CROWN BLIGHT OF CANTALOUP

Robert E. Foster

Crown blight, the spoiler, is still around! This cantaloup disease, characterized by premature injury and death of crown leaves, exposure of maturing fruit to sunburn, and general yield reduction, hit many plantings in the Yuma area this season.

Some fields showed only minor losses, while others could be picked only a few times and the most heavily diseased were abandoned completely. Losses may have reached 25 percent.

The crown blight disease became very important in Arizona about 10 years ago and reduced yields of cantaloups severely for several years. This problem, along with insect troubles, forced Maricopa County to give up the crop and severely taxed the resources and patience of Yuma growers.

Summon Aid of Research

During this time, many research programs were started by California and Arizona scientists on factors which might logically affect the disease. While a few important facts were learned, no control measures could be devised and gradually the experiments were dropped — all except breeding for disease resistance.

In all of the early tests, the most consistent factor to be noted was the reaction of certain cantaloup varieties to the disease. No matter how much or how little crown blight developed in the field, or what cultural practices or special treatments were used, Netted Gem and PMR 6 always showed the most crown blight, PMR 45 was intermediate, while Rio Sweet and certain breeding lines always had less crown blight damage. This was the lead and inspiration for an extensive breeding program aimed at producing disease resistant muskmelons.

A quick survey of known facts applying to crown blight may be interesting and may help reduce the effects of the disease until usable resistance is available. Some of the well-known symptoms of crown blight (one-sided effects on leaves, petioles and stems, alternate leaf killing, etc.) seem to point to the vascular system or the roots as the place where trouble begins.

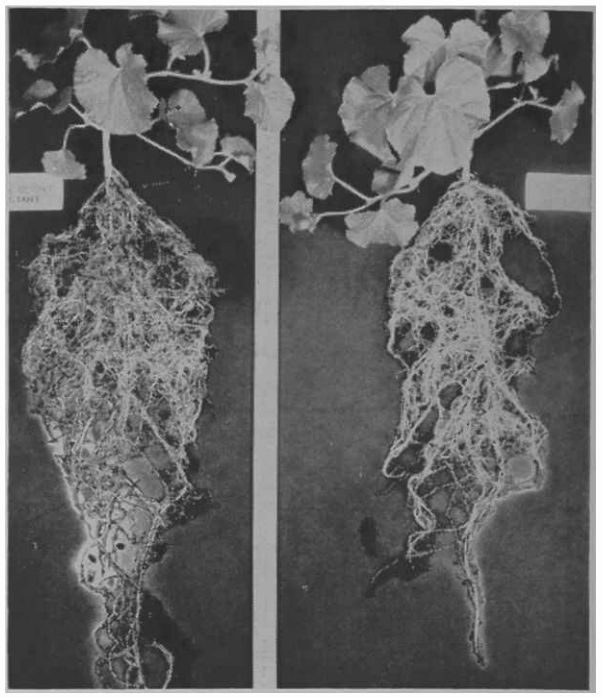
Related to Root Growth

Cantaloup entomoligists are pleased to report that there are no definite relationships between insects and crown blight except as vectors for viruses that may be involved. Crown blight symptoms can be duplicated in the greenhouse by mechanically restricting root development. The onset of these symptoms coincides exactly with the time roots become "pot-bound." Improper soil drainage and aeration — too much (sand boils or streaks) or too little (hardpan, high water table, etc.)—will produce early crown blight spots in a field.

Plant pathologists have ruled out all the above-ground pathogens except perhaps the viruses. Powdery mildew, a serious disease in itself, when present in a crown-blighted field reduces marketable yield even further, but is not the cause of crown blight. Soil-borne organisms can attack cantaloup roots under certain conditions and bring about crown blight effects.

