
Bakanae disease of rice in West Bengal

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Bakanae disease of rice was recorded in Nadia, 24-Parganas (North), and Murshidabad districts of West Bengal in two rice varieties (Saket 4 and Rashi) cultivated in *boro* season, both in seed bed and main field. In severely affected field, seventy five per cent hill showed the symptoms. Affected tillers became susceptible to stem borer infestation. Carbendazim spray checked the spread of the disease.

Key words : Bakanae disease, rice, control.

During survey of rice diseases in *boro* season (1989-90 and 1990-91) the incidence of Bakanae disease was noticed in many rice fields in West Bengal. As the disease was not reported earlier from West Bengal, an attempt has been made in the present report to record the symptoms of the disease, extent of disease incidence, characteristics of the infected plants and the pathogen and the host varieties affected.

MATERIAL AND METHODS

Surveys were conducted in Nadia, North 24-Parganas and Murshidabad districts of West Bengal for recording the incidence and symptoms of the disease and to

note the rice varieties affected by the disease. Other observations, namely percentage of affected tillers, number of affected tillers, height of both healthy and infected tillers, and characteristics of affected tillers were taken from twelve selected Bakanae affected rice fields in North 24-Parganas. The pathogen was isolated in modified Czapek Dox agar medium (Agarwal and Singh, 1974).

RESULTS AND DISCUSSION

The disease was recorded in both (1989-90 and 1990-91) seasons in Nadia, North 24-Parganas and Murshidabad districts. Rice cultivars Saket 4 and IET 1444 (Rashi) were affected by the disease. The intensity of incidence of the disease was higher in 1989-90 season than 1990-91 season. There was frequent rainfall in the early part of *boro* season in the former season. High soil moisture, humidity, rainfall might be the cause of higher incidence of the disease (Seto, 1935). Bakanae was reported earlier from Assam (Chetla, 1964), U. P. (Pavgi and Singh, 1964), A. P. (Vidhyasekaran *et al.*, 1967), Punjab (Bedi and Dhaliwal, 1970), Bihar (Singh, 1972), Orissa (Kauraw, 1981), Tripura (Sarkar, 1986), Maharastra (Parate and Lanjewar, 1987) but the disease was not reported earlier from West Bengal.

Symptoms

The most conspicuous and common symptom was the elongation of the infected plants. Such symptom was observed both in seed bed and the main field. The infected plants were distributed scattered in field. The affected tillers were several centimeters taller than the normal healthy plants, thin and yellowish green in colour. Some of the affected tillers produced small panicles with pale yellow flag leaves. Profuse growth of aerial roots was noticed at the lower ends of the affected tillers. Sometimes a white mycelial growth of fungus was noticed on such nodes. Many of the affected tillers dried up before flowering. Rest of the affected tillers produced very short panicle with chaffy grains.

The Pathogen

The fungus produced mycelial growth on modified Czapek Dox agar medium. With the increase in age, the underside of the mycelial mat became pinkish. Microconidia were more or less agglutinated in chains, cut off in false heads, later scattered in clear yellowish to rosy white aerial mycelium as a dull, colour less powder, one or two celled, fusiform egg shaped. Macroconidia were delicate, slightly sickle shaped, narrowed at both ends, scattered, laid down in sporodochia, pale, measuring (20-60 x 2-4.5) μ for 3 septe and (37-70 x 2-4.5) μ

Table 1. Intensity of Bakanae disease and characteristics of infected plants.

