Fig. 1. Symptoms of mosaic in Imp. 45 cantaloupe. Note the leaf distortions and puckering of the leaf surface. Yellowish areas among raised dark-green tissue also are characteristic.

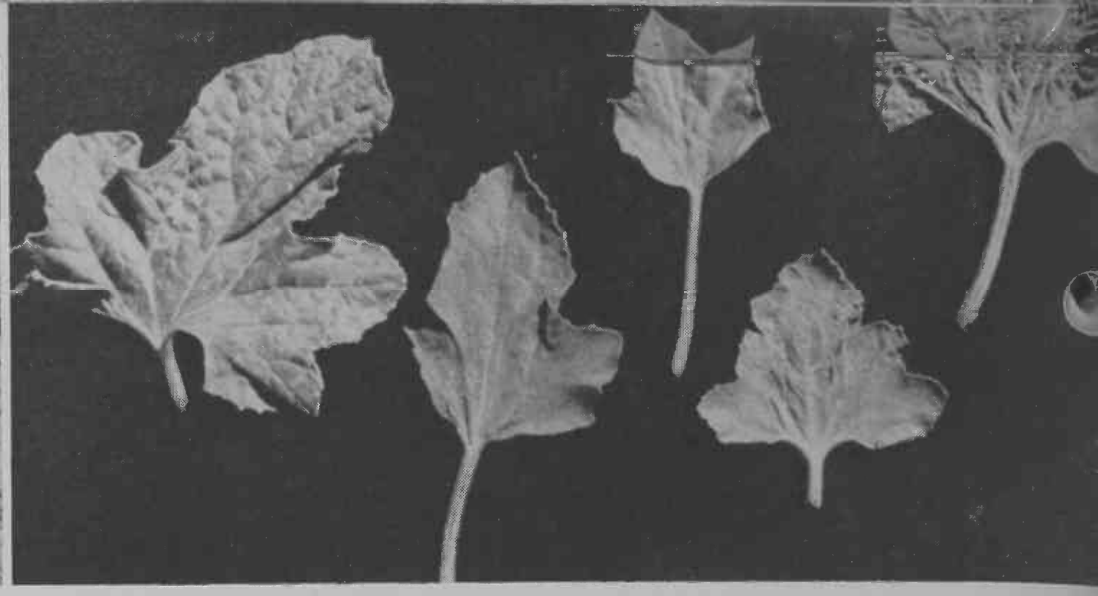


Fig. 2. Effects of mosaic on leaves of honeydew melons. At left is normal, healthy leaf. Note the distorted outlines and rough surfaces of four mosaic-infected leaves at the right.

Know Your Melon Seed

By PAUL D. KEENER

Mere mention of "mosaics" causes some concern among melon growers. The actual presence of the disease in a field has more pronounced effect, for every grower knows that the viruses responsible for mosaics in cantaloupes, honeydews, watermelons, cucumbers and squash may cause serious losses.

Mosaics may affect plants of any age. Plants infected early are usually stunted. In older plants, symptoms are often quite pronounced near, or at, the tips of runners (Fig. 1).

Affected leaves show yellowish (chlorotic) areas, variable in size and shape and usually situated among raised areas of dark green tissue.

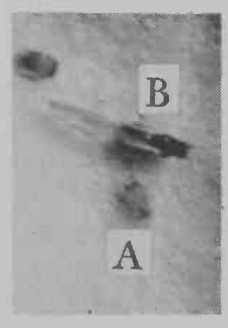


Fig. 3. Plant lice (aphids) on a portion of an Imp. 45 cantaloupe seedling. A, immatures (wingless) form. B, mature (winged) aphid. Greatly enlarged.

