Vegetarian 85-7

July 15, 1985

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I. NOTES OF INTEREST

A. New Publications


B. Vegetable Crops Calendar


September 5 - 7, 1985. Tenth Annual Joint Tomato Conference. Mariott's Marco Beach Resort, Marco Island. Tomato Institute will be held on September 5.

October 1, 1985. Pepper Institute. LaBelle Civic Center, LaBelle, Florida.

II. PESTICIDE UPDATE

A. Weed Update Parthenium hysterophorus

Parthenium hysterophorus called commonly Parthenium, pound cake weed, Santa Maria, or dog-flea weed, has become a major weed problem in South Florida. Parthenium is in the sunflower family. It is an erect and somewhat spreading, taprooted annual with many branches. This weed is usually to 80 cm tall but can be 1 m or more in height. The entire plant is covered with stiff to soft grayish hairs. These hairs are a source of allergens causing contact dermatitis in humans and livestock.

The leaves of parthenium are alternate and are almost sessile or with a long narrowly winged petiole. The blades are up to 10 cm wide and 15 cm long and are pinnately or bipinnately divided. The blade segments are usually quite narrow. The lower leaves form a basal rosette. The flowers are white and are born in a small cluster or head on a much branched inflorescence. The branches are spreading and numerous. The heads are composed of disk and ray flowers. Each head usually has 5 ray flowers on the outside. The seeds are black and about 2 mm long. Only the ray (pistillate) flowers are fertile. Parthenium is an ancient greek name for "virgin", signifying that only the ray flowers bear fruit. The species name hysterophorus is an old
Parthenium Weed
Parthenium hysterophorus
name for a genus used in this case for a species, which also means "virgin" in the same sense as parthenium.

Parthenium is found in disturbed areas and commonly in cultivated fields. It is native to the Americas and is scattered throughout Florida and to as far north as Massachusetts, west to Michigan, Oklahoma and Texas. From the West Indies and Mexico it extends through Central America into South America. The weed was introduced into India in 1956 as a grain contaminant and aggressively covered large areas. Discovered in Queensland, Australia in 1955, parthenium began to spread in 1973 and is aggressively covering areas which receive 200 to 800 mm of rain annually. The weed started to become a major problem in Dade county in the late 1970's and is still increasing.

Dispersal seems to be primarily by animals and equipment. Water transportation is an important dispersal means but wind transport is effective for only a few meters. The potential for spread of the weed in Florida seems great.

In addition to the potential for damage to agriculture due to its aggressiveness and prolific growth, parthenium produces a contact dermatitis and can cause severe allergic skin reactions. Because of this toxicity it has been called "the scourge of India" and is the cause of an epidemic involving thousands of adult males.

This dermatitis has also been documented in the United States and Australia. The allergens found in the plant hairs are lactones of which the major one is parthenin.

Because this weed spreads aggressively and is a source of major health problems, control measures are imperative.

The E.P.A. files, checked through the National Pesticide Information Retrieval System indicates no herbicides are registered for the control of parthenium.

There are published reports on control by the use of 2,4-D. Recent research has shown that Diquat will control parthenium postemergence. Paraquat does not provide control. Chevron Chemical Company is pursuing a 24C label for use of Diquat in tomatoes and peppers in Florida for the control of parthenium.

There are initial indications that at least one new experimental herbicide will control parthenium preemergence. Testing of this and other compounds will continue.

(Stall & David Hall - Veg. 7-85)

First Printed in Florida Weed Science Society
Newsletter Vol. 7 No. 2 May 85
III. COMMERCIAL VEGETABLES

A. 1984 U. S. Fresh Market Vegetable Production Summary

The USDA Crop Reporting Board has released 1984 fresh market vegetable production data for ten vegetables and melons. Production increased 5% from 3% more acreage whereas the total crop value of 2.97 billion dollars was only 1% greater than 1983.

The USDA report includes statistics for celery, sweet corn, honeydew melon, lettuce, onion, tomato, asparagus, broccoli, carrot, and cauliflower production. Reported vegetable acreage for Florida is 146,750; only about 1/3 of the total reported by the Florida Crop and Livestock Reporting Service. The USDA, because of budget restrictions, stopped collecting data on many of the important Florida vegetables several years ago.

Despite the omission of much Florida production, the state continues as the second most important in harvested area, production and value.

