July 11, 1978

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

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VEGETARIAN NEWSLETTER 78-7

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NOTE: Anyone is free to use the information in this newsletter. Whenever possible, please give credit to the authors.
I. NOTES OF INTEREST

A. Moving On

It has been nearly six years since I became associated with the Vegetable Crops Department -- six good years. I have been particularly pleased with the fine relationships I have established with readers of the Vegetarian, most especially the County Extension Agents. I have recently decided to accept the position of Chairman of the Department of Horticulture at Michigan State University (my Alma Mater). I assure you that I am not leaving because of any overwhelming negative factors in Florida -- I'm certainly not leaving to go to a better climate. Thank you for your assistance and cooperation.

While a faculty committee searches for a replacement, Dr. Chet Hall has agreed to serve as Acting Chairman. Dr. Hall is a long-time faculty member at the University of Florida, a leader in physiological research, a Fellow in the American Society for Horticultural Science and a recipient of a Florida Fruit and Vegetable Association Research Award.

(Kelly)

B. June Vegetarian Newsletter Page Missing?

The final page of last month's (June) issue of the "Vegetarian" may have been left off accidentally from many copies. If a page was missing from your copy, please attach this page.

(Stephens)

C. Quality Strawberry Plants

Growers should beware of strawberry plants stored for longer than a month at temperatures near the freezing point. The most vigorous, productive plants are obtained by digging shortly before transplanting to the production field. In transit, plants can be cooled or chilled for a few days to 2 or 3 weeks, but plants stored for 9 to 12 months are not recommended for production in Florida.

(William)
D. Tomato Growers' Institute Plans for 1978

Plans have been finalized for the Annual Tomato Growers' Institute. It is set for Thursday, September 7, 1978 and is to be held at 18710 S.W. 288th Street (County Agents' Office) Homestead, Florida. The program promises to be a good one. A detailed copy of the program will be mailed out next month. Please put this date on your calendar now and make definite plans to attend.

(Montelaro)

II. COMMERCIAL VEGETABLE PRODUCTION

A. Nematode Control In Fall Planted Cabbage

Nematodes can be a serious problem in late summer or early fall planted cabbage on many of our Florida sandy soils. This was observed in a number of cabbage fields throughout the state last fall. The problem can be handled easily at a small cost with the use of a good nematode control treatment.

Fields with a history of nematode problems should be treated if they are to be planted to fall cabbage. The fumigant nematicides, D-D and Telone II, are cleared and recommended for control of all nematodes attacking cabbage. They are especially desirable where root-knot nematodes are present in high numbers. Both D-D and Telone II must be applied at least 10 days before planting to avoid crop injury. A longer waiting period is required under cold, wet soil conditions. In all cases, growers should read and follow instructions on the labels carefully.

Two granular nematicides are approved for use in cabbage production. They are: (1) Nemacur 15% granular and (2) Mocap. Nemacur is recommended for all kinds of nematodes, but Mocap is registered for sting nematode only. As with the other materials, label instructions should be studied and followed carefully.

Good nematode control is only one factor in successful fall cabbage production. Good, healthy plants, free of diseases and nematodes are just as important. Failure in the execution of one production practice can mean partial to complete failure of a crop.

(Dunn and Montelaro)

NOTE: (1) Dr. Robert A. Dunn is Extension Nematologist, IFAS, Gainesville, Florida.

(2) The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition.
B. Tomato Variety 'Calypso' Released

'Calypso' is a new tomato variety released recently by the Caribbean Agricultural Research and Development Institute (CARDI) from a cooperative breeding program with the University of Florida. It is labelled in the release report as "a tomato variety for the Caribbean and Tropics." Yields of 'Calypso' in the dry season have been superior to other varieties commonly used in Trinidad. 'Calypso's' performance was about equal to that of 'Floradel' and 'Walter' in the wet season, at which time the yields of all varieties were appreciably reduced.

'Calypso' was tested in 1973 under the designation of MH-11 at Immokalee. It produced higher yields and larger fruit in both spring and fall tests. At other locations in Florida, it was equal to the best commercial variety.

CAUTION is advised by Mr. Don Burgis, Horticulturist at AREC at Bradenton, Florida. He warns that under adverse growing conditions 'Calypso' is apt to produce more "rough fruit" than 'Walter'. Growers who tried the 'Florida MH-1' tomato, well remember the rough fruit problems associated with this variety.

