

Effect of seed priming, potassium and anti-transpirant on dry-seeded rainfed *ahu* rice (*Oryza sativa*)

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ABSTRACT

A field trial was conducted during 1992 and 1993 to study the effect of seed priming, potassium and anti-transpirant on performance of dry-seeded, rainfed *ahu* rice (*Oryza sativa* L.). The grain yield and filled grains/panicle increased significantly owing to seed priming with 4% KCl and potassium application @ 60 kg/ha. Significant effect of paraquat as anti-transpirant on grain yield was observed only in 1992, as drought spell prevailed during that year.

The rainfed rice (*Oryza sativa* L.) throughout the world suffers from a complex array of environmental factors—collectively referred drought (O' Toole and Chang, 1976). In Assam, rainfed *ahu* rice often suffers from intermittent drought due to erratic distribution of pre-monsoon showers. Under such a situation, potassium may have great role in plant water relation besides its role as plant nutrient. Application of anti-transpirant may also be useful. Therefore the present investigation was undertaken to study the efficacy of potassium through seed priming and basal application along with application of paraquat as anti-transpirant.

MATERIALS AND METHODS

The experiment was conducted during the summer season of 1992 and 1993 at the Regional Agricultural Research Station, Karimganj. The crop was sown on 8 March in both the years and was harvested on 27 June 1992 and 16 June 1993. The soil was clay loam with pH 5.8 and available

phosphorus and potassium were 22.4 and 145.6 kg/ha respectively, with 1.07% organic carbon. Twelve treatment combinations comprising seed priming (without and with 4% KCl solution), potassium application (0, 30 and 60 kg K₂O/ha) and spraying of paraquat (no anti-transpirant and anti-transpirant application) were tested in randomized block design, replicated thrice. Paraquat was applied @ 50 ppm at maximum tillering stage. Seed priming was done by soaking the seeds in 4% KCl solution for 24 hr followed by drying under shade. Potassium was applied in 2 equal split doses, at 20 and 45 days after germination. The seed of 'Cauvery' rice was sown @ 75 kg/ha in lines 20 cm apart. Nitrogen and phosphorus were applied at 40 and 20 kg/ha respectively.

RESULTS AND DISCUSSION

Effect of seed priming

Priming with 4% KCl solution significantly increased the grain yield (Table 1). It

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may be attributed to significantly more filled grains/panicle as a result of seed priming. Effective tiller number, shoot and root lengths were significantly increased during 1992. Potassium supplied through seed priming perhaps played its role in plant water relation during 1992 when there was less rainy days (42 days) compared to 1993 (52 days). Effect of seed priming may be attributed to several physico-chemical changes in plants, greater hydration of colloids, increase in bound water, intensity of respiration and photosynthesis, and in hydrophylic colloids, and lower water deficits (Dawson, 1965). Borgohain (1988) reported that seed priming by KCl could increase the grain yield of rainfed direct-seeded rice.

Effect of K

Fertilization of crop with 60 kg K_2O /ha resulted in significantly higher grain yield over the control, but was at par with 30 kg K_2O /ha (Table 1). In 1993, the grain yield due to 30 kg K_2O /ha was on a par with the control. Number of filled grains/panicle was increased significantly due to K application. The root length was also significantly increased with increase in K application from 0 to 60 kg/ha. Scherer *et al.* (1983) reported that growth rate was influenced by application of K owing to water-retention capacity of plant. Ismunadji *et al.* (1977) reported that rice yield increased considerably with K. The significant effect of potassium on root length may be due to the more rainless days which encouraged deeper penetration of root for water during 1992.

Interaction effect

The interaction of priming and K was found significant in 1992 (Table 2). The highest grain yield was recorded with seed priming and application of 60 kg K_2O /ha.

Table 2. Grain yield (q/ha) as influenced by interaction of priming (P) and potassium (K) in 1992

Priming (P)	K			Mean
	K_0	K_1	K_2	
P_0	5.17	8.16	7.97	7.10
P_1	6.48	7.76	8.57	7.60
Mean	5.83	7.96	8.27	
CD (P = 0.05) for (P x K)	0.798			

P_0 , Without priming; P_1 , with KCl; K_0 , no K; K_1 , 30 kg K_2O /ha; K_2 , 60 kg K_2O /ha

The significant interaction of priming and K in 1992 may be due to a drought spell of 11 days during early tillering stage and more rainless days.

Effect of paraquat

Effect of anti-transpirant application on grain yield was significant in 1992, perhaps because of drought spells. Borgohain (1988) also reported beneficial effect of paraquat application as anti-transpirant in rice crop.

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