LEADING FRESH MARKET VEGETABLE STATES IN 1984

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(Maynard - Veg. 7-85)

B. Resistance in Vegetable Pathogens to Previously Effective Chemicals for Plant Disease Control

Most fungi and bacteria that cause plant diseases are naturally resistant to most pesticides available in the marketplace. Specific chemicals are employed to control plant diseases. Some chemicals such as Bravo, Manzate products, Dithane products, etc have some degree of efficacy across a wide range of fungal diseases. The mode of action of these types of products also tends to affect a wide range of physiological activities within the target pest. Resistance within
target pests to these broad-spectrum-type fungicides has been reported at a low frequency. In recent years, many chemicals developed for plant disease control have rather specific modes of action and some are efficacious against a small group of pathogen types. Other characteristics of some of the new plant disease control chemicals include slight to strong systemic movement within plants and various degrees of therapeutic properties. Ridomil products have "flat-stopped" on-going downy mildew epidemics with the use of a single application on a crop. As remarkable as these products perform, one tends to forget that these specific-type chemicals tend to naturally "select for" those existing segments of the target pest population which naturally are not sensitive to that chemical mode of action.

Many years ago Dr. Bob Stall found strains within the population of bacteria that cause bacterial spot of tomato and pepper to be resistant to streptomycin products. Those segments of the bacterial population that are not sensitive to streptomycin still abound. Resistance within bacterial species or strains to antibiotics is commonplace and should not be viewed with surprise.

Copper resistant strains of the bacterial spot organism also abound but can be effectively countered by the addition of a maneb or mancozeb-type chemical to the spray mix.

Cercospora api, the causal agent of early blight of celery, has a segment of its population which is resistant to Benlate. When other fungicides are used alternately, control is improved but when Benlate, by itself, is again inserted in the spray program, the rebound capacity of resistant population dominates and control is inadequate.

Resistance to Benlate and related compounds (e.g. Tospin M) occurs commonly. For many years we have observed the failure of Benlate to control the powdery mildew fungus on cucurbits in Florida. Drs. Ken Pohronezny and Ron Sonoda documented this phenomenon in 1983. At one time Benlate was an excellent chemical for powdery mildew control on cucurbits but such is no longer the case.

Recently, Bayleton was cleared for use on numerous crops in the United States and its efficacy against powdery mildews has been excellent. Like Benlate, the mode of action for Bayleton is specific. Dr. Ken Pohronezny has found that powdery mildew on squash was not controlled by Bayleton in certain commercial fields in Dade County. In this situation, Bayleton was highly efficacious against the powdery mildew species Erysiphe cichoracearum but not the species Sphaerotheca fuliginea. A similar situation on certain cucurbits exists at the Leesburg AREC according to Dr. Don Hopkins. Considering these new developments with Bayleton along with the lack of control by Benlate and the removal of Karathane from the marketplace, sulfur fungicides may have to be relied upon for powdery mildew control of cucurbits. If growers observe a sudden cessation of control of powdery mildew with Bayleton, sulfur should be inserted into the spray program.
Remember, sulfur fungicides can be somewhat phytotoxic during hot, sunny days.

Another major concern is the probable resistance to Ridomil MZ 58 by the fungus that causes downy mildew on cucurbits other than watermelons at the Leesburg AREC. For the past two years, Ridomil MZ 58 appears to have lost its effectiveness against downy mildew on cucurbits other than watermelons at the Leesburg AREC. Based on previous experiences, it is possible that this probable resistance may not exist in growers fields for a few years. However, such could occur next year. Only mother nature knows for sure. As with the Bayleton situation, if a grower observes poor to non-existant control of downy mildew control on cucurbits with Ridomil MZ 58, he should insert the mane or mancozeb compounds into the spray program immediately. Dr. Don Hopkins states that mancozeb products performed well in 1985 against downy mildew of cucurbits.

(Kucharek - Veg. 7-85)

C. Recent Changes in Vegetable Crops Extension Program Responsibilities

Recent additions to the Extension Specialist staff and reassignment of some responsibilities has led to the development of the most complete Vegetable Specialist staffs in several years. The map details the programmatic and geographic responsibilities of the Vegetable Extension Specialists. The information presented should help the county faculty identify their contact person(s) with greater ease.

(Hochmuth - Veg. 7-85)

IV. VEGETABLE GARDENING

A. Cucurbita: A Fascinating Genus

An article by the above name appeared in The Cornell Plantations, Vol. 34, No. 3, 1978, written by R. W. Robinson and Paris Trail. It is reprinted here in an edited version, since numbers of cucurbita appear so frequently in Florida gardens and so often are subjects for attempted identification. The wide variety of types and cultivars leads to much confusion in identification and familiarization of specimens within this genus. Therefore, such an article is helpful to us all in understanding the squashes.

