

Evaluation of some Sugarcane Varieties against Smut

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ABSTRACT

An experiment was conducted for evaluation of twelve commercial varieties against sugarcane smut (*Ustilago scitaminea* Sydow) at BSRI farm during the year 1997 and 1998. Out of the twelve, five varieties viz. Isd 20, Isd 21, Isd 26, Isd 27 and Isd 28 were found resistant; Isd 18 moderately resistant; Isd 19, Isd 24 and Isd 29 moderately susceptible and the varieties BS 96, Isd 22 & Isd 25 were found susceptible against smut disease. The varieties showing susceptible reaction to smut should be avoided for commercial cultivation.

Key words : Smut, *Ustilago scitaminea*, sugarcane, disease reaction.

INTRODUCTION

Smut caused by *Ustilago scitaminea* Sydow has been an important disease of sugarcane in most regions in which this crop is grown (Lee-Lovick, 1978). In Bangladesh, it is also common and economically important disease of sugarcane (Ahmed, 1974). It causes loss in yield as well as reduce the commercial cane sugar. Goyal (1982) reported that planting of naturally infected setts of variety Co 1158 resulted 100% smut incidence and complete loss in yield and the reduction in commercial cane sugar was 18.30% as compared to healthy canes. Rahman *et al.* (1998) reported yield loss of 83.92% in the clone I 291-87 and 59.45% in I 31-88 due to the infection of disease. Rahman *et al.* (1998) also reported commercial cane sugar loss of 64.12% and 39.39% in the diseased canes of the clones I 291-87 and I 31-88, respectively compared to their healthy canes. A high incidence of smut was observed in the promising clone I 291-87 at BSRI farm, as a result it had to be dropped from the breeding programme (Anon. 1995). The popular variety Co 1158 grown in this area has become highly susceptible to smut particularly in its ratoon phase.

At present, a large number of varieties resistant to smut are being cultivated commercially. The varieties under continuous cultivation since long, resistance to smut may change due to the evolution of virulent strains of the pathogen. In this respect, evaluation of varietal resistance is an important process not only to eliminate the susceptible variety (s) but equally to identify the durable resistant variety (s) which can be utilized in the breeding programme. In the present study, the reaction of agronomically promising commercial varieties of sugarcane to smut were tested with the mixed isolates of prevailing strains of the pathogen and the results are presented in this paper.

MATERIALS AND METHODS

The experiment was conducted at Bangladesh Sugarcane Research Institute Farm during the year 1997 and 1998. The test varieties included in the experiment were BS 96, Isd 18, Isd 19, Isd 20, Isd 21, Isd 22, Isd 24, Isd 25, Isd 26, Isd 27, Isd 28 and Isd 29. The widely used spore suspension method was followed for creating artificial epiphytotics of the disease (Durairaj *et al.* 1972, Satyavir and Beniwal, 1978). In this technique, chlamydospores of

Ustilago scitaminea were collected from different varieties and locations. The spores showing above 80 % germination were used for making one mixed thick homogeneous suspension @ 0.5 g spores/litre of water. Tween 20 was added to the suspension @ 0.5ml/litre. Sixty healthy setts (two budded each) of each test varieties were kept immersed in suspension for half an hour and then incubated for 24 hours before planting. The inoculated setts were planted in 20m long furrows in three replications during the month of November. The disease observations were recorded at fortnightly intervals commencing 60 days after planting. Affected clumps were marked and the final observation was recorded at 12 months of planting. Cumulative smut incidence of each variety was calculated for both seasons and average smut incidence of each variety was worked out.

The smut incidence of different varieties were evaluated on the basis of 1-5 grading scale (Anon., 1998) as follows :

Smut infection (%)	Grade	Reaction
0-3	1	Resistant
3.1-5	2	Moderately resistant
5.1-10	3	Moderately susceptible
10.1-25	4	Susceptible
Above 25	5	Highly susceptible

RESULTS AND DISCUSSION

The data collected on cumulative percentage of infection during the year 1997 and 1998 are summarised in Table 1. The varieties tested by dipping method in spore suspension varied to their reaction to smut. Out of 12 varieties evaluated against smut disease, 5 varieties viz. Isd 20, Isd 21, Isd 26, Isd 27 and Isd 28 were found resistant, variety Isd 18 was moderately resistant, 3 varieties viz. Isd 19, Isd 24 and Isd 29 were moderately susceptible and the rest 3 varieties Bs 96, Isd 22 and Isd 25 were susceptible. The agronomically most promising variety Isd 28 and Isd 29 released for commercial cultivation during 1996 and 1998

Table 1. Reaction of sugarcane varieties to smut disease.

Variety	Smut infection (%)			Grade	Disease Reaction
	1997	1998	Average		
BS 96	10.91	15.70	13.31	4	Susceptible
Isd 18	1.32	5.71	3.52	2	Moderately resistant
Isd 19	6.67	7.14	6.91	3	Moderately susceptible
Isd 20	0.91	3.67	2.29	1	Resistant
Isd 21	1.83	1.71	1.77	1	Resistant
Isd 22	32.12	15.44	23.78	4	Susceptible
Isd 24	10.72	5.36	7.82	3	Moderately susceptible
Isd 25	11.43	31.29	21.36	4	Susceptible
Isd 26	1.38	0.66	1.02	1	Resistant
Isd 27	2.13	1.35	1.74	1	Resistant
Isd 28	1.18	1.32	1.25	1	Resistant
Isd 29	6.25	7.45	6.85	3	Moderately susceptible

were found resistant and moderately, susceptible reaction against smut, respectively. The varieties Isd 20, Isd 21, Isd 26, Isd 27 and Isd 28 were found resistant, These varieties were also found resistant at the time of release. But the varieties BS 96, Isd 19, Isd 22, Isd 24, Isd 25 and Isd 29 were found moderately susceptible to susceptible which were resistant at the time of release. The plausible reasons are the presence of the smut pathogen in an endemic area and also due to the degeneration of varieties due to long cultivation in the field (Agnihotri, 1983).

From this experiment, it can be concluded that preference should be given in selecting those varieties which are resistant or moderately resistant to smut disease. But the evaluation of varieties should be a continued process so that the varieties showing susceptible or highly susceptible reaction over a long period of cultivation can be avoided.

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