

Relative Resistance of some Sugarcane Varieties to Wilt

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ABSTRACT

During the crop seasons of 1979-80 and 1980-81, 14 varieties and seven strains were inoculated with *Cephalosporium sacchari* Butler by standard plug method on ten months' old cane. The results collected after two months following inoculation indicated, the varieties/strains of Isd.1/53, Isd.2/54, B. S. 96 (Isd.15), L. Jaba C, I-60/74 and I-106/74 moderately resistant; Isd.16, B. O. 67 and Co.1132 intermediate, I-156/66 moderately susceptible; Isd.9/57 susceptible, B.O. 17 highly susceptible and Co.1148 very highly susceptible. None of the varieties were either immune or very highly resistant or highly resistant.

INTRODUCTION

Wilt is one of the major diseases of sugarcane in Bangladesh. In India too, it is a common and destructive disease. It was first recorded by Butler and Khan (1913) in India. Subsequently, the disease was reported from other parts in India including Uttar Pradesh, Bihar, Tamil Nadu and the Panjab (Luthra 1936; Srinivasan, 1964; Singh, 1978). The disease has also been reported from Argentina, Barbados, Colombia, Mexico, the Philippines, Trinidad, Uganda, South Africa, United States, West Indies and many other countries of the world (Hughes *et al.*, 1964). Its causal agent *Cephalosporium sacchari* Butler occurs alone or frequently in association with the red rot parasite (*Physalospora tucumanensis* Speg.) and hastens the deterioration of the affected canes (Ganguly, 1964). In a recent study Singh *et al.* (1975) have reported that *Fusarium moniliforme*, *Acremonium furcatum* and *A. terricola* are also associated with the wilt of sugarcane even if *C. sacchari* is an additional cause of the disease. Whatever may be the casual agents it is a disease of great economic importance in Bangladesh where it occurs annually in mild to severe form causing a substantial loss in yield. In a recent investigation in the Punjab State, Waritch (1981b) assessed losses caused by with in the commercial variety Co. 1148 to be 17.96% in cane weight compared to healthy cane at 40 percent level of disease incidence. However, considering its constant and wide-spread appearance throughout the country and observing that many of the commercial varieties have started showing wilt symptoms in the field it has been made a continuous annual programme to check the reaction of all the commercial and the promising varieties/strains to this disease. The present work is the average of two years results of inoculation tests.

MATERIALS AND METHODS

Twenty one varieties/strains were tested for wilt resistance during 1979-80 and 1980-81. At random 20 stalks of ten months' old cane against each variety were inoculated with fast growing same-aged culture of the fungus *Cephalosporium sacchari* Butl. grown on PDA medium by standard plug method. The plugs of inoculum were taken only from the periphery of the pure cultures made from hyphal tips. The 5th internode from the bottom was inoculated in the middle. Eight weeks after inoculation the canes were harvested and the linear spreads of infection (Lesion's Lengths) were recorded by splitting the inoculated canes longitudinally. The index of virulence was determined by dividing the lesion's length with length of the inoculated internode.

The disease resistance ratings for sugarcane as proposed by Hutchinson (1968) were followed in this experiment. In view of these ratings a scale of resistance/susceptibility for the ratios between lesion's lengths and internodal lengths were prepared (Scale) and the varieties/strains were rated accordingly (Table 1).

Table 1. 'Scale'+ to determine wilt resistance/susceptibility.

