

BACTERIAL LEAF STREAK DISEASE OF RICE IN WEST BENGAL

Bacterial leaf streak disease of rice, first reported from the Philippines by Reinking (1918) as leaf stripe was named as leaf streak by Fang *et al.* (1957) along with identification of the bacterium. In India this was reported by Srivastava *et al.* (1967) from New Delhi followed by reports from States of Maharashtra, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, Haryana & Mysore. It has been recorded in West Bengal in 1967 (Chattopadhyay and Mukherjee, 1968) as a minor disease, never reaching a very severe proportion until recently.

Excepting the isolation of the bacterium in pure culture, characterising it following standard methods (Mukherjee, 1968) and testing its pathogenicity, all observations were made in fields mainly in the Research Farm of the University, on two high yielding varieties namely Pankaj and IET—1991.

For last two years the disease has been found to occur in large areas of this state, at a very severe proportion, and in almost all the districts of the state. Since its record it has gradually built up mainly on high yielding varieties and reached a serious proportion in 1972 and continues to be so in 1973. The disease has been observed on rice crops in all three seasons namely Aus (May-Sept), Aman (July-December) & Boro (January-May) although in a significantly high degree only in Aman.

So long the disease has been prevalent only on high yielding varieties. However for last 2 years it has been recorded also on local varieties like Dular, Patnai, Benajhupi, Jalkamini, Dhairai etc.. Reactions of some high yielding varieties to the disease under field conditions in this state along with those reported from AICRIP, India, are presented in Table 2. While only BJ-1 and Krishna have been found to be moderately resistant others like IR-8, Joya, IR-20, Vijaya, Ratna, Bala and Cauvery have been found to be susceptible. Difference in reactions of some variety in different localities has obvious reasons like possibilities of strain variation or differences in the prevalent environments.

Symptoms observed in this area are on the leaves showing water-soaked, translucent, interveinal, small spots at first, clearly seen against light. Lesions gradually enlarge into larger, water-soaked, dark-green and translucent, yellowish brown, vein-bound streaks of 0.5 to 105 mm length. On these lesions bacterial exudes of yellow colour appear in rows in the morning which later get dried and appear bead like. In later stages of disease development the streaks turn brown, coalesce sideways to form large brown blotches and sometimes resulting into blighting of leaves. Longitudinal coalescence of streaks result in very long streaks. Severely affected leaves very often split longitudinally number of times taking shredded appearance. The causal bacterium, *Xanthomonas translucens* f. sp. *oryzicola* Bradbury, from its character studied, was found to be the same as described by Goto (1964).

Table 2. Reactions of some important varieties of rice to Bacterial Leaf streak disease in West Bengal.

Varieties	Reactions at	
	Kalyani, West Bengal	AICRIP, Hyderabad
TN—1	S	S
Pankaj	HS	S
IR—8	S	HS
Jaya	S	HS
Padma	S	S
IR—20	S	S
IR—22	S	S
Jagannath	S	S
Hamsa	S	S
FJ—1	MR	R
Ratna	HS	—
Bala	S	S
Canvery	S	MR
Vijaya	S	S
Krishna	MR	MR
Padma	S	S

In another observation (Table 1) three important findings have come out *e. g. i*) with aging of the plant as a whole the disease disappears on the crop, which has been claimed to be due to higher resistance of older leaves (Shekhawat and Srivastava, 1972), *ii*) the lesions are generally found on upper half of the leaf lamina which seems to have implications in spread of the disease and *iii*) at any age of the crop the topmost leaf (1st from top) is generally free of infection which is most likely to be disease-escape for the erect position of the said leaf. Similar 1st leaf resistance has also been claimed for brown spot of rice (Ono, 1953 ; Dasgupta, 1968). The underlying mechanisms of resistance or disease-escape is yet to be ascertained.

As is evident from Table 2, under natural conditions excepting the leaves symptoms on no other parts of the plant like sheath, stem or glume have been observed. However these plant parts take infection on inoculation as is observed by Srivastava *et. al.* (1967).

Table 1. Distribution of streak lesions on leaves of susceptible varieties at three different stages of growth.

Different leaves	Infection at growth stages		
	Early tillering	Final tillering	Grain filling
1st leaf (from top) (Boot leaf in case of grain filling stage)	No lesion	No lesion	No lesion
2nd leaf (Next lower)	Low Intensity. Small (1—3 mm), water-soaked, translucent lesions; no brown-ing. All lesions on upper half of leaf.	Moderate Intensity. Developed brown lesions, side wise coalescence. All lesions on upper half.	Very Low Intensity. Deep brown, restricted lesions 90-95% of the lesions on the upper half.
3rd leaf	High Intensity. Large, developed, brown lesions, coalescent both sidewise & longitudinally. All lesions on upper half.	High Intensity, younger lesions are also coalescent. 90% of lesions on upper half.	Low intensity. Deep brown restricted lesions.
4th leaf	High intensity. Same as 3rd leaf. Sidewise coalescence resulting in brown patches & longitudinal coalescence into longitudinal splitting & shredding of leaves.	Moderate intensity. Same as Early stage except absence of shredding of leaves.	Low intensity.
5th leaf	—	—	Completely dried leaf.

Table 2. Lesions of bacterial leaf streak disease on different parts of rice plants at different growth stages.

Plant Parts	Lesions at growth stages			
	Seedling	Early tillering	Final	Flowering to grain filling
Leaves	Moderate	Very high	Moderate	Low to absent
Leaf sheathes	Nil	Nil	Nil	Nil
Stems	NA	NA	Nil	Nil
Glumes	NA	NA	NA	Nil

The appearance of the disease in this state can be accounted by the fact that the disease is seed borne (Shekhawat *et al.*, 1972). Possibilities of survival of the bacterium in infected debris, stubbles or soil, propounded (Devadath and Dath, 1970) and ruled on (Shekhawat and Srivastava, 1972) need careful examination. Being generally a leaf parasite the bacterium enters the host through stomata after spreading from one leaf to other by wind mediated mechanical contact and from upper to lower leaves by rain or dew drops. The erect 1st leaf in this connection is having an advantageous position in escaping the disease. The disease spreads very fast with torrential rains and winds, common in the Aman season in this state.

Attempts for controlling the disease by dusting lime or spraying vitavax soln. (0.15%) have been successful (Fann and Wu, 1965; Shekhawat and Srivastava, 1971). There is only an indication that field spraying with an antibiotic preparation (Streptomycin 15% + Tetracycline 1.5%) at 100mg/litre could recover a moderately infected crop. Further works in this regard is underway.

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