

Susceptibility of Some Sugarcane Varieties to the Heat Treatment Used in the Control of Chlorotic Streak

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INTRODUCTION

The presence of chlorotic streak, a virus disease of sugarcane, was first recognized in Puerto Rico by Wilbrink, Bell, and Martin (1)² during the 1932 Congress of the International Society of Sugar Cane Technologists. In 1946 Adsuar (2) was able to confirm experimentally its presence in Puerto Rico in the sugarcane variety P.O.J. 2878.

Chlorotic streak is of considerable economic importance since it is known to cause a marked reduction in yields of cane and in the germination and tillering of the plant. Recent experiments conducted at this Agricultural Experiment Station by Landrau and Adsuar (3) conclusively reveal that, under our conditions, chlorotic streak causes a significant reduction in the yield of sugar per acre.

Very little is known concerning the susceptibility of different varieties to the disease. Nevertheless, field observations have shown that the sugarcane variety P.O.J. 2878, which in 1953 occupied 59.6 percent of the area dedicated to sugarcane production in Puerto Rico, is highly susceptible to chlorotic streak. Furthermore, some of the varieties bred in Puerto Rico and Barbados have also shown susceptibility to the disease. Barbados 34104 and 37161, P.R. 902 and 905, and M. 336 are all susceptible under certain climatic conditions.

OBJECTIVE

Fortunately, it has been demonstrated that immersion of infected cuttings in hot water at 52° C. for 20 minutes effectively controls the incidence of the disease and increases the yield of cane and sugar. However, since it is known that the hot-water treatment (4) may adversely affect the germination and vitality of the different varieties, it was considered wise to test especially those cane varieties recommended by this Agricultural Experiment Station (5) as superior under our conditions.

MATERIAL AND METHODS

The equipment used for treating the cuttings has already been described (3). The cane stalks were divided into three-eyed cuttings. Cuttings with

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² Numbers in parentheses refer to Literature Cited, p. 69.

TABLE 1.—Percentage of buds germinated by different sugarcane varieties as influenced by hot-water treatment

Varieties	Germination when—	
	Treated	Untreated
	<i>Percent</i>	<i>Percent</i>
H. 328560.....	52.8	37.3
P.R. 902.....	32.7	24.6
P.R. 905.....	28.4	30.1
P.R. 1000.....	28.9	18.0
B. 37161.....	63.9	27.8
M. 336.....	5.8	17.4
B. 40105.....	66.6	38.4
B. 37172.....	61.6	35.4
H. 371933.....	73.9	61.8
P.R. 907.....	57.5	38.0
B. 41227.....	47.1	60.2
P.R. 980.....	51.2	43.5
Co. 281.....	59.8	68.3

one or more dead or otherwise defective eyes or buds were discarded. Both treated and untreated cuttings of each variety were planted side by side in rows in the field. For the purpose of the experiment, only the total number of eyes of planted cuttings from each variety, treated or untreated, were taken into consideration and counts were made on the basis of germinated eyes.

RESULTS

Table 1 shows the results of the experiment.

The treatment adversely affected the germination percentage of M. 336 and B. 41227 at the 1-percent point and of Co. 281 at the 5-percent point. It was beneficial to the germination of varieties H. 328560, P.R. 1000, B. 37161, B. 40105, B. 37172, B. 371933, and P.R. 907 at the 1-percent point and of P.R. 902 at the 5-percent point. It had no significant effect on the germination of P.R. 905 and P.R. 980.

SUMMARY

Chlorotic streak, a virus disease of sugarcane, is known to occur in Puerto Rico and to cause a reduction in germination, tillering, and yield of sugarcane per acre.

Immersion of the infected cane in hot water at 52° C. for 20 minutes inactivated the virus and increased the yield of cane and sugar.

It is also known that the hot-water treatment may adversely affect the germination of the different varieties.

Thirteen of the best sugarcane varieties as recommended by this Agricultural Experiment Station were tested for susceptibility to the hot-water treatment.

The treatment adversely affected the germination percentage of M. 336, B. 41227, and Co. 281. It stimulated the germination of varieties H. 328560, P.R. 1000, B. 37161, B. 40105, B. 37172, B. 371933, P.R. 907, and P.R. 902. It had no significant effect on the germination of P.R. 905 and P.R. 980.

RESUMEN

La estría clorótica de la caña de azúcar es una enfermedad causada por un virus que reduce notablemente la producción de azúcar por cuerda.

El tratamiento para combatir esta enfermedad consiste en sumergir la caña afectada por 20 minutos en agua calentada a 52° C.

Se sabe que el tratamiento puede afectar la germinación de las distintas variedades. Se sometieron trece de las mejores variedades de caña de azúcar recomendada por la Estación Experimental al tratamiento con calor para determinar como se afectaba la germinación de las mismas.

El tratamiento afectó adversamente la germinación de las variedades M. 336, B. 41227 y Co. 281. Estimuló la germinación de las variedades H. 328560, P.R. 1000, B. 37161, B. 40105, B. 37172, B. 371933, P.R. 907 y P.R. 902. No influyó en forma alguna sobre la germinación de las variedades P.R. 905 y P.R. 980.

LITERATURE CITED

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