Drought will duplicate some of the symptoms, and in many cases a reduction of crown blight losses can be associated with ideal irrigation practices. Reducing plant and root stress by removing fruit, shading plants from bright sun or reducing plant water loss has resulted in less crown blight. A recent study in our laboratories has shown that cantaloups develop roots poorly at low temperatures (early season), reach a maximum root growth rate at 90° F., and then at higher soil temperatures (late season) drop off again in new root growth. This has special significance when it is realized that, for any plant, only a *growing* root is an *efficient* root.

ROOT SYSTEMS make the difference. Plant at left, below, is from a resistant strain; plant at right is susceptible to crown blight.



A Problem of Management

What conclusions can be drawn from the above? Certainly an implication is apparent: Crown blight seems to be a root problem! If crown blight symptoms are the result of root troubles it must be remembered that many factors, alone or in combination, may be at fault in any cantaloup field. And the primary causes at work in one field may be different from those responsible for poor root function in another field.

It seems logical to recommend, then, that any land preparation, any fertilization program, any irrigation schedule, or any other cultural practice that will permit or stimulate good early root development, root health, and continued root growth should be used to reduce crown blight losses.

Much has been said about the cantaloup viruses in relation to crown blight. Whether they are primary causes of crown blight or not, it is certainly evident that they can bring about serious losses which, to say the least, add to crown blight troubles. Stunting and distortion due to viruses can be seen readily in the above-ground portions of infected plants. It would be foolish to as-

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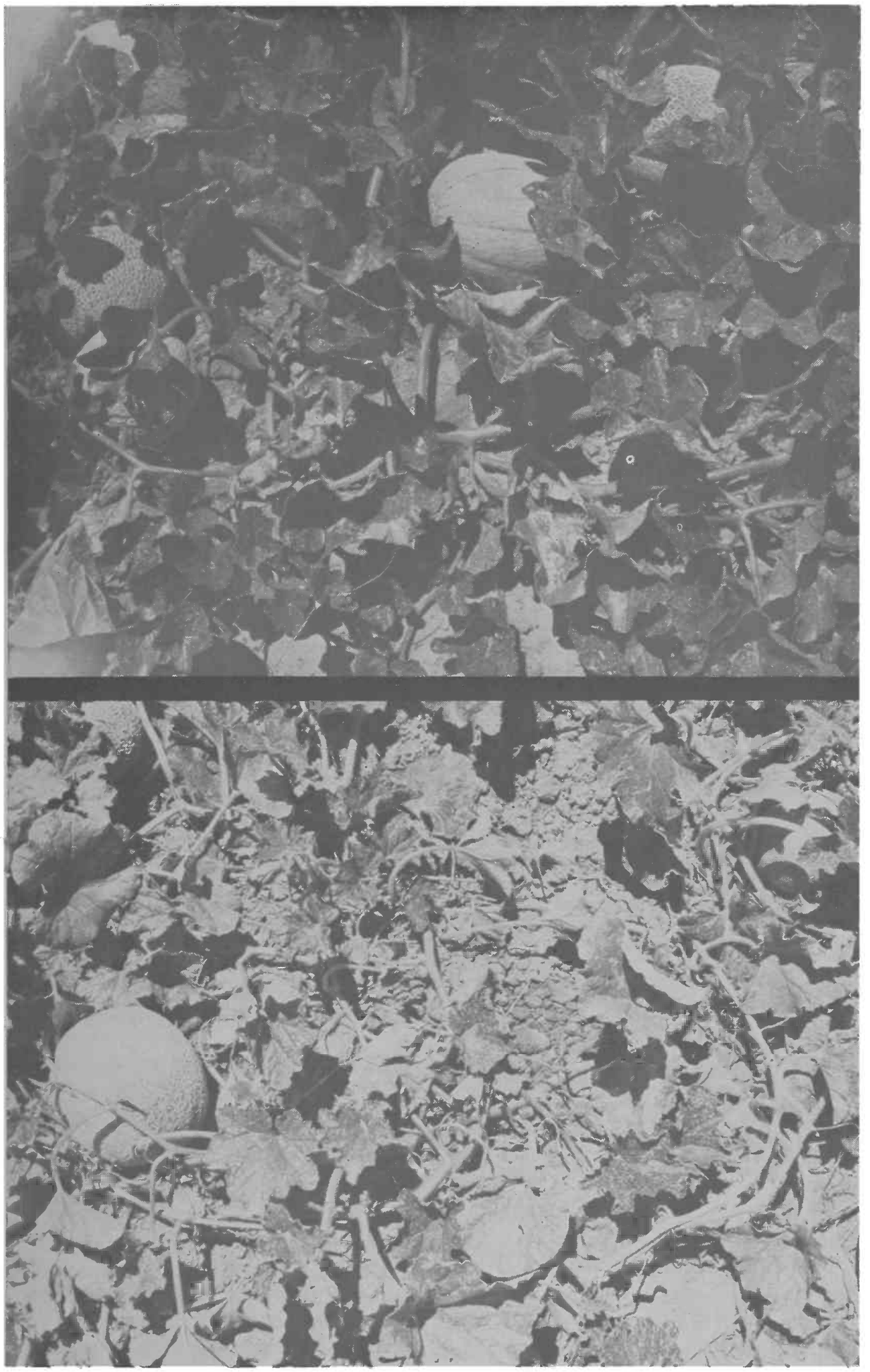
Dr. Foster is Horticulturist in the U. of A. Agricultural Experiment Station. The work of many colleagues has been drawn upon in the preparation of this article and is hereby gratefully acknowledged.



