

CMV Found In Ariz. Sorghum

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Cucumber mosaic virus (CMV) attacks a variety of plants. Included among the susceptible plants (hosts) are vegetable, field and forage crops and weeds. Among vegetables susceptible to strains of the virus are cantaloups, cassaba melons, cucumbers, watermelons and other cucurbits as well as such crops as beans, beets, tomatoes and others.

In addition to many vegetables, CMV attacks field crops such as alfalfa and sugar beets as well as many ornamental plants like petunia, zinnia, etc. Species of weeds are also susceptible and among these in Arizona fields and fence rows are Ground Cherry (*Physalis* sp.), Redroot (*Amaranthus* sp.), Mallow (*Malva* sp.) and wild sunflower (*Helianthus annuus* L.).

Significance of Wide Host Range

In view of the wide choice of hosts, CMV becomes a problem in any area devoted to crop production. Cropping year after year affords an opportunity for the

CANTALOUPE IRRIGATION

(cont.)

The very high levels of moisture encouraged the development of very shallow-rooted plants. Root systems thus developed were capable of supplying the plant needs for water *only* when the soil moisture was maintained at the initially high levels. However, when the water was withheld late in the plant growth cycle, a time when the water demand by the plants is normally high, soil moisture in the surface 6 to 8 inches of soil was quickly depleted. At this point the root systems were incapable of providing enough water to meet the plants' needs. Soon the plants began to "go down" badly.

Even an application of water applied as the plants began to collapse was relatively ineffective in bringing them back into normal production. A study of the soil moisture relationship confirms this fact, as the upper 6 to 8 inches was found to be relatively depleted of its moisture while the lower levels still contained an adequate supply. This water was unobtainable by the plants because of their shallow root systems.

AT RIGHT, stunted, chlorotic (in nature yellowed) broomed plants of sorghum. The variety is DD 38.

virus to become established in such reservoirs as perennial weeds and field crops. As a result, an area under cultivation becomes "infested" with virus sources after a few years.

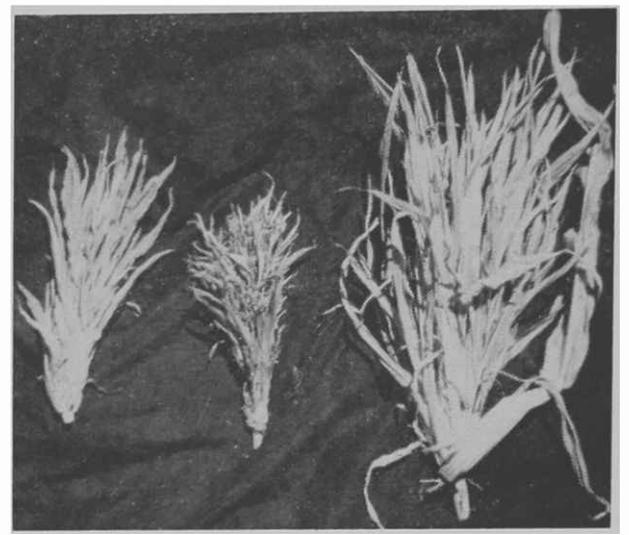
Varietal tests in 1957-58 at the University's Mesa, Ariz., Experiment Station involving various sorghum hybrids, contained many plants showing several abnormalities in growth, among which were stunting, brooming, yellowing and lack of seed production. In the latter instance, the normally occurring flowers were replaced by narrow leaf-like structures. The replacement of flowers by leafy outgrowths is called phyllody.

All degrees from partial seed production to no seeds at all existed in the varieties DD 38, RS 501, and Amak R-10. Phyllody was more severe in DD 38 and RS 501 than in Amak R-10. Combine Hegari showed only slight stunting and yellowing in a small percentage of plants. No phyllody was noted in that variety. All of the indicated symptoms were present in either the original growth or in the ratoon crop.

Symptoms Can Be Confused

Had not CMV been successfully isolated from the plants showing stunting, brooming, yellowing and phyllody, one might suspect that head-smut fungus was the only factor involved. Many of these symptoms occur with attacks of head-smut. It is known that the head-smut fungus does not always produce the black, powdery masses of spores on the outer surface of the plant. In fact, at times such spore masses are not visible to an observer at all. Several head-smutted plants were also found in hybrid sorghums in these plots.

BELOW, phyllody — replacement of flowers by leafy structures — is shown in this photo of sorghum, variety RS 501.



Recently, it has become recognized in other disorders that fungus infections often follow virus attacks. This means that both cucumber mosaic virus and head-smut could conceivably be present in many of the plants showing the described symptoms. Actually this was the case in some.

CMV Strains Isolated

The strains of virus isolated from sorghum hybrids into tobacco plants to maintain cultures, gave symptoms quite similar to those produced by viruses isolated from crown-blighted cantaloups and honeydews, lettuce with rib-discoloration and watermelons showing rind-rot symptoms. These host plants with the symptoms indicated have served as sources for the isolation of cucumber mosaics, tobacco ring-spot and other viruses.

In reactions on *Chenopodium amaranticolor* the sorghum isolations gave local lesions typical of cucumber mosaic virus. The lesions were quite similar to those produced on the same indicator plant by strains of some of the viruses isolated from crown-blighted cantaloups and honeydews, lettuce, tomato and alfalfa. Cantaloups with typical bronze-vein or bronze-leaf which often accompany crown blight symptoms, contain the same sort of virus strains.

What Do Studies Suggest?

Crops susceptible to the same strains of pathogens need not be closely adjacent in order for the disease organisms to persist. Intervening areas of weeds and other plants susceptible to cucumber mosaic and other viruses, provide ever-present reservoirs. If insects adapted to virus transmissions, along with suitable temperatures and other favorable factors, are present, viruses will continue to spread. Thus, CMV in sorghums could have originated from one or more of several sources.