

K SUPPLEMENTATION FOR RECLAMATION OF SALINITY AND BETTER GROWTH AND YIELD OF RICE

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Extended Summary

An experiment was conducted under pot-culture at net house of the department of Genetics and Plant Breeding, Sher-e-Bangla Agricultural University, Dhaka-107 to study the effect of supplemental K for reclamation of salinity and improve the growth and nutrients content of two selected rice varieties. The experiment was completed during the boro season (December-June) of the year 2008-09 using 4 salinity levels (0, 4, 8 and 12 dS m⁻¹ and 4 supplemental K levels (80, 100, 120, 140 kg K₂O ha⁻¹).

To study the effect of K supplementation for reclamation of salinity and better growth and yield of rice one standard check salt tolerant cultivar Pokkali and one popular variety BRRI dhan 29 (BR 29), developed by Bangladesh Rice Research Institute (BRRI) were selected. The effect of different salinity levels on plant height, root and shoot dry weight, total dry matter and grain yield of the two rice varieties significantly decreased with increasing the salinity levels. On the other hand, the effect of different levels of supplemental K on the plant height, root and shoot dry weights total dry matter and grain yield of the two rice varieties significantly increased with increasing the K levels. The plant height, root and shoot dry weights, total dry matter and grain yield of the two rice varieties were significant due to the interaction effect of different salinity and K levels. All of the growth parameters except grain yield of both the rice varieties increased progressively at all salinity levels with increasing the supplemental K levels except the highest level of K (140 kg K₂O ha⁻¹) at 12 dSm⁻¹ level of salinity; where they slightly decreased. In case of grain yield, the variety BR29 did not give grain yield at 12 dSm⁻¹ level of salinity.

The effect of supplemental K on the content of N, P, K, Na, Ca, Mg, and Na/K and Na/Ca ratio in shoots of the two selected rice varieties were significant under over all the salinity levels. Based on the results, the P, K, Ca and Mg content in shoots of both the rice varieties were increased; and N, Na content and the ratio of Na/K, Na/Ca decreased with increasing the K levels under over all the salinity levels. The interaction effect of varieties and salinity levels in relation to N, P, Na, Ca, Mg content and the value of the ratio Na/K, Na/Ca in shoots of the two selected rice varieties significantly increased and K content significantly decreased under over all the Ca levels. The interaction effect between salinity and Ca levels in relation to P, K, Ca, Mg content in shoots of rice varieties (mean)

increased significantly; and N, Na content and the value of the ratio Na/K, Na/Ca in shoots decreased significantly at all the salinity levels.

Based on the results of the experiment, the following conclusions may be made-

- Salinity significantly decreased the growth parameter such as plant height, root and shoot dry weight, total dry matter and grain yield of the selected rice varieties, but the above parameters increased significantly with increasing the K levels under different salinity levels
- Salinity increased significantly the content of N, P, Na, Ca, Mg and the values of the ratios Na/K, Na/Ca in shoots of the two selected rice varieties and K content significantly decreased under over all the K levels
- The P, K, Ca and Mg content in shoots of both the rice varieties were increased and the content of N, Na and Na/K, Na/Ca ratio values in shoots of the two rice varieties decreased significantly with increasing the K levels under over all the salinity levels
- Maintaining a relatively high K concentration and lower Na/K ratio in the shoots of rice acts an important role in regulation monovalent cationic osmoticum and physiological function of K
- Taking into account all information, reclamation of salinity may be achieved through K supplementation in saline areas for increasing cultivable lands in particular for rice production.