CANTALOUPES IN FLORIDA

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Cantaloupe culture in Florida dates back to the early 1900's when considerable acreage of the crop was planted in the area from the Georgia-Alabama border south to Marion and Sumter Counties. Due to the inability of growers to control the destructive diseases and insects and consequent losses, the acreage planted was reduced to insignificance by 1936.

The existence of a very considerable market for cantaloupes is evidenced by the statistics of USDA Bureau of Agricultural Economics. For the year 1951 gross sales of all cantaloupes grown in the United States totaled more than $41,000,000. More than half of this market was supplied by California and more than one quarter by Arizona.

Cantaloupes are very susceptible to mildews —downy and powdery—which defoliate the plants, causing the fruit to be insipid and often reducing its size. Humid climates, such as ours, furnish ideal conditions for the development of these diseases, particularly downy mildew. In addition, cantaloupes are susceptible to other serious diseases—including anthracnose, alternaria, mosaic, bacterial wilt, and fusarium wilt. Of almost equal importance with the disease problem in the past has been the lack of adequate controls for insect pests. Two of the most destructive, the pickleworm and the melonworm, are no problem in California and are not mentioned in a circular they issued there this year.

Rather extensive breeding work has been under way for many years on this crop by workers in the USDA and several Experiment Stations to produce a cantaloupe that would be highly resistant or immune to disease as well as insects and that would produce good yields of high quality fruits under average conditions and be as widely adaptable as possible. Extensive variety trials have been conducted by agricultural experiment station workers in this and other states to study the adaptability, yield, quality and other horticultural characters of the many old varieties as well as new ones that have become available from time to time.

For some years, a variety known as the Key melon has been grown for local consumption on the Florida Keys. It was probably introduced from some humid section of the West Indies. A decade or so ago, some seed of the same or a similar variety was brought to Tampa by Mr. A. B. Smith from the Isle of Pines. Mr. Henry W. Schneck, of the Kilgore Seed Company, recognized these as probably the same variety he had seen in Puerto Rico. He arranged to introduce them as the now familiar SMITH'S PERFECT. This melon has played an important role in Florida's reviving interest in cantaloupe production.

The SMITH PERFECT or FLORIDA GOLDEN DEW is resistant to downy but not to powdery mildew. The importance of the latter had not been recognized until the former had been controlled, either through natural resistance or by one of the newer and more effective fungicides. The Smith vine is vigorous and adaptable to a considerable variation of soil moisture. The fruit lacks the desired degree of uniformity of size, shape and netting. Its chief faults are relatively large size, lateness and low productivity. The flesh is thick, of deep salmon color, and of excellent flavor. The less healthy vines produce melons with little or no net, and these often sunburn.

GEORGIA 47 is one of the recently released varieties which is commanding much interest. It was developed by Mr. Frank Van Haltern of the Georgia Experiment Station at Griffin, Ga. It is very resistant to both mildews, sets a heavy crop of fruit and is earlier than the Smith. When grown on soils having a high level of fertility and abundant moisture, the melons are of medium size, quite uniform and well covered with a coarse net. The quality is excellent and the fruit is heavy for its size. It is firm, and when cut, displays thick orange flesh. Grown under dry conditions, although the flavor is good, it is small and often has an objectionable enlargement of the blossom scar.

The HALE'S BEST varieties, No. 36 and JUMBO, are still grown extensively for out of state shipments in Alachua and Marion

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Counties, at present the heaviest producing section of the state. These varieties produce fruit that are medium to large, round to slightly oval, well netted, orange-meated and of good flavor when produced on healthy plants. Their shipping and holding characteristics appeal to both grower and merchant. However, they are very susceptible to both mildews and often produce low yields of small, insipid fruit.

The group of powdery mildew resistant varieties were bred for the great arid sections of the West. Each offers some advantage over the others. They are of the Hale's Best type, and are not resistant to downy mildew. With the effective new fungicides now available, they should be given a thorough trial.

Choice of variety depends to a considerable extent on the market to be sought. Truckers who buy for resale prefer large sizes. Other trade channels generally prefer small to medium sizes. Choice must depend, too, on soils, water supply, and other factors.

Plant breeders have made notable progress, combining disease resistance, desirable size, shape, flavor, net, general appearance and shipping quality.

One developed in Texas, Weslaco No. 27, seems quite promising. A sister line introduced as Rio Sweet has an undesirable characteristic of producing fruits the maturity of which are difficult to determine. The No. 27, grown only once in Sanford, seems to eliminate this undesirable characteristic, is a heavy bearer of nice uniform fruit and shows good disease resistance. Dr. G. H. Godfrey of the Texas Experiment Station plans to introduce it soon as Rio Gold.

