

SHORT COMMUNICATION

**Screening of Some Sugarcane Genotypes Against Smut
Caused by *Ustilago scitaminea* Sydow**

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Sugarcane smut is caused by *Ustilago scitaminea* Sydow., a basidiomycetous fungus (Rott, 2000) that exists in several physiologic races (Agnihotri, 1983). In Bangladesh, it is common and economically important disease of sugarcane (Ahmed, 1974). It causes serious losses in yield and in sucrose content (Hoy, 1986; Padmanaban *et al.*, 1988). This is a result of systemic nature of the disease which leads to a grassy growth habit in susceptible varieties and complete crop loss (Comstock, 2000). The fungus has the potential to infect all types of cane. It was first reported in Natal in South Africa in 1877 and has since been reported in all other countries that lie between 20° N and 20° S of equator (Martin *et al.*, 1961). Smut reduces the yield and quality of sugarcane. Reduction in yield and quality of sugarcane varies widely in different sugarcane growing areas of the world and is dependent mainly on the races of the pathogen present, the sugarcane varieties and the prevailing environmental conditions (Lee-Lovick, 1978). Data on quality parameters indicate that in smut infected canes, brix and purity of sugar are adversely affected (Martin *et al.*, 1961). The loss may go upto 100% when naturally infected setts are planted and the loss may range from 42.47 to 59.20% when artificially inoculated setts are planted (Bachchhav *et al.*, 1979; Goyal *et al.*, 1982). Whittle (1982) reported maximum potential loss of 12.4% to 25.6% in comparisons of yields of artificially inoculated and healthy varieties. In Bangladesh, Rahman *et al.* (1998) reported yield loss of 83.92% in the clone of I 291-87 and 59.45% in I 31-88 due to the infection of smut disease. 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 breeding programme (Anon., 1995).

Chemical control and agronomic practices are not very effective to reduce the infection of smut. Substitution of susceptible varieties by resistant ones is one of the most successful and reliable method to combat the disease. Resistant genotypes of sugarcane could play an important role in reducing the loss caused by the disease. Therefore, screening of sugarcane genotypes against smut disease is a pre-requisite in the varietal development programme before releasing varieties and finally recommended for commercial cultivation. Aiming to this, the present study was conducted to determine the level of resistance/susceptibility of sugarcane genotypes against smut pathogen.

Twenty six sugarcane genotypes namely, I 39, I 6-04, I 112-01, I 18T₂, I 25-04, I 39-04, I 91-05, I 94-05, I 150-05, I 85-06, I 94-06, I 139-06, I 223-06, I 310-06, I 347-

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06, I 61-07, I 76-07, I 124-07, I 133-07, I 153-07, I 157-07, I 164-07, I 167-07, I 178-07, I 200-07 & I 215-07 were planted at BSRI farm, Ishurdi during the crop seasons 2010-11 and 2011-12 where variety Isd 39 as resistant standard and clone I 6-04 as susceptible standard. The genotypes were tested through artificial inoculation with the causal fungus *Ustilago scitaminea* following spore suspension method (Durairaj *et al.*, 1972; Satyavir and Beniwal, 1978). Two budded setts of each genotype were inoculated by dipping in spore suspension for 30 minutes and then planted in 16 m long rows with three replications. Data on disease incidence were recorded starting from 60 days after planting and at an interval of one month up to 12 months. Cumulative smut infection percentage from the whole season for each genotype was determined by dividing the number of smutted stool/clump by total stool in a genotype and converting to percentage. The smut incidence (%) of different genotypes were evaluated on the basis of R-resistant (0.0-3.0), MR-moderately resistant (3.1-5.0), MS-moderately susceptible (5.1-10.0), S-susceptible (10.1-25.0) and HS-highly susceptible (>25.0) reaction (Begum *et al.*, 2007).

Data collected on cumulative percentage of infection during the year 2011 and 2012 were summarized in Table 1. The genotype tested by dipping method in spore suspension varied to their reaction to smut. Out of 26 genotypes evaluated against smut disease, 10 genotypes viz. Isd 39, I 112-01, I 39-04, I 91-05, I 94-05, I 150-05, I 61-07, I 153-07, I 157-07 and I 200-07 were found resistant (R); 5 genotypes viz. I 25-04, I 310-06, I 76-07, I 133-07 and I 164-07 found moderately resistant (MR); 4 genotypes viz. Isd 18 T₂, I 85-06, I 223-06 and I 124-07 found moderately susceptible (MS); 5 genotypes viz. I 6-04, I 347-06, I 167-07, I 178-07 and I 215-07 found susceptible (S); and finally 2 genotypes (I 94-06 & I 139-06) showed as highly susceptible (HS) reaction. The promising variety Isd 39 and the clone I 6-04 used for cultivation during the crop seasons were showed as resistant and susceptible reaction against smut, respectively. The incidence of smut in I 139-06 was recorded to a tune of 80.32% in 2011 which reveals that the conditions for the development of disease were congenial. The plausible reasons were the presence of the smut pathogen in an endemic area and also due to the degeneration of varieties over long time cultivation in the field (Agnihotri, 1983).

From this study, it can be concluded that preference should be given in selecting those genotypes which were resistant (R) or moderately resistant (MR) to smut disease. But the genotypes showing moderately susceptible (MS) to susceptible (S) reaction to smut should be dropped for commercial release and cultivation.

Table 1. Reaction of different sugarcane genotypes against *Ustilago scitaminea* Sydow causing smut disease at BSRI farm, Ishurdi during the cropping season 2010-11 and 2011-12

Sl. No.	Sugarcane genotypes	Smut infection (%)			Disease reaction
		2011	2012	Average	
1.	Isd 39 (RS*)	0.00	0.00	0.00	R
2.	I 6-04 (SS**)	46.26	29.85	38.05	S
3.	I 112-01	0.00	5.88	2.94	R
4.	Isd 18T ₂	8.77	1.72	5.25	MS
5.	I 25-04	6.25	0.00	3.13	MR
6.	I 39-04	0.00	0.00	0.00	R
7.	I 91-05	0.00	0.00	0.00	R
8.	I 94-05	3.84	1.33	2.59	R
9.	I 150-05	0.00	2.85	1.43	R
10.	I 85-06	10.16	3.17	6.67	MS
11.	I 94-06	55.17	2.12	28.65	HS
12.	I 139-06	80.32	8.95	44.64	HS
13.	I 223-06	12.69	1.75	7.22	MS
14.	I 310-06	4.47	5.47	4.97	MR
15.	I 347-06	19.23	8.00	13.62	S
16.	I 61-07	0.00	0.00	0.00	R
17.	I 76-07	3.57	4.25	3.91	MR
18.	I 124-07	18.92	0.00	9.46	MS
19.	I 133-07	4.41	4.08	4.25	MR
20.	I 153-07	0.00	0.00	0.00	R
21.	I 157-07	0.00	2.73	1.37	R
22.	I 164-07	2.40	5.47	3.94	MR
23.	I 167-07	18.75	10.71	14.73	S
24.	I 178-07	12.06	8.88	10.47	S
25.	I 200-07	0.00	0.00	0.00	R
26.	I 215-07	22.38	0.00	11.19	S

*RS = Resistant Standard, **SS = Susceptible Standard

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