

EFFECT OF DIFFERENT LEVELS OF POTASSIUM AT EACH OF THE TWO
NITROGEN LEVELS ON THE INCIDENCE OF SHEATH ROT,
GROWTH AND YIELD OF RICE*

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The effect of different levels of potassium (0,50,100, 150 and 200 kg/ha) at each of the two nitrogen levels of 75 and 125 kg/ha and *Sarocladium oryzae* inoculation on growth and yield was studied in rice variety IR. 50. The disease incidence increased with increase in nitrogen level but decreased with increase in potassium application. Grain and straw yields, tiller height, length of the panicle, and 1000 grain weight were found to increase with increase in application of potassium and nitrogen. Compared to the healthy plants the inoculated ones showed considerable reduction in height of the tillers, length of the panicle and 1000 grain weight. But the reduction was minimised with increased application of potassium at both the levels of nitrogen.

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Sheath rot disease of rice caused by the fungus *Sarocladium oryzae* (Sawada) Gam. has become a serious disease in India. In Tamil Nadu, yield losses upto 57 per cent have been recorded by Mohan (1980) under Coimbatore condition. It is true with rice crop that nutritional imbalance weakens the resistance to many diseases (Prasad and Ragunathan, 1972.). Troildenier (1969) has recorded that increased application of potassium reduced the damage by the diseases. In this study, the effect of different levels of potassium at each of the two levels of nitrogen on disease incidence, growth and yield of rice was studied.

MATERIALS AND METHODS

A field trial was conducted at Annamalai University, Experimental Farm during late Thaladi season with IR. 50 rice variety. The plots were laid out in randomised block design,

with four replications. The plot size was 5m x 5m with a spacing of 15 x 15 cm. Different levels of potassium viz., 0,50,100, 150 and 200 kg/ha with a common dose of phosphorus at the rate of 62.5 kg/ha were applied basally. The nitrogen at the rate of 75 and 125 kg/ha was applied in two equal split doses, one as basal and other at 25 days after transplanting. The leaf sheaths of boot leaves were inoculated by inserting pieces of mycelium and wrapped with thin layer of wet cotton for lesion development (Tasugi and Ikeda, 1956). Observations were made periodically and the disease incidence and yield components were recorded.

RESULTS AND DISCUSSION

The sheath rot incidence in rice increased significantly from 44.95 per cent at 75 kg N/ha to 49.64 per cent at 125 kg N/ha (Table-1). The

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Table 1. Effect of graded levels of potassium at each of the two N levels on the incidence of sheath rot and yield of rice variety IR. 50.

Treatments	Disease incidence	Incidence Per cent decrease over control	Grain yield		Straw yield	
			Grain yield kg/plot	Per cent increase over control	Straw yield kg/plot	Per cent increase over control
N level : 75 kg/ha						
0	44.95	--	4.00		6.05	
50	37.28	17.06	4.32	8.00	6.48	7.02
100	25.25	43.16	4.63	15.63	6.98	15.29
150	16.95	62.29	4.78	19.38	6.93	14.46
200	11.25	74.97	5.13	28.13	7.35	21.15
N level : 125 kg/ha						
0	49.64	--	4.43		6.83	
50	41.85	15.69	4.75	7.34	7.15	4.76
100	30.72	38.11	4.90	10.75	7.68	12.45
150	21.35	57.00	5.35	20.90	8.48	24.42
200	15.66	68.45	5.65	27.68	8.00	17.22

CD (P = 0.01) = 2.54

NS

NS

NS : Not Significant

increase in sheath rot incidence with increase in nitrogen fertilization was also reported by Misra and Mathur (1983). The disease incidence was variably decreased with increase in potassium application at both the levels of nitrogen. Maximum reduction of 74.94 and 68.45 per cent was observed at 200 kg/ha with 75 and 125 kg N/ha levels respectively over control. The reduced disease incidence in potassium treated plants might be due to (a) the effect of potassium directly on the pathogen (Habibullah and Prasad, 1976), (b) its effect on the host, altering its physiology and biochemistry (Ramamamy and Prasad, 1974), (c) its ameliorative effect of the adversaries of

high nitrogen fertilization (Isumunadji, 1973), and (d) by offering and or increasing the anatomical resistance of host (Matsubayashi *et al.*, 1963).

Increase in potassium levels from 0 to 200 kg/ha at each of the two nitrogen levels, increased the grain yield and straw yield, due to concomitant reduction in disease incidence. Maximum increase of 28.13 percent in grain yield was pronounced at 125 kg N/ha with 200 kg K/ha while straw yield was more pronounced at 125 kg N with 150 kg K/ha.

It was observed that inoculation with *S. oryzae* decreased the height of the tiller, length of the panicle and 1000 grain weight to the maximum of

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Table 2. Effect of graded levels of potassium at each of the two N levels on the incidence of sheath rot on height of the tillers, length of the panicle and 1000 grain weight on rice variety IR-50.

Treatments Levels of K kg/ha	Height of the tiller (cm)		Per cent decrease due to infection		Length of the panicle (cm)		Per cent decrease due to infection		Mean 1000 grain weight (g)		Per cent decrease due to infection	
	Healthy inoculated	inoculated	Healthy	inoculated	Healthy	inoculated	Healthy	inoculated	Healthy	inoculated	Healthy	inoculated
N levels : 75 kg/ha												
0	70.45	66.68	5.35	20.80	19.05	8.41	19.53	18.57	4.92			
50	71.23	67.90	4.67	21.10	19.80	6.16	19.70	18.86	4.25			
100	72.38	69.48	4.00	21.95	20.98	4.41	20.05	19.30	3.74			
150	74.65	71.85	3.74	22.40	21.50	4.01	20.65	20.00	3.15			
200	75.50	72.78	3.60	22.90	22.05	3.70	21.00	20.40	2.85			
N levels : 125 kg/ha												
0	71.20	67.20	5.60	21.30	19.65	7.75	19.98	18.83	6.74			
50	72.73	69.02	5.10	21.75	20.35	6.44	20.28	19.25	5.10			
100	74.60	71.39	4.30	22.80	21.76	4.56	20.65	19.68	4.70			
150	76.48	73.45	3.96	23.15	22.24	3.93	21.20	20.40	3.77			
200	76.90	73.98	3.80	23.35	22.45	3.85	21.55	20.80	3.50			

Height of the tillers : Treatments : N.S.
 Length of the panicle : Treatments : N.S.
 1000 grain weight : Treatments : N.S.
 N.S. - Not Significant

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5.60, 8.41 and 5.74 per cent at zero level of potassium respectively over healthy (Table 2). Interestingly, it was found that the percentage of decrease due to inoculation was less marked in plants applied with high levels than in low potassium applied plants. This may be due to the increased vigour of the plants which received high levels of potassium.

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