

Fight Against Melon Crown Blight

Research Features Teamwork

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The fight against melon crown blight has been stepped up in recent months with an over-all cooperative research program in Arizona and California.

During the last 10 years these melon-growing districts, especially the Salt River Valley, have been experiencing a toll of damage from the complex disease known as crown blight. Coupled with serious outbreaks of insect damage, the devastating combination has resulted in near abandonment of cantaloup plantings in Salt River Valley for 1956.

Sunburning Is Result

Crown blight of melons is a condition in the vines which shows up as blighted leaves, first evident around the crown of the main stem affecting initially the older leaves. Later stages of development of the complex disease result in sunburning of the exposed fruit following death of the adjacent leaves, which had provided appropriate and necessary shade protection.

The damaging effects of crown blight have been increasing during recent years. Lower temperatures during early growth of the vines followed by rapid rise in seasonal temperatures approaching fruit maturity seems to aggravate the severity.

There are some indications that unfavorable soil moisture conditions, low nitrogen supply, and harmful insect infestations enhance the damage attributed to crown blight. Known virus diseases of cantaloups also weaken the plants and crown blight may then be more serious.

Research Stepped Up

In order to more rapidly arrive at a basis for controlling the melon crown blight, the United States Department of Agriculture, recognizing the seriousness of the crown blight damage, allocated

\$50,000 for research for the fiscal year 1955-56. This made it possible to increase the activities on the problem by USDA research personnel in cooperation with the Universities of Arizona and California.

Facilities Increased

Half of the amount was made available for Arizona and provided increased research facilities for the University of Arizona project leaders, Drs. Foster, Marlatt, and Pew. The USDA program in melon insect control in Arizona also was increased, thus providing Mr. Orin Hills and his staff with additional facilities. Through agreement with USDA and Arizona melon growers, the increased melon research program was largely centered at the University of Arizona Agricultural Experiment Station, located near Yuma in the heart of the melon-growing area.

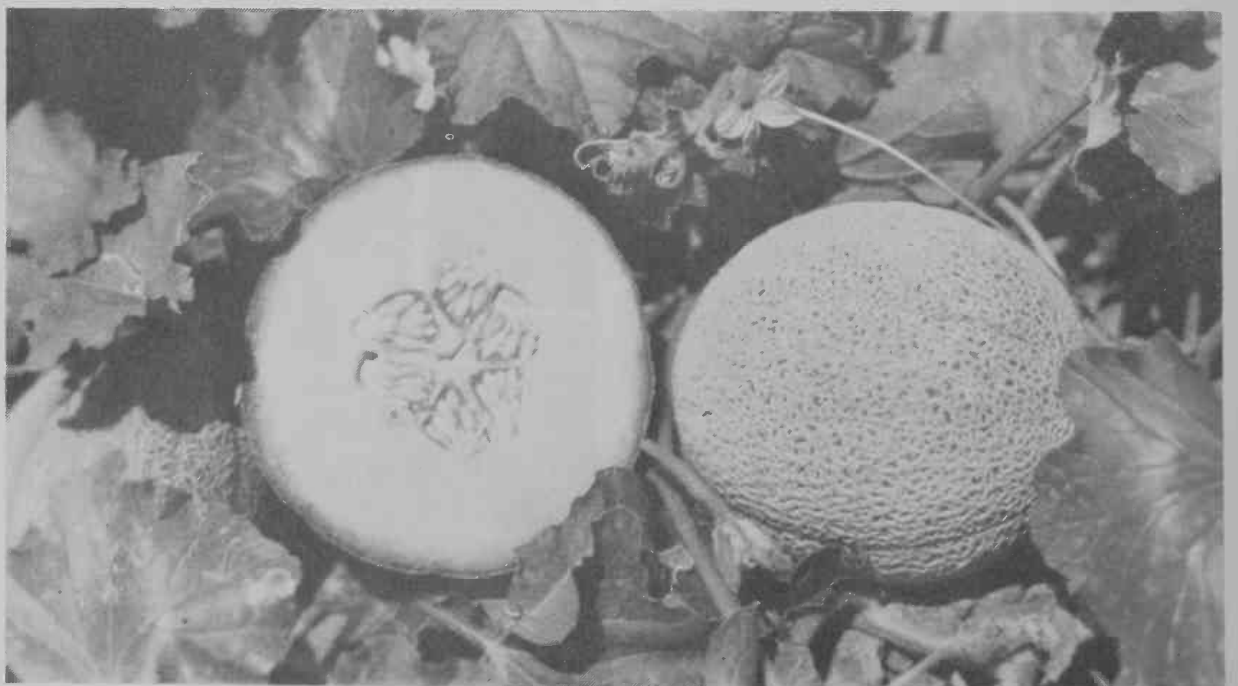
Dr. Robert E. Foster, vegetable breeder, is concentrating on developing strains and varieties of cantaloups resistant to crown blight. In the testing program there are 485 foreign introduction strains of melons to find additional sources of resistance to crown blight. Breeding operations in 995 separate breeding stocks have been conducted at Mesa and Yuma for the purpose of increasing resistance to crown blight and incorporating crown blight resistance with high yield and better quality characteristics. New strains showing resistance to crown blight already have been developed in the breeding program.