Six years ago a volunteer cantaloupe was found at Sanford, in October, which had withstood the hot, wet summer nicely. Progeny of this plant have been grown and selected each year since and has been called Sanford No. 9. It is similar to Smith Perfect in resistance to downy mildew, vine growth, and fruit quality, but a little earlier. The melons have more uniform netting and there is less tendency to sunburn.

An extensive breeding program has been carried on at the Central Florida Experiment Station for two years, during which time four crops have been grown. Some of the resulting melons show promise of combining desirable characteristics. Segregation in each succeeding generation will offer opportunity for selection of the best individuals until uniformity is attained.

Cantaloupes can be grown on a wide variety of soils but they seem to prefer a light sandy loam, well drained, but not apt to be very dry. Although generally preferring soils with a nearly neutral reaction, cantaloupes are being successfully grown under a wide variation of pH. Muck should be avoided due to fruit rots caused by contact with the damp organic soil. Florida has large areas that meet or can be made to meet these requirements. These areas are scattered for some four hundred miles from the Georgia line to the southern part of the peninsula. Some sections are very nearly free from risk of frosts and therefore almost continuous production might be achieved, resulting in greater market consciousness for the product.

Fertilization varies widely in different sections and on different soil types. Calcium should always be available, however, as much enters into the composition of the plant. Generous fertilization, patterned after local practices for any of the cucurbits, should be satisfactory. Amounts from seven hundred pounds of fertilizer per acre when grown on a fertile soil, to three thousand pounds have been used to produce a good crop of melons.

A single planting of melons, made at Sanford with varying distances between rows and between hills in the row, indicates that closer planting may be more advantageous than the wider spacing generally practiced. This will give more plants per acre, will provide more vines to shade the fruit thus reducing chance of sunburn, and will help control weeds by more quickly covering the ground. A spacing of two feet between hills in five foot rows gave very satisfactory results with Georgia 47. Closer spacings were not tried. In Arizona, best yields resulted from much closer planting of the Powdery Mildew Resistant No. 45 variety. Approximately equal yields were recorded from plots where distance between hills was 5, 8, 10 and 12 inches in rows 6 feet apart. Wider spacing, 15, 20, 25 and 30 inches, gave lower yields but the melons were slightly earlier in maturing. Further investigation will be needed to determine the best spacing for each variety, under Florida conditions.

As has previously been mentioned, growth and production of cantaloupes may be seriously

impaired by one or more organisms causing a diseased condition of the plant, unless adequate control measures are undertaken. Unfortunately, no one fungicide will control all of the diseases. Nor can they all be entirely controlled by chemical means. Therefore, it is necessary to have a knowledge of the plant symptoms caused by each organism so that the selection and application of the proper control measures will be satisfactory. Time does not permit a description of each disease. However, such information can be obtained from your Experiment Station or Extension Service. Only the more important diseases and control measures will be mentioned.

Downy mildew, often referred to as rust (*Pseudoperonsopora cubensis* B. & C. Rostow), has been a limiting factor of production in Florida. Parallel research on plant breeding for disease resistance and chemical control has made it possible to overcome this disease to a very considerable degree. Thorough application and proper timing are necessities for mildew control when chemicals are used. It is difficult to set up a rigid schedule to be followed in the application of a fungicide, as much depends upon weather conditions and growth of the plant. However, the first application should be made as runners begin to form and repeated at weekly intervals or as often as required to keep new growth protected.

The following materials used as sprays have given good results: Nabam plus Zn SO_4 (2 qts. + ¾ lb.); Nabam plus Mn SO_4 (2 qts. + 1 lb.); wettable Manzate (manganese ethylene bisdithiocarbamate–1½ lb.); tank mix Nabam plus Zn So_4 plus Tri Basic Copper Sulfate (1 qt. + ½ lb. and 2 lbs.), all made up to 100 gallons. Alternating Zn So_4 and Mn SO_4 with Nabam proved better than either used continuously. A 6 percent Zineb dust applied at 30 pounds per acre gives fair control. Dusts have not proven to be as effective as sprays for downy mildew. All recommended insecticides are compatible with the above fungicides.

Powdery mildew (caused by *Erysiphe cichoracearum* D. C.) can be controlled. Until a few years ago sulfur was the only known fungicide that controlled the organism but its use was limited by phytotoxic qualities. Since then a new organic fungicide, Mildex, (*dinitrocapryl-phenyl crotonate*), has proven to be effective in eradicating the fungus once it has become established. No injury to the plant foliage or fruit has been observed under repeated application. Mildex has been used as a spray (6 oz. to 100 gals.) and a 1 percent dust with comparable results. Manzate has also given fair control.

Anthracnose (caused by *Colletotrichum lagernarium* (Pass.) Ell. and Hals.) can be controlled with the same fungicides used for the control of downy mildew.