Ratio x/y	I	Abbreviation	I Rating**
0 = no infection	= immune		=0
over 0-0.50*	=very highly resistant	=VHR	=1
„ 0.50-0.75	= highly resistant	=HR	=2
„ 0.75-1.00	= resistant	=R	=3
„ 1.00-1.25	= moderately resistant	=MR	=4
„ 1.25-1.50	= intermediate	=INT	=5
„ 1.50-1.75	= moderately susceptible	=MS	=6
„ 1.75-2.00	= susceptible	=S	=7
„ 2.00-2.25	= highly susceptible	=HS	=8
„ 2.25 and above	= very highly susceptible	=VHS	=9

X= linear lesion length

Y= length of inoculated internode

+ = 'scale' developed for this experiment

** = Hutchinsson's (1968) ratings.

RESULTS AND DISCUSSION

All the varieties were more or less infected but the infections varied in lesions' lengths. The results obtained in 1980 showed comparatively less infection in almost all the varieties probably because of weather conditions which were favourable for cane growing but unfavourable for wilt development. However, the average of two years' results indicated that none of the varieties were immune or very highly resistant. All the varieties/strains ranged from resistant to very highly susceptible.

Table 2. Resistance ratings of 21 varieties/strains.

Sl. No.	Varieties/strains.	Ratio $\frac{\bar{X}}{\bar{Y}}$			Rating	
		1980	1981	Mean	Numerical	Abbreviation
Commercial Varieties						
1.	Isd.1/53	0.58	1.22	0.90	3	R
2.	Isd.2/54	0.49	1.23	0.86	3	R
3.	Isd.9/57	1.48	2.08	1.78	7	S
4.	Isd.15(BS-96)	0.83	1.01	0.92	3	R
5.	Co. 975	1.25	1.08	1.16	4	MR
6.	Co. 1158	1.11	1.12	1.11	4	MR
7.	B.O. 17	3.01	1.20	2.10	8	HS
8.	L.Jaba C	0.92	1.00	0.98	3	R
Near Commercial Varieties						
9.	Isd. 16	0.68	2.14	1.41	5	INT
10.	B. O. 67	1.31	1.61	1.41	5	INT
11.	B. O. 70	0.92	1.58	1.15	4	MR
12.	B. O. 71	1.03	1.31	1.17	4	MR
13.	Co. 1148	3.85	1.25	2.55	9	VHS
14.	Co. 1132	1.19	1.48	1.33	5	INT
Promising Strains						
15.	I-156/66	1.43	1.78	1.60	6	MS
16.	I-5/74	0.80	1.21	1.05	4	MR
17.	I-18/74	1.07	1.04	1.05	4	MR
18.	I-59/74	1.11	0.97	1.04	4	MR
19.	I-60/74	0.95	0.91	0.93	3	R
20.	I-96/74	1.08	0.98	1.03	4	MR
21.	I-106/74	1.06	1.05	1.05	4	MR

Isd.1/53, Isd.2/54, B. S. 96(Isd.15), L. Jaba C and I-60/74 proved to be resistant; Co.975, Co.1158, B. O. 70, B. O. 71, I-5/74, I-18/74, I-59/74 and I-109/74 moderately resistant; Isd.16, B. O. 67 and Co.1132 intermediate; I-156/66 moderately susceptible; Isd. 9/57 susceptible; B. O. 17 highly susceptible and Co.1148 very highly susceptible. In India particularly in the Punjab area the variety Co.975 has gone out of cultivation due to its being susceptible to this disease (Waraitch, 1981a). But in our inoculation tests its was found to be moderately resistant. And at present it is one of the most widely cultivated varieties in Bangladesh. That the variety proved to be moderately resistant here may probably be due to some differences in climatic factors. The variety Co. 1148 was found to be very highly susceptible which is in agreement with the results obtained by Gupta and Gupta (1976), Singh (1981) and Waraitch (1981b). The variety B.O.17 has become a runout one because of its higher susceptibility to wilt. Of the five promising strains I-60/74 yielded better results as regards wilt reaction.

There is hardly an area in the country free from wilt complex. Every year wilt appears in mild form in high land areas and in severe form in low-lying areas where soil is comparatively poor and sandy type. In areas particularly Darsana, Jaipurhat, Rangpur and Dinajpur wilt is a serious problem specially during period of drought.

The scale followed in this experiment, however, may vary from country to country. Under Bangladesh conditions it is presumed that this scale is better suited to test varieties against wilt disease with the results obtained after two months following inoculation on ten months' old cane.

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