Based on these observations and the lack of recent field trials in Florida, growers are advised to "go slow" with 'Calypso'. No grower, regardless of size of operation, need try more than 1 to 2 acre test plantings until more is known about its performance under Florida conditions. Anyone wishing a copy of the 'Calypso' release can obtain one on request from this office.

(Montelaro)

C. Virus Control With Oil Sprays In Vegetables

A recent breakthrough makes the control of virus diseases of vegetables a distinct possibility. This was reported by Drs. Zitter and Ozaki at the Vegetable Field Day held in May at Belle Glade. Virus disease control is achieved through the use of specially prepared and applied mineral oil sprays. The mode of action is simple. Mineral oil interferes with the aphid's ability to acquire and transmit viruses. It is felt that oil sprays should be effective against all stylet-borne (aphid-transmitted) viruses.

Certain oils were known to suppress the transmission of viruses by aphids. However, prior formulations failed as a result of crop injury. The introduction of a new oil formulation (JMS Stylet-oil) and improved application techniques has essentially eliminated the problem of crop injury. A 24C label was granted for use on squash, pepper and tomato in Florida and the material will be distributed to the vegetable industry next season by a state-wide supplier of pesticides.
Vegetable growers are warned to use the recommendations supplied by the distributor's representative. Timing, equipment and application techniques are very specific and should be adhered to carefully. In general they are as follows:

1. The program of spraying oil should be started when aphids first appear on the crops.
2. Specific nozzles are recommended for certain crops.
3. Pressure used should be no less than 400 psi.
4. Oil sprays should be applied weekly (more often on fast-growing crops like squash).
5. Oil sprays should be applied separately and at least one day after other fungicide applications.
6. Leaves should be dry at time of application.

Growers wishing to use oil sprays should check with their County Agent. A copy of the Belle Glade presentation is available from this office upon request.

(Montelaro and Simone)

NOTE: (1) Dr. Gary W. Simone is Extension Plant Pathologist, IFAS, Gainesville, Florida.

(2) Use of trade names in this article is not intended as an advertisement of a specific product to the exclusion of others which might now or in the near future demonstrate similar efficacy.

D. Weeds, Nematodes, and Cover Crops

Numerous weed species have been identified as alternate hosts for nematodes (Table 1). Purple nutsedge hosts at least 7 different nematodes and root-knot nematode infests many of the "most troublesome weeds" found in Florida's vegetable fields. Perhaps the greatest increases of both weed and nematode populations occur during summer when fields are left fallow. Because suppression or control of these pests is a major cost of producing vegetables, growers can increase their production efficiency by controlling both pests using similar cultural practices.
Table 1. "Troublesome weeds" in Florida that are reported to host nematode pests.

<table>
<thead>
<tr>
<th>Weed name</th>
<th>Nematodes reported to infest the weed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purple nutsedge (Cyperus rotundus)</td>
<td>Root-knot, sting, awl, spiral, lance, reniform, and stubby-root</td>
</tr>
<tr>
<td>Bermudagrass (Cynodon dactylon)</td>
<td>Root-knot and root-lesion</td>
</tr>
<tr>
<td>Junglerice grass (Echinochloa colona)</td>
<td>Root-knot</td>
</tr>
<tr>
<td>Goosegrass (Eleusine indica)</td>
<td>Root-knot, root-lesion and reniform</td>
</tr>
<tr>
<td>Crabgrass (Digitaria sp.)</td>
<td>Root-knot, sting and root-lesion</td>
</tr>
<tr>
<td>Signalgrass (Brachiaria sp.)</td>
<td>Sting</td>
</tr>
<tr>
<td>Purslane (Portulaca oleracea)</td>
<td>Root-knot, root-lesion and reniform</td>
</tr>
<tr>
<td>Spiny amaranth (Amaranthus spinosus)</td>
<td>Root-knot</td>
</tr>
</tbody>
</table>


Flooding, for example, can reduce populations of nematodes and certain weeds such as nutsedge and some other perennial weeds that are not adapted to growing under wet conditions. Where flooding is feasible during the summer, anaerobic conditions should be maintained for several months to reduce oxygen levels around the pest organisms, thereby reducing their populations. This practice is especially feasible where organic or muck soils predominate because subsidence is also reduced by flooding.