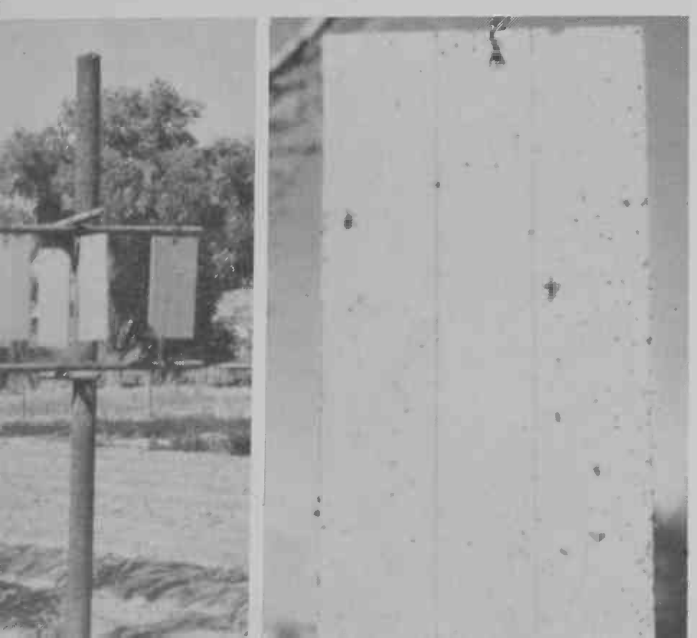
Leaf surfaces may become puckered (Fig. 1) and the leaf outlines may become irregular and distorted (Fig. 2). Affected fruits usually are smaller than normal and may assume odd shapes. The pulp becomes pale in color and the taste is insipid.

"How do mosaics get their start in a planting?" Certain melons, especially honeydews, harbor the viruses *within* their seeds. Even though the actual percentages of infected seeds are small in any particular lot, these few seeds give rise to "centers of infections." It is from these "centers" that insects, particularly plant lice (aphids) (Fig. 3), and other agencies, carry the disease to neighboring, healthy plants.

Aphids may pick up virus from a diseased plant after a remarkably short feeding period. Numerous species are known to be capable of spreading mosaic viruses in melons. Just which aphids are involved in the Deer, Salt River and Yuma Valleys has never been demonstrated.

In an effort to ascertain what species of aphids are in flight in the vicinity of melon plantings, field traps (Figs. 4 and 5), consisting of four boards coated with a sticky substance (sticky-board traps), have been operated during the past year at several locations by the Departments of Entomology and Plant Pathology of the University of Arizona. The sticky material serves to ensnare in addition to aphids, other insects suspected of being virus carriers.

Fig. 4. (At left) Field trap used to ascertain species of aphids in flight at various locations. The four boards are affixed to bars, two of them at right angles to the others. A sticky material is used to coat the board surfaces. Fig. 5. (At right) View of a single sticky board. Note the various insect types entrapped in the sticky material.



Past experience in the Yuma Valley of Arizona and the Imperial Valley of California, indicates that mosiacs in melons are more prevalent some years than in others. In these regions, serious losses have occurred in cantaloupes and honeydews in seasons when numerous aphids have been in flight. In the Imperial Valley it has been estimated that as many as 40,000,000 aphids may pass a line one mile long every hour during the height of a flight.

Since but very few aphids are required to initiate mosaic spreads from diseased melon plants to healthy ones, the possibilities for losses are tremendous. Thus far, heavy losses have not occurred in such areas as the Deer and Salt River Valleys, but the severe damage well-known to melon growers of the Yuma and Imperial Valleys, is possible for the future if vigilance is not maintained.

The viruses causing mosaics in melons are spread also by *contact* of a diseased plant or plant part with a healthy one (mechanical spread). Machinery, man, wind, water, etc., are responsible for a certain amount of mechanical spread. It is evident why caution should be exercised in carrying out the usual cultural practices connected with melon production. If a field becomes infected, particularly along one edge of the planting, all operations should be carried

(See next page)

out in such a manner as to work *towards* the most heavily infected portion rather than through, then away from the infestation.

