to be safe and nutritionally adequate (maximum of 1 kG permitted for fresh fruits and vegetables),
2. irradiation can effectively control pathogenic bacteria and parasites from raw or fresh-cut (minimally processed) produce and meats without significantly increasing product temperature, qualifying it as a cold pasteurization/decontamination treatment that can be incorporated in HACCP (Hazard Analysis Critical Control Point) programs,
3. it is also effective as a broad spectrum quarantine treatment for fresh fruits and vegetables, and potentially, cut flowers and ornamental plants, as methyl bromide is phased out,
4. irradiation can contribute to reducing postharvest losses in fruits, vegetables, tubers and grains due to insect infestation and decay,
5. that, as permitted tolerances of human pathogens decrease (e.g., zero tolerance of in the U.S. for Listeria monocytogenes), irradiation may be one of the only means to meet these tough standards.

The group also made several interesting comments. Consumer acceptance tests worldwide indicated that, once educated as to the safety and benefits of food irradiation, consumers are willing to purchase irradiated food. However, the food industry has been slow to adopt irradiation due to perceived consumer resistance, or reluctance to deviate from standard practices or be the first to adopt a controversial practice. The participants recommended directing more educational programs to leading industry executives.

On a recent field trip to Food Technology Services in Mulberry, Florida, our group was told that fresh and frozen poultry and beef will be irradiated in the near future at their facility to reduce the risk of foodborne pathogens. Also, with the phase-out of methyl bromide by 2005 as a postharvest

quarantine fumigant, irradiation may quickly be implemented as the treatment of choice by produce exporters.

Spices and dried vegetable stocks have been irradiated for some time. The FAO conference also noted that new commercial scale facilities are being constructed for irradiating food in several locations - Iowa will soon pasteurize 100,000 tons/year of chicken and ground beef products; Brazil, India and Thailand are also constructing facilities for a variety of food products.

Food irradiation may soon become another method in the shipper's arsenal for minimizing risks of being contaminated by foodborne microorganisms and for reducing postharvest losses during commercial marketing operations.

***(Sargent, Vegetarian 00-05)***

## *Back to the Basics*

As we approach the end of the spring season, it is not too early to start thinking about and even implementing your fall season IPM program. With all the advances in pest management, new chemistries and space age spray rigs, it is often easy to overlook some of the basics.

Field sanitation is one of the most important tactics in vegetable pest and disease management. Think back not so many years ago, that only through universal cooperation were growers able to survive the whitefly and Gemini-virus situation. The best thing that growers can do for themselves and their neighbors is to clean up crop residues promptly after harvest. Sanitation is an important IPM technique that should not be over looked as an effective, preventative tool against many vegetable pest and disease problems. Sanitation includes any practice that eradicates or reduces the amount of pathogen innoculum, pests, or weed seeds present and thus helps reduce or eliminate subsequent pest and disease problems.

Prompt crop destruction at the end of the season will immediately end the production of disease innoculum and insects and eliminate the spread of diseases and pests to any other host plants in the vicinity. Downy and powdery mildew on melons can spread via wind from older, diseased plants to plants in surrounding fields that are still maturing. These diseases are obligate parasites. This means that they can only grow and multiply on living host tissue. Some plant pathogens, such as the bacterium that causes bacterial spot of tomato and pepper, are unable to survive for extended periods of time outside of the host tissue. Plowing or disking under infected plant debris helps not only by covering up the innoculum but also speeds up the disintegration of plant tissue and kills the pathogen. Good sanitation will help control a number of important vegetable pathogens.

Destruction of tomato vines will kill off white fly populations and eliminate transmission of the tomato yellow leaf curl virus to subsequent crops and also eliminate innoculum from late blight and other fungal diseases. This is particularly important in the case of TYLCV, as sanitation and whitefly control are the only tools currently available for the management of this disease. A crop-free period is also considered a necessity for the control of a number of other important vegetable pests such as pepper weevil, tomato pinworm, and Thrips palmi and is recommended for

management of all vegetable pests.

Weeds and volunteers should also be removed to prevent the survival and over-summering of pathogens that could serve as innoculum reservoirs for the next crop. Techniques such as mowing off pepper should not be relied upon as this often results in re-sprouts which can harbor pests and disease problems over summer.

The use of cover crops and summer fallowing of fields are also effective tools in reducing weed populations that can cause problems in the subsequent crop. The role of summer fallow in weed management is often overlooked. Summer fallow keeps new weed seeds from being added to the soil seed-bank. It also reduces the increase in asexual propagated plants such as nutsedge. Yellow nutsedge can put out 70 new tubers (nuts) every two months. Keeping the weeds from propagating will reduce the weed problems encountered during the next cropping season and helps reduce insects and diseases that may over summer in weedy fields.

Chemical fallowing is a twist on the traditional method of fallowing that depends on disking fields through out the summer period to reduce weed pressure in subsequent crops. One approach uses Roundup to kill weeds during the crop free period.

