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Short communication

YIELD LOSS ASSESSMENT IN RICE DUE TO FALSE SMUT

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False smut of rice disease appears in severe form in Uttar Pradesh, Punjab, Bihar State of North India. False smut caused by *Claviceps oryzae-sativae Hashioka*, is considered as an economically less important disease though it has been reported from most of rice growing varieties/entries rice in the world including India (Ou, 1972). Normally the disease causes little loss of yield, but under favourable condition of disease development heavy losses have been reported in restricted areas (Ansari *et al.* 1988). Infected panicles showed losses which ranged between 7 and 75.4 percent. Agarwal and Verma (1978), Singh and Dubey (1978) reported 44% loss in Ratana and 17% in IR8 from false smut. In the present investigation attempts were made to assess the yield loss caused by false smut disease in rice and hybrids rice grown in farmer's field in semi deep water and deep water situation at Bahraich and Gonda districts.

The observation on false smut severity was noted under natural field condition. The rice varieties were grown by farmers in semi deep water and deep water conditions. The observations on varieties namely Madhukar, Jalmagna, Sarju 52, Jal Lahari, Samba Mahsuri and Hybrid PA 6444, on the infected tillers/m2 were recorded. Ten smutted and 10 unsmutted (healthy) panicles were randomly collected from each variety from the farmers' field. The panicles were hand threshed to record the total grain weight. The total number of grain and smutted balls were counted from 10 smutted panicles separately and smutted balls percentages were workout. The disease severity was calculated by multiplying the percent smutted fillers with percent smutted balls (Singh and Dubey 1978). The percent smutted filler were calculated by -

$$\frac{\text{100 x number of smutted tiller/sqmt}}{\text{Total number of tillers (Healthy and diseased) sqmt}}$$

The grain weight of 10 smutted panicles including smutted balls were subtracted from the total weight of 10 unsmutted (healthy) panicles of respective varieties and the percent loss in yield was calculated by –

$$\frac{\text{The reduction in grain weight x percent infected tiller x 100}}{\text{Grain weight of 10 unsmutted (Healthy) Panicles x 100}}$$

The maximum percent infected tiller and the smutted balls was observed in PA 6444. The minimum percent infected filler was found in Madhukar and minimum percentage of smutted balls was found in variety Jallahari. The maximum disease severity was recorded in PA6444, whereas, the minimum in Jallahari. The maximum percentage of yield loss was observed in PA 6444 (20.0%) followed by Samba Mahsuri (16.7%), Jalmagna (6.4%), Sarju 52 (5.0%), Jallahari (4.4%) and Madhukar (4.3%). The data reveal that the maximum percent yield loss was observed in varieties where disease severity was more accompanied by high reduction in grain weight. Therefore, the total loss in yield occurs due to infected fillers, smutted grain/panicles and decrease in grain weight. The maximum and minimum temperature ranged between 30.43 and 27.08^{0}C which favours the disease development. Ikegami (1959) has also reported that decrease in grain weight has observed due to increase in the number of spores balls/panicle while the number of Kernel/ear head was almost same inspite of different incidence of infection. The high relative humidity accompanied by cloudy day during the flowering of the varieties was more favourable for the severe incidence by this fungus (Rao and Raju 1955). The results are corroborated with the findings of Ansari etal (1988) who reported lowest loss in CRIIS - 5029-2-16 (0.04%). The maximum yield loss was calculated in DR 447-20 (48.56%). Singh (1984) screened 47 rice entries against false smut infection. Results showed that 14 were free from disease. Ten varieties showed trace infection. Nineteen varieties showed moderate susceptible and 4 varieties showed severe disease incidence. In a 1989 wet season trial, maximum (15 to 20%) panicle infection by false smut was recorded in fine grain varieties. Six other varieties showed 10-15% infection. Few cultivars could be rated as tolerant, showing 1-5% infection. Singh and Dubey (1978) reported 44% loss in variety Ratana 17% in IR8 and 0.6% in Parasa from false smut. Earlier the infection of false smut have been reported to tune the 68.06% on variety HKR-126 68% and 36% on hybrid rice PA 6444 (Barnwal and Singh 2011).

Table 1: Disease severity and percent loss in yield of rice varieties

Varieties	Infected fillers	Smutted balls (%)	Disease severity	Grain weight of 10 Panicles (g)		Difference in weight (g)	Total loss in yield (%)
				Unsmutted	Smutted		
Madhukar	20.00	4.00	80.00	50.80	40.00	10.80	4.25
Samba Mahsuri	50.00	3.64	182.00	19.80	14.00	5.80	16.65
Sarju 52	16.67	2.86	47.68	39.00	28.70	11.70	5.00
Jal Lahari	16.94	1.88	31.85	40.80	30.20	10.60	4.40
Jalmagna	14.50	2.20	31.90	36.00	25.00	11.00	6.38
PA 6444	60.00	8.00	480.00	45.00	30.0	15.00	20.00

Maximum yield loss was recorded in Hybrid rice PA6444 (20.0%) followed by Samba Mahsuri (16.7%), Jalmagana (6.4%), Sarju52 (5.0%). Lowest damage was recorded in Jallahari (4.4%) and Madhukar (4.3%) during wet season 2012 under natural field condition in semi deep water and deep water areas.

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