Weeds Harbor Viruses

In addition to seed-initiated centers of infection, numerous weeds are suspected of harboring the viruses causing melon mosaics. Weeds also serve as breeding areas for the insects which spread mosaics. The eradication of weeds along fencerows and irrigation ditches as well as from within the crop itself, is an important part in the attempt to exclude these viruses from melon plantings.

Just as harmful as weeds is the encouragement to aphid breeding on suitable crops such as sugar-beets, carrots and alfalfa. Wherever possible and practical, these crops should be maintained apart from areas devoted to melons. During the 1950 season, several instances of the effects of nearby plantings of alfalfa, beets and carrots on the numbers of mosaic-diseased cantaloupe and honeydew plants, were noted. Two such instances, showing the average percentages of infected plants in their relative positions in the plantings, are diagrammed in Figures 6 and 7.

Plant Disease-Free Seed

Comparatively disease-free seed is available in the market and should be used. Periodically, seed stocks are examined at the Experiment Station for their mosaic content. Direct control of the insect carriers has been shown to be impractical. A few insects capable of causing spreads will escape any insecticides applied to a planting.

—Paul D. Keener is Assistant Plant Pathologist.

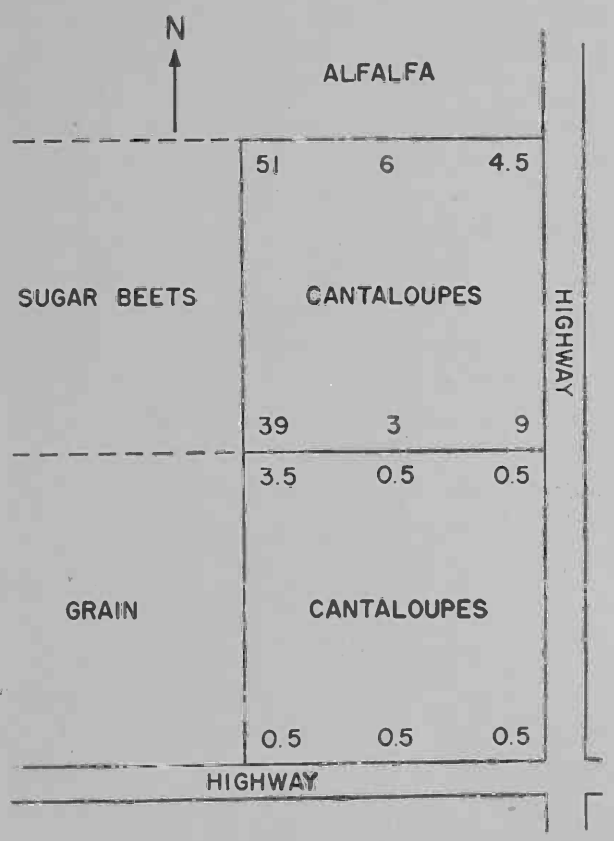


Fig. 6. Average percentages of mosaic-infected Imp. 45 cantaloupe plants in relative positions in two 40-acre stands. The proximity of sugar-beet and alfalfa plantings has had an effect on the amount of disease, as these crops serve as breeding grounds for the aphids which spread mosaic. Average percentages based on counts of 400 plants (200, two weeks before harvest; 200, after the first two pickings).

Improving The Range

(Continued from page 7)

After the area was cleared and fenced, one-half acre was seeded to a mixture of Lehmann lovegrass and Arizona cottongrass and one-half acre was seeded to Lehmann lovegrass and slender grama. These three grasses were used to determine their compatibility when used as mixtures for range reseeding.

The remaining four and one-half acres inside the fence were allowed to come back to native vegetation in order to study the effect of clearing and protection alone on the yield of grass. A plot outside the fence was used as a check and was open to grazing of all kinds.

Grass Increased

In order to determine the effect of the three different treatments in terms of the number of pounds of grass produced per acre, sample plots were clipped in the respective areas in September, 1949. The most noticeable effect of the treatments was the increased yield of grass following brush removal, reseeding, and protection.