Proper application of multi-purpose soil fumigants when soil moisture is at or near field capacity can reduce both nematode and weed populations. Note previous Vegetarian Newsletter articles for details (77-12).

Planting resistant or non-host crops during the summer growing season can reduce both weed and nematode populations in fields intended for vegetables in the fall. Crops such as corn, sorghum, small grains and certain varieties of soybean generally host low to moderate populations of root-knot nematode. Careful selection of resistant crops is required where mixed populations of nematodes infest the field. For example, Dr. H. L. Rhoades at the Sanford AREC has shown that populations of sting and root-knot nematode can be reduced by planting hairy indigo, a vigorous growing cover crop. Yields of green bean and cabbage were similar following either
hairy indigo or other treatments plus an application of nematicide. However, cucumber yields were improved when a nematicide was applied following the hairy indigo cover crop.

By providing a dense canopy that competes against weeds, cover crops such as hairy indigo can reduce weed seeds and vegetative propagules of perennial weeds. Mowing the early weed growth just above the hairy indigo will release the cover crop so that a canopy will form naturally within 4 to 6 weeks after planting.

In summary, growers who plant resistant or non-host crops can achieve several crop management objectives. First, growers can improve soil properties such as soil structure and cation exchange capacity by incorporating a cover crop before it produces seed and becomes a weedy pest. Second, subsequent weed populations can be reduced when a cover crop competes against a native population of weeds. Third, nematode populations can be decreased substantially by plowing down a resistant cover crop rather than an array of nematode-infested weeds.

(William)

III. VEGETABLE GARDENING

A. Know Your Vegetables -- Chinese Cabbage

Chinese cabbage has been grown in Asia since the fifth century, but was not grown in the U.S. until about a century ago. Now, it is grown for sale primarily in California, New Jersey, Hawaii, and Florida. In Florida, the principal production areas are the organic soils of the Everglades and Central Florida. Some production is scattered throughout other counties on sandy soils such as in Martin County. Many home gardeners around the state include Chinese cabbage in their fall and winter gardens.

The name, Chinese cabbage, is applied to such a wide range of types and varieties of this vegetable that placing them in a logical order is quite difficult. The confusion is due in part to there being two sub-species and to the fact that Chinese and Japanese plant breeders have spent hundreds of years selecting within these two sub-species.

Following is an outline of the major types and varieties of Chinese cabbage.

Chinese Cabbage

Cruciferae - Mustard Family

GROUP I.

Brassica campestris L. (Pekinensis group), or sometimes referred to as Brassica pekinensis is commonly called the pe-tsai group. In one place or another, common names include celery cabbage, Chinese white cabbage, Peking cabbage, pai-
Pe-tsai includes the broadleaved, compact-heading varieties, of which there are two major forms Chihili and Che foo. Note, however, that there are some varieties of the pe-tsai group which have the broad leaves, but do not form a compact head, eg. Santo.

Form A: Chihili type -- forms a cylindrical head 18 inches long and 6 inches in diameter, with an erect, upright growing habit. Among the varieties having this form are 'Chihili', 'Michihili', 'Market Pride', 'Shantung', and 'Shaho Tsai'.

Form B: Che-foo type -- forms a compact, round head of green-bladed, white-petioled leaves. Varieties represented in this category are Che-foo, Wong Bok, Spring Giant, Tokyo Giant, Tropical Pride, Tropical Delight, Early Top, Tip Top, China King, Winter Giant, Oriental King, and Winter Knight.

GROUP II.

Brassica campestris L. (Chinensis group) is sometimes written Brassica chinensis. The most commonly accepted designation is bok choy, or pak choi. Many refer to it as Chinese mustard. Other names, some of which overlap those in Group I, are (a) celery mustard, (b) pei tsai (Mandarin), (c) pak choi (Cantonese), (d) chongee (Japanese) and (e) Japanese white celery mustard.

Bok choy is a non-heading form of Chinese cabbage, with several thick white leaf stalks (petioles) and smooth, glossy, dark green, round leaf blades forming a celery-like cluster. There are not as many bok choy varieties available as there are of the pe-tsai type. Two are (a) 'Canton Pak Choi' (Sakata Seed Comp.) and (b) 'Pai Tsai White Stalk' (Herbst). Closely related is a flowering type of bok choy which is called Choi sum (Brassica Chinensis var. parachinensis). "Sum" in cantonese means "flower stalk".