Bottom rot of the fruit (caused by *Pythium* sp.), is not considered to be a serious problem except on poorly drained soils. Unhappily, when it does occur no effective control measure is known at the present time.

Several virus strains are known to affect cantaloupes. Elimination of weed hosts and control of insect vectors will help to reduce infection. Aphids, of which the melon aphid (*Aphis gossypii* Glover) is the principal species, must be controlled since they transmit these mosaics and also cause a primary injury by sucking plant juices. Under conditions favorable for them to migrate from infected host plants, very serious reduction of the stand can occur. Plantings have been observed where the loss ran as high as 40 percent due to mosaic, yet showed no characteristic aphid injury, because a good control of the insect had been effected. California Experiment Stations report that a mosaic inoculated aphid can transmit the disease even though it feeds on the plant no longer than one second. Therefore, it is important not only to control the insect, but also to attempt to eliminate host plants in the vicinity of the field which may serve as a reservoir of inoculum.

In addition to aphids, pickleworms (*Diaphania nitidalis* (Stoll)) and melonworms (*Diaphania hyalinata* (L)) are the principal insects attacking cantaloupes. There are several others of occasional importance, such as cutworms, wireworms, and 12-spotted cucumber beetles.

The adult pickleworm and melonworm moths are very similar in appearance, as are their life histories and habits. The moths lay their eggs singly on the growing buds before the melons are set, and later, on the developing fruit. The larvae feed on and in the growing buds. After the melon begins to form, the young pickleworm bores into it and feeds inside, causing it to decay. The melon-

worm may bore in, too, but it also feeds on the outer surface, causing irregular, unsightly scars. Some of these may heal.

In experimental work at the Central Florida Experiment Station, during a five-year period, a number of insecticides have been tested for control of these insects. These included dust formulations of DDT, lindane, parathion, aldrin, methoxychlor, cryolite and dilan, and emulsifiable concentrate formulations of dilan and lindane. Both the dust and liquid forms of dilan caused severe injury. Over the five-year period, the best control of aphids, pickleworms and melonworms was obtained with a 1½ percent lindane dust or 1 pint of 20 percent lindane emulsifiable concentrate. The dust should be applied at the rate of 30 to 35 pounds per acre and the emulsifiable concentrate diluted in the amount of water required by the type of sprayer used.

Aphids are most injurious during the first weeks of plant growth and the field should be watched closely for signs of attack. Application of the insecticide should begin at the first indication of their presence and be repeated as required. Control of pickleworms and melonworms should begin when the first blossoms open and continue at seven day intervals for five or six weeks.

Cantaloupes are very susceptible to nematode injury, the most apparent being root knot. Aside from the long advocated fallowing, flooding or growth of immune crops, all that can be recommended, at present, is soil fumigation prior to planting. Root rots quite generally become factors after the primary injury. The nematode problem is far from being solved.

Producing a good melon in the field is only half the battle. Crews must be trained to pick them at just the proper time. Each variety will have to be studied carefully. Color, net, and ease of separation from the vine are all indications of degree of maturity. Some can be picked a little less mature than others and ripen enroute to market, without loss of flavor. Others must be fully mature but possess the characteristic of retaining good quality long enough to permit distribution.

Handling from the time of picking should be as gentle as possible. Melons reaching the packing house early in the day will not have become heated as much as those that arrive later. Grading should separate degrees of ripeness as well as size and general perfection. This will permit sending to each market those that will reach their destination in the best possible condition. Frequent routine tests for dissolved solids will go a long way towards eliminating poor quality. Results of these practices, employed in California and elsewhere, indicate that they are satisfactory and economical.

Cantaloupe production in Florida is on the increase. With further development of new and more prolific varieties better adapted to our climate, it may well be that Florida will recapture the position in cantaloupe production it held in 1910.

In conjunction with this paper, pictures were shown. The kindness of Homer L. Osborne of Kilgore Seed Company, Sanford, Florida, and the U. S. D. A. Horticultural Field Station, La Jolla, California, is gratefully acknowledged for furnishing the slides.

RECENT DEVELOPMENTS IN THE CONTROL OF THE MAJOR DISEASES OF UNSTAKED TOMATOES GROWN ON THE SANDY SOILS OF SOUTH FLORIDA

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The four major foliage diseases which regularly occur on unstaked tomatoes grown on the sandy soils of southern Florida are late blight, *Phytophthora infestans* (Mont.) DBy., gray mold, *Botrytis cinerea* Fr., bacterial spot, *Xanthomonas vesicatoria* (Doidge) Dows, and gray leaf spot, *Stemphylium solani* Weber. Another disease or condition of tomato to become a threat in recent years is known as ghost spot. This paper includes a brief discussion of either the effect of various fungicides on the above diseases or the suggested spray program for their control. A description of the symptoms of late blight is not included since this disease is quite common.

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