Reactions of different strains of cantaloups to differential nutrition have been demonstrated by the teamwork of Dr. Foster, George Sharples, and Laurie Houck. The differential responses to mineral nutrients have already been obtained under greenhouse conditions at the Mesa Experiment Station and further tests have been extended to field conditions in the Yuma area and Salt River Valley at the experiment stations and in cooperation with growers. The new Arizona Sunrise cantaloup developed by the University of Arizona and now in the certified seed program, has proven very promising for the Yuma area with particular reference to earliness and improved quality.

Many Tests Underway

Dr. W. D. Pew, vegetable physiologist, has been conducting fertilizer, irrigation, and tillage tests on cantaloups in Arizona for several years. Marked responses have been obtained from nitrogen fertilizers and closer spacing of plants have increased yields under Salt River Valley conditions. Improved cultural management of cantaloups seems to have considerable merit in connection with alleviating the effects of crown blight. The restriction of the root system of cantaloups to upper layers of the soil where hardpans impervious to water penetration exist, has been demonstrated at the Mesa Experiment Station under controlled greenhouse conditions.

During 1956 the experimentation has been concentrated at the Experiment Station located in the Yuma Valley. In the experimental phase of cultural management of cantaloups under field conditions, particular attention is being given to

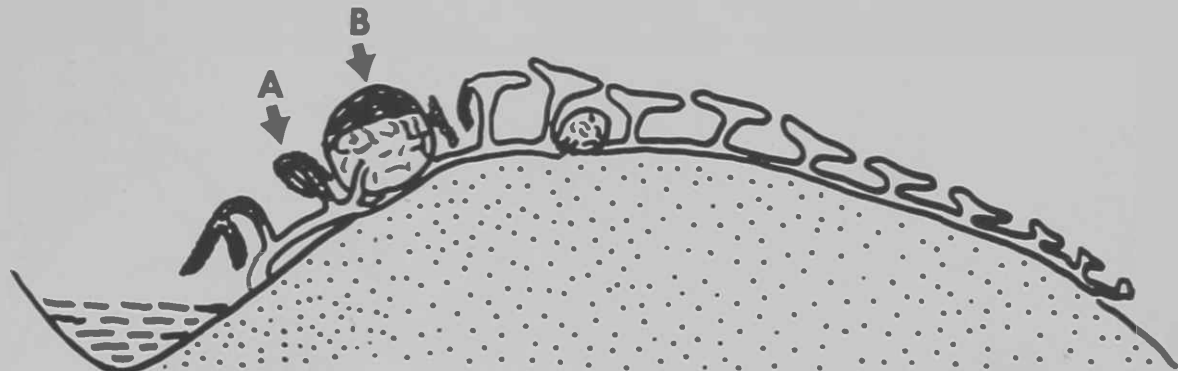
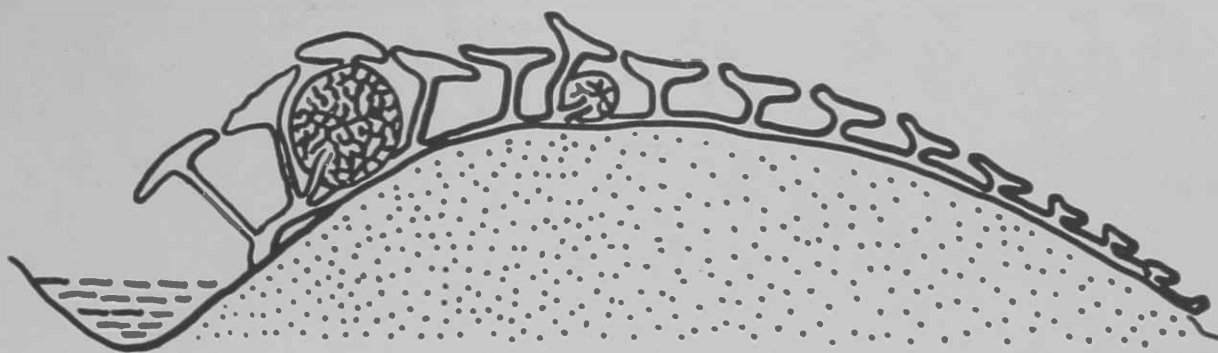


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POPULAR PMR 45 cantaloup (at right) is the leading commercial variety in Arizona. This variety was developed by the USDA and released in 1936.