YOU MAY NOT spot them easily, but in the upper photo of a crown blight resistant cantaloup there are, well shaded by healthy crown leaves, five cantaloup fruit. The susceptible PMR45 cantaloup plant, below, was grown under the same conditions in the same plot. But note the dead crown leaves and exposed fruit.

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sume that there were no similar adverse effects on the root system.

The Answer — Better Roots

Where does crown blight resistance fit into the picture? The only morphological difference apparent between young resistant and susceptible cantaloup plants is in root growth. The resistant plants develop a larger, faster growing root system.

Efforts of research scientists to reduce crown blight are showing significant results. In this university's Horticultural Department a breeding program has produced plants with very good resistance to crown blight. The fruit quality of these plants with blight resistance is not high, but further selection can correct this situation.

We also have a cantaloup strain with a marked degree of tolerance or resistance to watermelon mosaic virus. Certain U. S. Department of Agriculture cantaloup selections have excellent resistance to powdery mildew.

Muskmelons from foreign countries are being used in a breeding program which aims at resistance to cucumber mosaic virus and watermelon mosaic virus.

The team approach of horticulturists on both state and federal staffs, combining their talents and sharing information of their findings, promises that continued work will produce melons with good market quality and resistance to crown blight and the various viruses which harm varieties currently grown.

Dr. Wm. J. Van Arsdell

Dr. William J. Van Arsdell, Professor of Animal Science, died July 1, 1963, of a heart attack while vacationing with his family in Tulsa, Oklahoma. He was 38 years old.

Widely known in Arizona as coach of the U. of A.'s livestock judging team and advisor to the Rodeo and Block and Bridle clubs, he was named Professor of the Year for 1962-63 by the U. of A. Agricultural Council.

Known to University students as well as 4H and FFA youth as "Dr. Van," he was held in high esteem by both students and faculty. He had a rare combination of wisdom and patience in counselling students that stimulated them to do their very best in all things.

Dr. Van Arsdell joined the U. of A. faculty in 1958 after having served as head of the livestock section of the Samuel Roberts Noble Foundation of Ardmore, Oklahoma, and as Assistant Professor of Animal Husbandry at Michigan State University. He served with the 99th Division of the U. S. Infantry during World War II.

He was author of a dozen scientific publications, including an article on live animal liver biopsy techiques for vitamin A studies. He held membership in the American Society of Animal Science, Sigma Xi, Alpha Zeta, and the Farm House Fraternity.

He was married to Jeanne Carolyn David in 1950 and is survived by his wife and daughters Debra and Susan of 7409 Calle Kenyon, Tucson.