The area that was so treated produced eight times more grass than the open range. (See chart and pictures on page 7.) The area that was cleared of brush and not grazed for four years yielded more than three times as much grass as the untreated range.

Annual grasses accounted for less than 1 percent of the yield in the cleared, seeded, and protected area and about 27 percent in the cleared and protected area. Almost 57 percent of the grass yield of the open range was annual grasses. Although annual grasses are a source of forage when green and do provide some soil protection, they are not so dependable as perennial grasses from year to year.

Of course, the yield of grass that will be obtained as a result of removing noxious plants, seeding, and protection depends upon several factors. Among these factors are the amounts and kinds of noxious plants, the quality and quantity of native grasses left on the range, weather conditions, and the productivity of the site. The cost of clearing brush-infested ranges and reseeding must be considered, too.

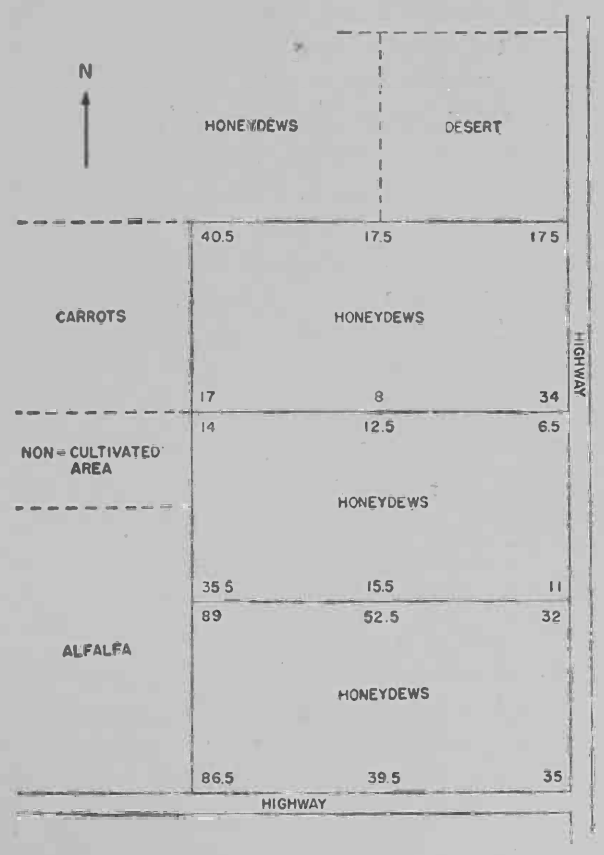


Fig. 7. Average percentages of mosaic-infected Honeydew melon plants in relative positions in three stands. The nearness of fields of alfalfa and carrots has had some effect on the prevalence of mosaic, as these crops serve as breeding areas for some of the mosaic-carrying insects. Average percentages based on counts of 400 plants (200, two weeks before harvest; 200, after the first two pickings).

New Bulletins

New bulletins and circulars are listed below. Ask your County Agricultural Agent for a copy.

Experiment Station

Gen. Bul. 229—Arizona Range Resources and Their Utilization: II, Yavapai County.

Extension Service

Cir. 122 (Revised)—Prevent and Control Poultry Diseases and Parasites.

Cir. 161—Packed Lunches That Please.

Cir. 162—Salads From Arizona-Grown Foods.

Cir. 163—Frozen Desserts.

Are Other Benefits

Increased yield of grass is only one of the benefits received by eradicating noxious plants from the ranges. The more perennial grass there is, the longer the grazing season will be and the more pounds of beef will be produced. Water is conserved and soil erosion is prevented. The habitat is improved for game birds and wildlife.

Yes, brush control, reseeding, and protection will improve the condition of the brush-infested ranges of Arizona.

—A. C. Everson is Research Assistant, Dept. of Botany and Range Ecology.