The key to a successful chemical fallow program is the timing of the applications. Two Roundup Ultra treatments with one tillage trip in between should cover the entire fallow period.

## Procedure

- Disc field after harvest.
- Allow weeds to germinate and grow to a desirable height (approximately 25-30 days).
- Treat with Roundup Ultra (first treatment).
- Allow treated weeds time to translocate product throughout plant (at least one week).
- Lightly disk field (can be one to five weeks after herbicide treatment).
- Allow weeds to germinate and regrow to a desirable height (approximately 25-30 days).
- Treat with Roundup Ultra (second treatment)
- Allow treated weeds time to translocate product throughout plant (at least one week).
- Prepare field for planting (can be one to five weeks after herbicide treatment).

**Note:** Allow 3 days between last application and planting. Given the impending loss of methyl bromide, such techniques may prove valuable in some vegetable cropping systems for the control of persistent weed species such as nutsedge.

Field sanitation will be come an increasingly important tool to growers in face of the impending loss of methyl bromide whose ease of use and effectiveness in controlling a wide range of problems allowed us to neglect some of these practical common sense pest management techniques.

There is also growing interest is in the use of warm season legumes or grasses as cover crops and green manures in vegetable production. Cover crops can provide a number of benefits. They can

provide a significant source of nitrogen for subsequent crops and capture nitrogen that might otherwise be lost to leaching. They can help reduce erosion, runoff, and potential pollution of surface waters. Cover crops add organic matter to the soil improving soil physical properties. They can impact insect and disease life cycles; and suppress nematode populations and weed growth. There are some drawbacks, such the additional cost of seeding and managing the cover crop, possible difficulties in incorporating the cover crop at the end of the crop cycle and resulting interference with subsequent field operations and other potential drawbacks.

Cover crops affect the economics of farming operations differently, depending on the cover crop and the cash crop. Growers need to account for the cost of cover crop seed and planting costs. Quantifiable savings can include reduced fertilizer and herbicide applications, and reduced costs of pest and disease control. Growers will have to determine how they want to account for less apparent long-term savings such as, reduced soil erosion, increased organic matter content, improved soil physical properties, reduced leaching, and enhanced nutrient cycling.

These factors must be considered in evaluating the particular cash crop and cover crop combination to be grown. The best use of cover crops will maximize the benefits without reducing the yield or quality of commercial cash crops.

The desired purpose of the cover crop will help determine the most appropriate species. If the purpose of a cover is to provide readily available, biologically-fixed N for subsequent crops, then the grower should choose a legume like cowpea or sunn hemp, which fixes nitrogen and has a low C:N ratio. If the cover crop will be managed for weed suppression, the grower might be better off with a heavy biomass producer with demonstrated weed suppression characteristics, such as sorghum-sudangrass.

There are a number of alternatives to methyl bromide out there and growers would be well advised to start to consider these and experiment with them before the 2005 cutoff date. Supplies are already starting to get tight and prices are rising on this material. MB alternatives will certainly involve some changes in your crop management program and it would be wise to see what's involved and how these alternatives might be successfully incorporated into your operation.

***(Gene McAvoy, Ext Agt II, Hendry County, Vegetarian 00-05)***


## *Spinach Subsitutes for Cooking Greens*

When you get hungry, do you hit the drive through, go for the microwave or take a trip to the closes snack machine? These are all luxuries which many of our neighbors cannot afford. Hunger and nutrition are issues which affect our homeless residents and local families as well as our neighbors

around the globe.

Agriculture in America provides such popular crops as tomatoes, corn, wheat, lettuce, beans and cabbage. Our major food crops were imported and bred to improve certain desirable characteristics. Many countries are looking at lesser known plants to provide food, fiber, medicine and shelter. Perhaps we should learn from them.

A recent news article on moringa, Moringa oleifera, a native of India, got me thinking about the value of many unfamiliar plants. Also known as the **horseradish tree** here in Florida, moringa has highly nutritious edible leaves and seed pods which can be eaten fresh or dried. The plant has been used to settle sediment to clarify water and is reported to have antibiotic properties. Moringa grows wild in many parts of the world, but the local people were unfamiliar with the beneficial attributes of this miracle plant.

Hank Bruce, author, gardener, humanitarian, philosopher and friend, shares information on many unusual and underutilized food and herbal plants in his book, The Global Garden, which will be released later this summer. He shares his insight on the value of bio-diversity in our home gardens and the cultural exchange and education available while learning about many unfamiliar plants.

With his permission, and the help of vegetable specialist Jim Stephens, I, Eleanor, am sharing some information on a few leafy greens that thrive in Florida's summer heat & humidity. They all provide a continuing harvest throughout the season. Most are attractive plants in the landscape as well, making them multi-purpose plants (Okinawa spinach, quail-grass, mountain orach, and **Brazilian spinach** are among the most attractive). Also, they will all grow as container plants.