'Chinese Tsai Shim' (Sakata) is a dark green variety of the flowering type which is very similar in appearance to ordinary bok choy which has bolted. A purple variety of the flowering bok choy is 'Hon Tsai Tai' (Sakata). It has dark green deeply cut (serrated) leaves with purple-red veins. Both flowering varieties have small yellow flowers borne on top of erect flower stalks. However, the purple variety 'Hon Tsai Tai' has purple flower stalks.

Bok choy should not be confused with a similar but broader leaf Chinese mustard cabbage called kai choy (Brassica juncea var. rugosa). Other names for it are (a) Chieh tsai (Mandarin), (b) gal choi (Cantonese), (c) takana (Japanese) and (d) oriental mustard. Popular varieties are (a) 'Pauu Sum Kaai Tsoi', a wrapped heart mustard, (b) 'Takana', a red and green leaved Japanese variety, and (c) 'Milke Giant', a giant size mustard.
Climatic Requirements

Chinese cabbage is a cool season annual vegetable. It grows best with short days and moderate to cool temperatures (60 to 70 degrees F mean temp.). Although cultivars will vary in their response to temperature, below 60°F, seedstalks may form before good heads can be produced. In particular, some of the bok choy varieties, such as 'Canton Pak Choi', will bolt quickly when grown in cool weather. Temperatures above 75°F cause soft, bitter heads. Many growers have reported that hot weather causes seed stalk formation (bolting). However, studies have shown that bolting is due to the longer day usually associated with the warm weather.

In Florida, best results are obtained when Chinese cabbage is planted in the fall through early spring. The short warm, mild days of this period are ideal for good head formation. Severe cold snaps during this time can result in damaged leaves and seed stalk formation.

Chinese cabbage is fairly quick maturing. It varies from 40 days from sowing to harvest for some cultivars to 75 days for the longer maturing ones.

Planting Instructions

Chinese cabbage is grown from seed sown directly in the garden row, or it may be transplanted. Space the rows 24 inches apart; space pe tsai types 18 inches apart and bok choy types 8 to 12 inches apart within the row.

Use similar soil preparation, liming, fertilizing and cultivation practices as for regular cabbage. Keep soil moist for best results.

The major diseases are downy mildew, black speck, virus, and bacterial soft rot. Insect pests are cabbage worms and aphids.

Harvesting

Most Chinese cabbage is harvested by cutting the entire plant just above the soil line. Old, ragged, and decayed outside leaves are removed. The heads or entire plants are then ready for washing, using, or storage. For flowering cultivars, pick the tender, young flower stalks leaving at least 3 to 4 young leaves on the plant. Successive stalks will grow from the leaf axils. Add a little side-dress fertilizer after each picking.

Uses

Chinese cabbage of all types is used both fresh and cooked with certain varieties being more suitable than others for some uses.

For salad use, leaves can be sliced finely (like cole slaw) and used with or in place of lettuce. Since the leaves are crisp and tasty, they make excellent additions to sandwiches.
Chinese cabbage is cooked in various ways; as a potherb, with meat or other vegetables, or fried in vegetable oil.

To prepare and cook flowering bok choy, follow these simple steps - provided by Sakata Seed Company. Wash the stalks thoroughly with clean water and cut into 1 1/2 to 2 inch lengths. Prepare a well-heated skillet or frying pan using a good grade vegetable oil. Fry beef, pork, or ground meat to a light brown. Add the cut lengths of stalks to the already fried meat and mix all ingredients thoroughly. At the same time, stir all ingredients, adding small amounts of cold water to prevent the contents from overcooking or burning. Continue this procedure for 30 seconds or so, adding salt, pepper, or other seasoning. Just prior to removing the frying pan from heat, add small amounts of cold water and allow enough time to evaporate until all ingredients are tender, but not over fried. Serve immediately while hot. With a little practice one can prepare a very tasty dish. The secret is when and how much water is added and the length of time the ingredients are fried.

A unique dish, Kimchi, is prepared in Korea and elsewhere by fermenting Chinese cabbage and pickling it in salt solution. Under cool conditions, Kimchi can be stored for up to three months and can also be dried for later use.

Nutritional Value

According to Purseglove, Chinese cabbage contains 91.0% water, 1.7% fat; 5.4% carbohydrates; and 0.6% fiber. Chinese cabbage also is a good source of vitamins and minerals, again with variations between leafy-green and non-leafy heading types.

(Stephens)