

Reaction of some Promising Sugarcane Clones to Top-rot Disease

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ABSTRACT

Reaction of 53 promising clones to Top-rot disease was tested through artificial inoculation with the bacterium *Pseudomonas rubrilineans* following piercing bruising method. Out of 53 clones, 27 clones were very highly resistant, 11 clones resistant, 10 clones intermediate and among the rest, one clone moderately susceptible, and 4 clones were found susceptible. None of the clones was found immune.

INTRODUCTION

Top-rot is one of the major sugarcane disease in Bangladesh caused by the bacterium *Pseudomonas rubrilineans*. Its another phase is leaf stripe known as Red stripe (Cottrell-Dormer, 1932) whose effect is generally considered of minor importance (Edgerton, 1959) but the pathogen have potentiality to cause epidemic (Chona & Rao, 1963; Fors, 1978). In addition to leaf stripe stage the organism frequently produces top-rot in cane (Agnihotri, 1983). Besides, in severe cases Red -stripe lead to top-rot development. Top-rot may also develop independently without showing leaf stripe phase. However, top-rot phase is more severe. Under severe leaf infection due to top-rot, yield losses were as high as 15% (Martin and Wismer, 1961). In Hawaii, the rot is only confined to the upper portion of the cane stalk (Lee *et. al.* 1925), while in Louisiana (U.S.A), sometimes the whole cane is affected (Edgerton, 1959). In Louisiana, the variety P.O.J. 727 was found most susceptible and at least 10 percent of the stalks were destroyed in a screening plot. In Bangladesh, both the phases of the disease is frequently observed in the sugarcane fields. In a preliminary survey at SRTI farm it was observed that a promising clone I-294/74 was highly susceptible to red-stripe followed by top-rot under natural condition and the breeders had to drop the clone from the breeding programme (SRTI Annual Report, 1984). Considering the importance of the disease and its wide spread out breaks in Bangladesh, it was decided to study the reaction of promising clones to top-rot disease through artificial inoculation with the bacterium *Pseudomonas rubrilineans*.

MATERIALS AND METHODS

Fifty three clones were used as inoculating materials and the pure culture of the *Pseudomonas rubrilineans* was inoculated. The suspension of the pure culture of the bacterium with a concentration of 5×10^7 was prepared as per procedure of Kiraly *et. al.* (1974). The ready suspension was inoculated by a newly developed Piercing-bruising method. In this method the base of spindle leaves were pierced and bruised by a bunch of needles fixed at the end of a steel rod and immediately a piece of cotton, soaked in bacterial suspension was squeezed on injured places. In this way twenty five plants of each clone at the age of five months were inoculated in May, 1985. Data recorded in percent infection at an interval of seven days since inoculation, and continued upto 6

weeks. As top-rot is more severe to cause damage to sugarcane crop compared to red stripe, the clones were tested for top-rot disease only, and rated following international rating (Hutchinson, 1968) following a scale which is shown in Table 1.

Table 1. Index of rating top-rot disease.

Infection		Rating	
Over	O	Immune	where,
"	0 to 1 %	VHR- 1	VHR- Very Highly Resistant
"	1 to 2%	HR2	HR - Highly Resistant
"	2 to 4%	R-3	R- Resistant
"	4 to 7%	MR-4	MR-Moderately Resistant
"	7 to 10%	INT-5	INT- Intermediate
"	10 to 15%	MS-6	MS-Moderately Susceptible
"	15 to 20%	S-7	S-Susceptible
"	20 to 25%	HS-8	HS- Highly Susceptible
"	25%	VHS-9	VHS- Very Highly Susceptible

RESULTS AND DISCUSSION

Different clones responded differently to the top-rot development. The detail results are shown in Table 2.

Table 2. Gradation of clones on the basis of their infection to top-rot development.

Clones	Grading	Number of clones
Isd. 16, Isd. 17, Isd. 5/55, Isd. 9/57, Co. 640, Co. 1148 Co. 1158, BO. 67, I-156/66, I-59/74, I-112/76, I-491/76, I-258/77, I-354/77, I-28/80, I-16/81, I-29/81, I-61/81, I-68/81, I-71/81, I-87/81, I-59/82, I-151/82, I-6/82, Mohiskundu, M-147/44 and CP. 69-1052.	VHR	27
Isd. 1/53, Isd. 2/54, Isd. 15, Co. 975, Co. 1132, L. Jaba-C, I-2/66, I-106, I-8/82, I-106/82 and I-107/82.	R	11
BO. 70, I-24/74, I-21/75, I-41/75, I-119/77, I-147/77, I-91/79, I-96/80, I-48/81 and I-150/82.	INT	10
I-70/79.	MS	1
Kallanpur, I-3/82, I-4/81 and Nagarbari.	S	4

The Table 2 shows that out of 53 clones, 27 clones were found very highly resistant, 11 clones resistant and 10 clones intermediate in reaction. Among the remaining clones, 1 clone moderately susceptible and other 4 clones were found susceptible to top-rot disease. None of the clones was found immune, highly resistant, moderately resistant, highly susceptible and very highly susceptible to the disease. The result was in conformity with the findings of Edgerton (1959), Rana and Shukla (1968) and Malek *et al.* (1983) where they reported that different genotypes responded differently to the

top-rot disease. Wismer (1979), reported that the performance of sugarcane variety (s) from artificial inoculation with the pathogen varies from natural infection under field conditions.

However, as per international rating (Hutchinson, 1968), clones rated from immune to intermediate in reaction to top-rot in sugarcane may be considered for release as a variety. In this study, 38 out of 53 clones may be considered as better genotypes, and 10 clones showing intermediate reaction may also be released if their performance are satisfactory to other major disease.

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