Cucurbita species are among the most ancient of cultivated plants in the Western Hemisphere. When Columbus arrived in the New World, he found cucurbits in profusion. At that time Cucurbita was already widely distributed in the eastern United States, from Florida to Canada. But Cucurbita is not native to these regions. Centuries earlier, despite the difficulties of travel at that time, Indians brought it across the continent from the Southwest. Cucurbita
VEGETABLE CROPS EXTENSION PROGRAMMATIC RESPONSIBILITIES

D. L. Cantliffe 0.7 Administration
K. M. Delate 1.0 Youth Work & Master Gardener
D. D. Gull 0.4 Postharvest Handling-District I
G. J. Hochmuth 0.8 Soil & Fertilizer Management
D. N. Maynard 1.0 Variety Recommendations
S. M. Olson 0.6 Small Farm Management
M. Sherman 0.4 Postharvest Handling
W. M. Stall 0.8 Weed Management
J. M. Stephens 1.0 Home Vegetable Gardening, Urban Gardening, and Youth Work

DISTRICT I
S. M. Olson
0.6 FTE
North Florida Research & Education Center
D. D. Gull
0.4 FTE
Gainesville
Postharvest Handling

DISTRICTS II & III
G. J. Hochmuth
0.8 FTE
Gainesville

DISTRICT IV
D. N. Maynard
1.0 FTE
Gulf Coast Research & Education Center

DISTRICT V
W. M. Stall
0.8 FTE
Gainesville
traveled widely in prehistoric times, for it is believed to have originated in Mexico.

Cucurbita has been cultivated for centuries, and many of the squash, pumpkin, and gourd varieties grown today were developed by Indians in pre-Columbian times. Squash varieties such as 'Crookneck' and 'Scallop', pumpkins like 'Connecticut Field', and the ornamental gourds were known to the Indians before 1492. Squash was an important food for the American Indian. The ability of its fruit to be stored through the winter months and the even longer storage life of its seed and strips of squash dried in the sun made it available when other food was scarce.

Several species of Cucurbita are cultivated. The words squash, pumpkin, and gourd really have no meaning in a botanical sense, since each may be used for more than one species. All summer squash is Cucurbita pepo, but winter squash may be C. maxima, C. moschata, C. mixta, or C. pepo. The traditional pumpkin of Halloween is C. pepo, but C. maxima and C. moschata are also used by processors for canned pumpkin. The small ornamental gourds are C. pepo, but the fruit of C. ficifolia and Lagenaria, Luffa, and other genera are also called gourds.

Cucurbita maxima can be distinguished from the other species by its fleshy, often corky peduncle (fruit stem), its soft, round stem, and its rounded leaves with soft hairs. Leaves of C. pepo are more prickly and more deeply lobed, and peduncles of this species are hard and sharply angular. The peduncle of C. moschata is also hard, but it is smoothly grooved and flares at the point of attachment to the fruit. Cucurbita mixta is similar in appearance to C. moschata, but some C. mixta varieties are distinguished by a hard, corky peduncle that is not flared at the fruit attachment. For many years C. mixta was not recognized as different from C. moschata, but they do not cross readily and are distinct species. Cucurbita ficifolia, the Malabar gourd, is easily recognizable by its large watermelon-shaped fruit, with spotted light and dark green skin and white flesh. It grows at high elevations in Central and South America and is used for food by natives there. In Europe and Japan it has been used as a rootstock to provide exceptional vigor and resistance to soil-borne diseases when grafted to cucumber.

The Cucurbita species with the longest history of domestication is C. pepo. Remnants of its fruit dating back as far as 7000 B.C. have been identified in Mexican caves that were populated by prehistoric Indians.

Its long history of cultivation is one reason C. pepo is such a variable species. Different fruit colors and shapes that arose by mutation over the centuries were preserved for their novelty or utilitarian value, and today as a legacy we have a rich assortment of diverse varieties. Bicolored, warted, pear-shaped, and numerous other kinds of gourds; orange-skinned pumpkins, ranging from small-fruited varieties such as 'Small Sugar' to the large 'Connecticut Field', the vegetable marrow of England; bush summer squash varieties such as
target pests to these broad-spectrum-type fungicides has been reported at a low frequency. In recent years, many chemicals developed for plant disease control have rather specific modes of action and some are efficacious against a small group of pathogen types. Other characteristics of some of the new plant disease control chemicals include slight to strong systemic movement within plants and various degrees of therapeutic properties. Ridomil products have "flat-stopped" on-going downy mildew epidemics with the use of a single application on a crop. As remarkable as these products perform, one tends to forget that these specific-type chemicals tend to naturally "select for" those existing segments of the target pest population which naturally are not sensitive to that chemical mode of action.

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'Zucchini'; and winter squash borne on vines of the 'Table Queen' or 'Acorn' variety - all these are members of the same species, Cucurbita pepo. The 'Vegetable Spaghetti' is still another interesting variety of C. pepo.

Cucurbita moschata has also been cultivated for centuries, but it is not as diverse as C. pepo. The most popular variety of C. moschata today is 'Butternut'.

Cucurbita maxima is a relative newcomer to America. Unlike the other cultivated Cucurbita species that originated in Mexico, C. maxima is native to South America. It was introduced to the United States around 1827. The 'Hubbard' cultivar was developed in Marblehead, Massachusetts, about ten years later, and New Englanders have been noted for their fondness of winter squash ever since.

