

A Local Lesion Host for Strain E of the Sugarcane Mosaic Virus

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Preliminary results indicated that Atlas sorghum (*Sorghum bicolor* [L.] Moench) gave local necrotic lesions when infected with strain E of the sugarcane mosaic virus (SMV) (3). Sehgal et al. (5) found two sorghum hybrids to be local lesion hosts of a strain of maize dwarf mosaic virus (MDMV), and reported Sill's unpublished finding that CK-60-MS sorghum gave local lesions when inoculated with the Johnson grass negative strain of MDMV. Some researchers consider MDMV and SMV as strains of one virus (2, 6). The purpose of this paper is to give details of local lesion production by a strain of SMV on sorghums, and to note the possible bearing of this information on the relation between SMV and MDMV.

The SMV strain reported here as producing local lesions on Atlas was first isolated in Florida by Todd (8) from St. Augustine grass (*Stenotaphrum secundatum* [Walt.] Kuntze) and later compared with MDMV by Shepherd (6). I have collected this strain frequently over the past 3 years from sugarcane (*Saccharum officinarum* L.), sweet corn (*Zea mays* L.), and St. Augustine grass, and have identified it (3) as Summers' (7) strain E on the sugarcane differential variety, C.P. 31-294. Strains A, B, and D were collected from sweet corn in southern Florida and identified on sugarcane varieties C.P. 31-294 and C.P. 31-588, according to Abbott & Tippett (1). Atlas sorghum seed were supplied by the U.S. Sugar Crops Field Station, Meridian, Miss. CK-60-MS sorghum seed were supplied by Darrell T. Rosenow, Texas Agricultural Experiment Station, Lubbock. AKS 653 and AKS 663 sorghum seed were supplied by J. O. York, Univ. Arkansas, Fayetteville.

Inoculum was prepared by comminuting mosaic-infected leaf tissue with 3 to 10 times its wt of distilled water in a blender and filtering through cheesecloth. Inoculation was accomplished by drawing Carborundum-dusted leaves between the inoculum-wet thumb and index finger.

Atlas sorghum infected with SMV strains A, B, or D exhibits a severe systemic necrosis and mottling. Inoculated leaves sometimes show necrosis, but this is a diffuse type, often spreading rapidly and resulting in early collapse and withering of the entire leaf. Discrete lesions are not formed. By contrast, strain E infection of Atlas results in discrete lesions (Fig. 1) on the inoculated leaves, and systemic symptoms rarely appear. Occasionally the next leaf unrolled after inoculation shows a few isolated, chlorotic, or discolored lesions, but subsequently unrolled leaves show no evidence of infection. Local lesions produced by strain E appear on young seedlings 4 to 5 days after inocula-

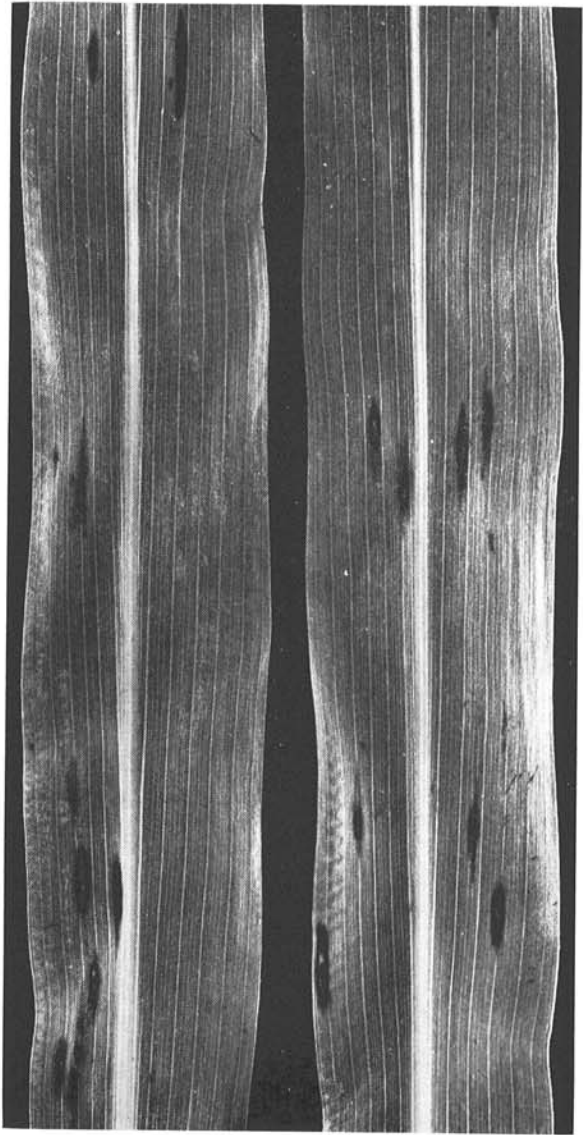


Fig. 1. Leaves of Atlas sorgho showing local necrotic lesions 5 days after inoculation with sugarcane mosaic virus, strain E.

tion, the same period required for systemic symptoms to develop with other SMV strains on Atlas.

Local lesions were produced on Atlas with strain E extracted from several sorghum varieties, sweet corn, sugarcane, and St. Augustine grass. SMV strains A, B, and D extracted from these same hosts failed to produce local lesions. These results indicate that the local lesions were not due merely to some toxic or abrasive effect.

Attempts were made to isolate virus from 3 locations on plants showing local lesions: (i) from young leaves that were unrolled after the appearance of local lesions; (ii) from local lesions; and (iii) from areas between local lesions. In attempts to recover virus from the young leaves, the methods already described were used. In attempts to recover virus from inocu-

lated leaves, a paper punch was used to punch out discs, either those including a local lesion or from areas between local lesions. The discs were crushed on a ground-glass surface with a ground-glass spatula; the wet spatula was then rubbed on Carborundum-dusted leaves of young Sart sorghum plants (a systemic host). No virus was recovered from young leaves unrolled after the appearance of local lesions or from leaf discs punched from areas between local lesions. The virus was recovered from 11 out of 29 leaf discs that included local lesions.

The number of lesions produced on Atlas by strain E was roughly related to concentration of virus in the inoculum, but no lesions were obtained with dilutions greater than 1/20, and often not with dilutions beyond 1/5; these same inocula often gave infection rates around 50% on systemic test plants (sorghum) at a dilution of 1/30, and some infection at 1/1,000. Variability was great; a reasonably smooth dilution-infection curve was obtained only by combining data from several trials. Inoculation of Atlas with strain E produced local lesions erratically until it was learned that the infectivity of the inoculum had to be higher for local lesion production than for infection of systemically infectible sorghums. When highly infective inocula were used, local lesions were produced consistently throughout the year on plants ranging in age from 6 days to 4 weeks after planting.

After the appearance of Sehgal's paper (5), AKS 653, AKS 663, and CK-60-MS sorghums were inoculated at two different times with SMV strains, A, B, D, and E. No distinct local lesions were produced except by strain E on CK-60-MS. The reactions of

Atlas and CK-60-MS to strain E are essentially identical, except for minor differences in the appearance of the local lesions.

In reporting the production of local lesions in sorghums by MDMV-A, Sehgal et al. (5) cited the failure of Dean & Coleman (4) to obtain local lesions with SMV in sorghums; presumably he regarded this as evidence reinforcing the distinctness of MDMV from SMV. It is now known that strains of both viruses produce local lesions in sorghum, and that SMV-E and MDMV-B produce local lesions in the same sorghum variety (CK-60-MS). So far, there is no evidence to rule out the possibility that MDMV-B is SMV-E.

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