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Incidence of Brown Stripe Disease of Sugarcane in Puerto Rico

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INTRODUCTION

Among the sugarcane diseases caused by fungi in Puerto Rico, brown stripe has been attracting considerable attention lately. Apparently the disease is of importance on the northern coast of the Island. Brown stripe was first reported by Paris (1)², in 1928 in Cuba, on the variety *Cristalina*. During 1925 and 1926, favored by the dry-weather conditions prevailing at the time in Cuba, this disease caused severe damages to the variety *Cristalina*.

In Hawaii (3) in the period from 1930 to 1940, the disease was considered of major importance on the Islands of Kauai and Oahu. A great deal of research was conducted in Hawaii and Australia on brown stripe disease. Particular emphasis was given to the chemical composition of the soil, and its effect on the susceptibility of certain varieties. Liu (2), considered brown stripe a disease of major importance in the Dominican Republic, where it attacked the varieties B. 42231, B. 41227, and P.O.J. 2878. The prevalence of the disease was associated with nutritional deficiencies, especially of potash and phosphorus.

In Puerto Rico, the disease did not attract proper attention until 1964, when a general disease survey was carried out by Adsuar, Liu, *et al.* (4) over a considerable part of the sugarcane area of the Island. This paper reports the findings of a disease survey with special reference to the incidence of brown stripe on the northern and southern coasts of Puerto Rico.

RESULTS AND DISCUSSION

In a recent disease survey the presence of brown stripe was for the first time detected on the varieties P.R. 980 and M. 336 at Caño Tiburones. It was subsequently recorded also on the varieties P.R. 1028, P.R. 1048, B. 11-341, and Eros, at Igualdad and San Sebastian. Infected plants

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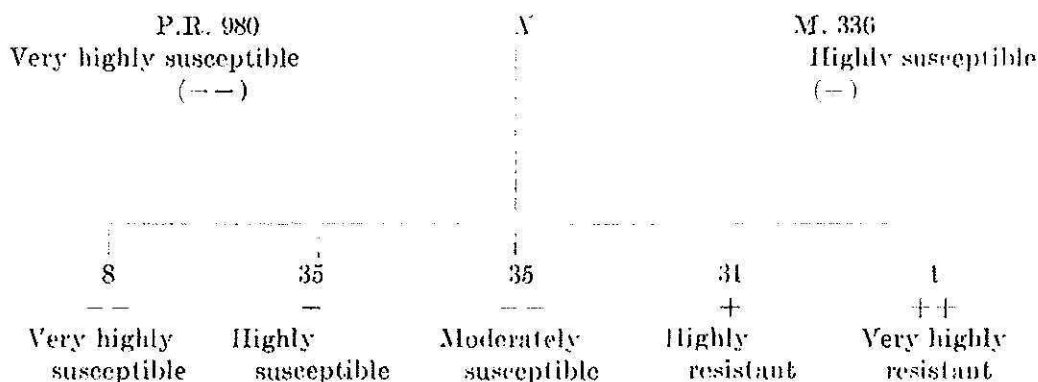
² Italic numbers in parentheses refer to Literature Cited, p. 75.

showed typical brown stripes with yellow halos. In some instances, certain varieties, such as P.R. 980 and M. 336, were so severely affected by the disease that top rot resulted in many cases.

It is of importance to note that the causal agent is disseminated by air currents from plant to plant and from field to field. Conidia germinate rapidly on the cane leaves in the presence of free moisture. In Caño Tiburones, some commercial varieties such as P.R. 980, P.R. 1048, and M. 336 were severely affected by the disease. The losses caused by brown stripe can often reach considerable proportions. Thus, the recent outbreak of the disease observed on the southern coast of the Island should cause considerable concern.

In a search for resistance to the brown stripe disease under our conditions, special attention was given to recording the extent of infection as it appeared on the leaves of some seedling selections. A total of 110 seedling selections from a single cross combination, P.R. 980 \times M. 336, were examined. The number of lesions on the leaves of affected plants was used as a criterion in determining degree of resistance. Using this criterion some selections were found to be highly resistant while others appeared to be extremely susceptible to the brown stripe disease. A study of the frequency of distribution with reference to the degree of resistance and susceptibility of these seedling selections revealed that resistance to brown stripe in the genus *Saccharum* is not controlled by a single dominant genetic factor.

The relative resistance and susceptibility of varieties P.R. 980 and M. 336 and their progenies to brown stripe disease in Puerto Rico are shown in the diagram below:



The most effective method for controlling the disease in the field is to substitute resistant for susceptible varieties. Highly promising varieties in respect to agronomic characteristics and sucrose content developed or imported in Puerto Rico, should be tested for resistance to the brown stripe organism by whatever method is available and convenient.

According to Liu (2), varieties C.P. 52-43 and Co. 331 exhibit a con-

siderable degree of resistance to brown stripe disease in the Dominican Republic. It would also be of interest to find out whether these same varieties are resistant to the disease under our conditions.

SUMMARY

In the recent disease survey over the Island of Puerto Rico, care was taken to record the incidence of brown stripe disease. The extent of infection observed varied with localities. At Caño Tiburones, San Sebastian, and Igualdad, varieties P.R. 980, P.R. 1028, P.R. 1048, M. 336, and Eros were observed to be heavily affected by brown stripe. The apparent resistance and susceptibility of some 110 seedling selections from the cross combination P.R. 980 \times M. 336 were recorded in the course of the survey. A study of the frequency and distribution of the brown stripe lesions on these selections indicates that the degree of resistance or susceptibility to the disease is not controlled by a single dominant factor, but seems to be polygenic in nature.

RESUMEN

En un estudio hecho recientemente en Puerto Rico de las enfermedades de la caña de azúcar, se llevó un récord de la incidencia de la raya parda. Se observó que el grado de infección variaba según las localidades. En el Caño Tiburones, en San Sebastián y en la Central Igualdad, en Añasco, las variedades P.R. 980, P.R. 1028, P.R. 1048, M. 336 y Eros estaban seriamente afectadas. En el curso del estudio se tomó nota de la aparente resistencia y susceptibilidad de unas 110 cepas selectas del cruce de la P.R. 980 y la M. 336. Un análisis de la frecuencia y distribución de las lesiones de la raya parda en el caso de estas selecciones indicó que el grado de resistencia o susceptibilidad a la enfermedad no están controlados por un solo factor dominante, sino que esta condición parece ser de naturaleza poligénica.

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