A recent introduction, the 'Melon-squash', has attracted considerable attention. It is not from a cross between squash and melon, of course, because such a cross is impossible. Its name is derived from its reputed muskmelonlike flavor when eaten raw. 'Butternut' has a similar flavor and texture when eaten raw. Although 'Melon-squash' is described in a seed catalog as being "the sweetest squash of the century," in tests its sugar content was nearly identical to that of 'Butternut'. It is claimed that the flavor of the 'Melon-squash' improves during postharvest storage. This may well be, for storage at fifty to sixty degrees Fahrenheit is known to bring about conversion of starch to sugar in winter squash. The 'Melon-squash' is a good keeper.

'Melon-squash' fruits are large, up to thirty pounds, and the vine growth rank and unsuitable for a small garden. 'Melon-squash' fruit is larger than that of 'Butternut' but is similar in having a small seed cavity in the base of the fruit and a neck entirely fleshy.

Although the 'Melon-squash' has been reported to be botanically related to Cucurbita maxima, it lacks the fleshy peduncle and other characteristics of that species. Isozyme tests indicate that it belongs to C. moschata. The consumption of uncooked squash may be centuries old. In fact, the word squash is derived from the Indian word askutasquash, meaning "eaten raw or uncooked". But the Indians also cooked squash by boiling or broiling, and charred remains of squash thousands of years old have been found in Mexican caves.

Possibly the Indian word for squash is derived from the use of uncooked seeds. The flesh of wild Cucurbita species is so bitter that it is inedible, and seeds were likely the first part of squash to be used by humans for food.

Cucurbita seeds are an excellent source of protein and oil. The Mexicans have long been fond of squash seeds, but the hard seed coats of most varieties limits their popularity in this country. Now C. pepo varieties such as 'Lady Godiva', 'Eat All', 'Sweetnut', and 'Hull-less' are available. The seeds of these varieties are tender
since they lack the tough seed coat of normal squash seed, and they are delicious uncooked or roasted.

Gardeners growing 'Lady Godiva' or other "naked-seeded" varieties do not need to worry about isolating these plants from other squash to prevent cross-pollination. Honeybees will probably cross-pollinate 'Lady Godiva' with summer squash, pumpkin, or other varieties of C. pepo, but the seed in the 'Lady Godiva' fruit will still not have a tough seed coat. The seed coat is entirely maternal tissue and is not affected by cross-pollination. But home gardeners should not try to save seed from 'Lady Godiva' for planting, because the next generation will not breed true for naked seeds if cross-pollinated.

Cucurbita has been under investigation at Cornell University since 1888, when Liberty Hyde Bailey crossed different varieties of Cucurbita pepo. The original purpose of his experiments was to determine if the immediate effect of foreign pollen on fruit of the maternal parent (xenia) exists in Cucurbita. He found that it does not, for fruit of each variety was exactly the same, regardless of which variety provided the pollen. The effect of cross-pollination was not evident until the next, or F₁, generation. But the renowned Liberty Hyde Bailey did not stop there, when he had the answer to the question that prompted his experiments. He went beyond, to the F² and succeeding generations. He observed an extraordinary extent of segregation for fruit size, shape, color, and other characters. in the next ten years he grew some thirty acres of cucurbits (a word, incidentally, coined by Bailey) and produced over a thousand kinds of squash, each different from any ever seen before.

Bailey had a remarkably long and productive career. In 1943, fifty-five years after going to Cornell, he greatly enriched our knowledge of Cucurbita by naming and meticulously describing nine new species and devising useful keys to distinguish Cucurbita species. Five years later he named still more species of Cucurbita, making him the most prolific of all discoverers of Cucurbita species.

Bailey also made interspecific and intergeneric pollinations with cucurbits. He quickly dispelled the idea that squash will cross with cucumbers and melons. He also proved that different species of Cucurbita do not readily cross, but he did succeed in crossing C. moschata and C. pepo - the first interspecific cross of Cucurbita ever made. Since then much valuable information has been accumulated by other workers about the compatibility relationships of Cucurbita species. Numerous interspecific hybrids have been obtained, with varying degrees of difficulty and of consequent sterility.

Although these studies have been invaluable in their contributions to our knowledge of the phylogeny and origin of Cucurbita species, this basic information has not yet been put to much practical use by plant breeders. Squash varieties derived from interspecific matings are just now being developed. Recently H. M. Munger of Cornell University introduced a compact version of the 'Butternut' type that was developed from a cross of a bush summer
squash with the vine 'Butternut'. The parental species were *C. pepo* and *C. moschata*, the same cross made by Liberty Hyde Bailey many years before.

(Stephens - Veg. 7-85)