Blight

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UPPER: Healthy cantaloup plant with crown fruit approaching maturity under shade protection of healthy leaves.

LOWER: Crown blight condition of cantaloup plant shown in leaves around the main stem of the plant. Note the older leaves closest to root system have blighted as shown by the arrow A. Continued blighting of leaves results in exposure of crown fruit to sunburning as indicated by arrow B.



irrigation management, tillage practices, and fertilizer application. In connection with the irrigation experiments, the use of moisture measuring devices known as resistant blocks, and tensiometer-type instruments enable more accurate control of soil moisture levels and irrigation schedules in relation to cantaloup plant growth.

Pathological Tests Started

Dr. Robert B. Marlatt, vegetable pathologist at the University of Arizona, is in charge of the pathogenic disease research phases. In connection with melon crown blight research, he is concentrating on making diagnostic readings on various test plots. At the Yuma Experiment Station he has the following experimentation in progress for the 1956 season.

In the spray research program on cantaloups he has included the following materials: Actidione, a fungicide, and streptomycin, a bactericide and fungicide; soil fumigations with chloropicrin is being continued to help determine whether a soil-borne organism is involved in crown blight.

Plots are again being shaded with camouflage netting to note any effects of shade on crown blight. Soil temperatures will be correlated. In connection with powdery mildew on cantaloups, 5 fungicidal dusts have been applied, Karathane at 1/2 and 1% Ovotran at 4 and 8%, Actidione at 2 ppm, and 2 Hercules materials.

Dr. Paul D. Keener of the University of Arizona is investigating the possibility of certain viruses either alone or in combination as possible causes of melon crown blight. He is also examining mi-

croscopically the cell structure of cantaloups and honeydew melons.

Mr. Orin Hills and A. C. Valcarce, USDA entomologists, with headquarters at Phoenix, have expanded their research program on harmful insects on cantaloups. Their research program has been extended into the Yuma area in cooperation with Dr. D. M. Tuttle, University of Arizona entomologist headquartered at the Yuma Experiment Station. They also are conducting experiments at the University of Arizona Experiment Station, Mesa.

In both areas their research concerns the development of more effective methods of controlling insects and mites affecting cantaloups. Nine different insecticide treatments are being tested. These tests include seed treatments, a spray injection into the seed row at time of planting, a granular insecticide placed under the seed before planting, 5 different foliage sprays, and one foliage dust. All of these materials except the dust are systemic insecticides which are materials that have the property of entering the conductive system of the plants and render the plant juice toxic to insects or mites.

In addition to the experimental plots, regular observations are being made in 130 different fields of cantaloups and honeydews in the Salt River Valley and Yuma area. Special attention is being given to the population intensities of serpentine leaf miner and related parasites, beet leafhopper (the carrier of curly-top virus), and the two-spotted mite.

New Facilities at Yuma

The recently completed research building at the Yuma Experiment Station provides offices and laboratories for the expanded melon research program. Roy Nelson, research assistant, has provided

excellent aid in the experimental plantings consisting of 905 plots being conducted by the research project leaders. The USDA cooperative funds provided for three agricultural aids to carry out research details at Yuma.

In connection with the cooperative USDA research with the University of Arizona, both Dr. V. R. Boswell, Head of Vegetable Crops, USDA, and Dr. T. W. Whitaker, USDA Geneticist, have been especially helpful and the continued support is urgently needed in order to expedite the solution of the melon crown blight problem.

Important to Arizona

The income from the Arizona melon industry amounts to approximately \$15 million annually. Improvements in this important crop benefit Arizona growers and shippers, consumers, railroads, truckers, ice manufacturers, and suppliers of the following items: seed, containers, fertilizers, insecticides, and machinery. Arizona's leading position in the nation's spring melon industry is an important phase of Arizona's agriculture.

Arizona's 1955 crop of cantaloups from over 20,000 acres were grown for the most part in two localized districts — (1) Yuma area, (2) Salt River Valley. The respective values of the melon crops shipped from the two areas were nearly equal for 1950. However, in 1955 the Salt River Valley crop was much less due to very poor yields which proved unprofitable. In fact, the average yield for that area was 63 crates per acre for the 1955 season. (A good yield is 200 crates per acre).

The Yuma area has been increasing in melon acreage and there are 17 thousand acres in the area during the 1956 season. Growing conditions and prices have been much more favorable in the Yuma area.