A STUDY OF THE COMMON MOSAIC OF SUGARCANE WITH SPECIAL REFERENCE TO STRAINS OF THE VIRUS

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The common sugarcane mosaic virus (i.e., Sugarcane Virus 1, Brandes) * has been divided into 10 strains and sub-strains based, chiefly, on the symptoms produced upon three host varieties, C.P. 31/294, Co. 281, and C.P. 29/291. The designations A to D correspond to the numbers 1 to 4 in previously published descriptions. Strain A produces ordinary mosaic symptoms (i.e., a rather mild, irregular mottling with no necrosis) on all varieties tested. The same type of symptom is produced on Co. 281 by strains B, D, Da, E, and G, and on Louisiana Purple and other varieties by sub-strains Da and Db as well. Strains B and G produce rather general mottling featured by severe chlorosis and a varying extent of necrosis on C.P. 31/294, but the latter fails to produce the typical sheath discoloration and stunting on C.P. 29/291. Strain C produced, on all varieties infected (including Co. 281 and Louisiana Purple), a severe mosaic pattern characterized by initial, elongated, whitish blotches or islands which may coalesce or extend into long, yellowish-white streaks, usually accompanied by necrosis, often blighting or killing the growing point of C.P. 31/294 and other seedlings. These same symptoms are also typical of strain D and sub-strains Da, Db, and Dc on C.P. 31/294. Sub-strain Da is separated from strain D only by the fact that a high percentage of germination recovery occurs in Co. 281 infected with it. Definite symptom differences between these two have not, as yet, been demonstrated on any host variety. Sub-strains Db and Dc are also different on Co. 281, the former producing a mild necrotic pattern (much milder than those produced by strain C) on the older leaves and the latter producing scattered, purplish leaf sheath lesions.

Strain E produces, on C.P. 31/294, symptoms similar to those described above for strains C and D except that they are fewer in number (often only one or two per leaf), more clear cut, and are, characteristically, accompanied by pronounced reddening of adjacent tissues. It causes little or no stunting. Co. 281 is very resistant to infection by strain E and also recovers from it. Like strain G it does not produce typical leaf sheath discolorations or stunting of C.P. 29/291. Strain F produces, on all varieties infected artificially, a very fine regular pattern that is often nearly masked and easily distinguished from the coarser, positive pattern produced by strain A. However, it produces severe necrosis on, and stunting of C.P. 807, a variety long considered immune to mosaic, and from which it was

* In accordance with recommendations of the Committee on Virus Nomenclature, of the Sixth International Botanical Congress, Proc. 1:425, 1935, the strains of sugarcane virus 1 are now designated by letters rather than by numbers, as in previous publications.
obtained. Further evidence indicating the probable existence of additional strains of sugarcane virus 1 has been obtained.

A fairly comprehensive strain survey of Louisiana was conducted in 1934. This has been augmented by later collections as well as a number from Mississippi, Alabama, and Georgia secured by Dr. R. D. Rands. From this survey it has been possible to reconstruct a plausible picture of a succession of strains of the sugarcane mosaic virus in these states, more definitely, of course, for Louisiana. Strain E was apparently responsible for the original mosaic that swept over Louisiana after 1919, and caused such destruction to the varieties D. 74, Louisiana Purple, Ribbon, and L. 511. It occurs now mainly in isolated plantings of the Purple variety, and is the only strain found on this variety in such areas. The spread of strain D seems to have coincided with the distribution of the P.O.J. varieties about 1925-26, which were nearly 100 per cent mosaic at the time, and it is apparently the strain from which they showed such high percentages of recovery prior to 1930. Co. 281 was released that year with mosaic-free seed and its subsequent general infection with mosaic, east of the Atchafalaya River, was the result of the ascendancy of strain B. Plantings of this variety west of the river remained nearly mosaic-free except in areas where diseased seed had been brought in from the eastern parishes.

Each of the three strains (B, D, and E) seems to have appeared first in Louisiana in the parishes east of the Atchafalaya river. The westward progress of each was halted by this natural barrier for several years. The other strains described have to date apparently been of minor importance. This is very fortunate, particularly for the very destructive strain C, which apparently makes little progress in present commercial plantings.

The evidence secured from the other states mentioned indicates a similar strain history there, but considerably retarded because of the sparsely-occurring small fields and a lag in variety changes in the syrup sections.

Results from several years' replicated yield tests comparing a number of pure-strain clonal lines are presented.

**DISCUSSION**

Answering questions of Dr. Lauritzen and Dr. Matz, Dr. Summers stated that the mosaic strains remain stable when passed from one host to another. Answering a question of Dr. McIntosh as to whether these strains are of recent origin, Dr. Summers stated that that was hard to answer. It seems rather definite, however, that most of the strains are of recent origin or were at least not widely distributed until the past six or eight years.

Asked by Dr. Matz if it is not true that the most severe strains are less likely to be of widespread occurrence, Dr. Summers said that this is true of the most severe strain, strain B, which does not spread as widely in the field, and also true of strain A which under greenhouse conditions is as severe as any of them.