Note: Please keep in mind that common names can be and often are mis-leading, particularly as to specific areas and plants. Where possible, we are correlating these common names to their generic names

**Spinach**, (espinaca in Spanish), Spinacia oleracea, is the typical green spinach of Popeye fame. However, there are many other plants which share the common name in one fashion or another. Most all are potherbs which produce edible leaves usually boiled or cooked like spinach. We suggest you give them a try and perhaps you will find one even your tyke likes, maybe even better than his regular spinach.

**Malabar spinach**, Basella rubra, also known as **Ceylon spinach** and vine spinach, has received a lot attention at EPCOT’s "Land" attraction.. This prolific plant grows as a heat tolerant vine with red or green foliage. Harvest frequently as mature leaves are tough. Young leaves and shoots taste like sweet corn and can be eaten fresh or cooked. Two other edible species of Basella are **Japanese spinach**, B. japonica, and **Chinese spinach**, B. lucida.

**New Zealand spinach**, Tetragonia tetragonioides, is another hot weather groundcover crop for the Florida garden. It has potential as a heat hardy hanging basket. Seeds are often available commercially. The plants are drought tolerant and grow in full sun or light shade. Plants grow from cuttings and reseed easily in frost free areas. Tender new shoot can be used in a salad. For the best cooked flavor, boil the leaves twice, pour off the first water and add fresh water for the final cooking.

**Goosefoots** (genus Chenopodium) have several members used as spinach. **Strawberry spinach** (C. capitatum) gets its name from the small strawberry like fruit which can be eaten raw or cooked. Young leaves are eaten in soups and salads. It re-seeds easily, as Hank Bruce puts it, "with enthusiasm," so beware of where you plant it.

Other goosefoots include **good king Henry** ( C. bonus henricus), **lamb's quarters** (C. album), **quinoa** (C. quinoa), and **Australian spinach** (C. erosum). **Amaranth goosefoot** (C. amaranticolor) grows very tall (to 10 feet), especially along fertile Florida lake-shores.

**Mountain spinach**, Atriplex hortensis, known as **garden orach**, is often substituted for spinach in European countries. This attractive plant produces 4 to 6 foot tall plants with leaves that may be red, green or white depending on the variety. Coastal gardeners may want to try this salt tolerant green. Leaves are arrowhead shaped and can be eaten raw or cooked. Keep flower spikes trimmed to promote tender growth.

**African spinach**, Celosia argentea is in the Amaranth family. This African native is known as cockscomb and quailgrass in the United States. This plant is an annual which produces attractive flowers suitable for drying. The leaves are red and green and can be eaten fresh or cooked. Tender stems can be cooked like asparagus shoots. This heat lover grows well in pots or in the garden. Provide full sun and adequate moisture. Harvest often to maintain plants at 2 to 3 foot high

**Brazilian spinach**, Alternantheria sessilis, as its name implies, is native to South America. This plant is another **amaranth** but grows as a groundcover growing to 10 to 12 inches high. It thrives in partial shade or full sun and prefers soil enriched with compost.

**Chinese spinach or tampala**, Amaranthus gangeticus, is another heat loving annual amaranth. It is a popular addition to Asian diets. This plant grows quickly from seed. Grow it in full sun and provide uniform moisture for best flavor.

According to Hank, a daisy relative, **Okinawa spinach**, Gynura crepiodes, has attractive succulent leaves which are dark green above, purple underneath, and nutty tasting. Leaves may be eaten fresh or lightly steamed (to avoid a mushy product). The daisy- like blooms attract butterflies. Hank has found this one to be very adapted to our Florida summers.

**Other spinach substitutes**: oraches, chickweed, pokeweed, corn-cockle, Spanish needle, and iceplants (Mesembryanthemum).

**More research and observational trials** would be helpful to evaluate consumer preference, nutrition and utility and adaptability to our mild, humid climate. Hank is willing to work with Master Gardeners and botanical gardens to set up evaluation. Surely, there are other plants that deserve just as much attention as the popular spinach, corn, tomatoes and watermelon! Lets get a "Global Garden Network" going here in Florida.

If you are unable to locate seeds, contact Hank Bruce directly at 352-383-2704 or by email at He is anxious to hear about your growing experiences.

ECHO, Educational Concerns for Hunger Organization, is located in North Ft. Myers. The group shares information and seeds from a variety of crops being used and evaluated throughout the

world. They conduct classes and tours and link growers to research. For more information, visit them on the web athttp://www.echonet.orgor call 941-543-3246.

(Editor's note: photos available on the web from University of Florida fact sheets by crop name using the key word search feature.

(Information source: Stephens, James M. 1988. Manual of Minor Vegetables. Florida Cooperative Extension Service Bulletin SP-40, for sale from IFAS, University of Florida.)

***(Eleanor Foerste and Stephens, Courtesy Ext Agt II - Osceola County, Vegetarian 00-05)***

## *Extension Vegetable Crops Specialists*

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*This page is maintained by Susie Futch.... if you have any questions or comments, contact me at zsf@gnv.ifas.ufl.edu*