Sl. No. of field	Affected hill (%)	No. of tiller per hill	No. of infected tiller per affected hill	Height of healthy tiller (cm)	Characteristics of affected tiller				
					Height (cm)	No. of nodes producing roots	Percentage of tiller	Affected by stem borer	
					Dried before flowering	Producing panicle			
1	59.75	10.98	1.87	41.83	58.18	1.50	46.15	15.35	38.46
2	47.75	11.93	2.23	35.33	68.48	2.50	37.50	25.00	37.50
3	48.75	12.93	1.95	44.90	66.55	1.75	14.28	50.00	35.71
4	58.75	13.17	1.93	48.25	67.17	2.00	20.00	20.00	60.00
5	45.00	11.43	2.11	46.50	74.79	2.00	26.66	0.00	73.33
6	62.50	11.65	2.06	44.50	70.13	1.50	16.66	25.00	58.33
7	47.50	13.25	3.34	61.40	81.90	3.00	23.52	23.52	52.94
8	65.17	13.12	2.40	46.67	66.72	2.00	17.64	11.76	70.58
9	47.50	12.50	2.25	49.25	69.70	1.50	46.15	7.69	46.15
10	62.50	11.24	1.85	42.42	60.80	2.50	0.00	28.57	71.42
11	76.87	11.40	2.60	46.40	62.90	2.50	30.00	10.00	60.00
12	55.00	12.38	2.23	42.60	67.85	2.25	29.41	29.41	41.17
Average	56.42	12.17	2.24	45.84	67.93	2.08	25.66	20.53	53.80

for 5 separte conidia. The pathogen was identified as *Fusarium moniliformae* Sheld.

Disease intensity and characteristics of infected plants

It appears from the Table-1 that the rice variety IET 1444 produced 12.16 tillers per hill and around 50% hills showed disease symtoms. In each affected hill more than two tillers (2.24) showed bakanae symptom and the diseased tiller was more or less 20 cm taller than the healthy one. Aerial roots developed from two to three basal nodes per affected tiller. Twenty five per cent of the diseased tillers did not produce flower and were dried up, 54% of the affected tillers were infested by stem borer and 21% tillers produced small panicles.

Control

Carbendazim (Bavistin 0.3%) was sprayed in such a way that the basal part of the stem and soil at the base of the plant were covered by the spraying. Spraying was conducted after draining out of water from the field. Irrigation was introduced 3 days after spraying and carbendazim was sprayed twice at 12 days interval. First spraying was done after 15% of hills showed disease symptom. Carbendazim checked further progress of the disease in the field whereas in control plots in the same field, 57% of hills showed disease symptoms at pre-flowering stage. Sarker (1986) obtained good control of the disease by seed treatment with carbendazim.

REFERENCES

- Agarwal, V. K. ; Singh, O. V. (1974). Routine testing of crop aeds for *Fusarium moniliformae* with a selective medium. *Seed Research*, 2 : 19-22.
- Bedl, P. S. ; Dhaliwal, D. S. (1970). Studies on the seed microflora of Rice variety Taichung Native-1 with special reference to its pathological significance. *Jnl. Res., Ludhiana*. 7(4) : 600-605.
- Chetia, M. (1964). Airspora and its role in sterility in plants. I. Airspora in and around Gauhati. II. Source of airspora over paddy fields. *J. Univ. Gauhati*, 15 (2): 121-133.
- Kauraw, L. P. (1981). Effect of lengrh of treatment and fungicide concentration on seed germination and incidence of foot rot disease of rice. *International Rice Research Newsletter*, 6 (6) : 15.
- Ou, S. H. (1985). Rice Diseases, Second Edition, Commonwealth Mycological Institute, London, pp. 380.
- Parate, D. K. , Lanjewar, R. D. (1987). Studies on seed mycoflora of two rice cultivars grown in rice tract of Vidarbha. *RKV Research Journal*, 11 (1) : 47-50.
- Pavgi, M. S. ; Singh, J. (1964). Bakanae and foot rot in Uttar Pradesh, India. *Plaut Disease Reporter*, 48 : 340-342.

- Sarkar, B. B. (1986). Controlling bakanae and foot rot disease with fungicide seed treatments. *International Rice Research Newsletter*, 11 (3) : 18.
- Singh, T. K. S. (1972). Blocking the synthesis of gibberellic acid by *Fusarium moniliformae* Sheld and its effects on 'Bakanae' symptom in rice. *Oryza*, 9 (2) : 65-72.
- Vidhyasekaran, P ; Muthuswamy, G. and Subramanian, C. L. (1967). Role of seed microflora in paddy seed spoilage. I. Production of hydrolytic enzymes. *Indian Phytopathology*, 19 (4) : 333-341.

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