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NITROGEN AND PHOSPHORUS REQUIREMENT FOR MUSTARD CROP UNDER IRRIGATION WITH SALINE WATER

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Irrigation with saline waters require judicious use of fertilizers for better crop production. The beneficial effects of N and P on millet and sorghum crops yield under saline conditions have been reported by Ravikovitch and Yoles (1 71) and Indulkar and More (1985). Contrary to this Khalil et al. (1967) and Bernstein et al. (1974) observed increased sensitivity of corn, oat and barley crops by nitrogen and phosphorus application. Keeping in view the contradictory results the present investigation was undertaken and results pertaining to N and P requirement of mustard crop under saline irrigations are reported.

A field experiment was carried out during 1982-83 and 1983-84 at the Research Farm, R.B.S. College, Agra. The experimental soil was sandy loam in texture (16% clay, 14% silt, 70% sand) with 1.13 cm/h hydraulic conductivity. The surface soil (0-15 cm) had ECe 2.8 dS/m pH 8.6, ESP 16, and SAR 15. The available N, P and K status were 242, 18 and 112 kg/ha, respectively. Micro-plots of 2 5 m X 2.5 m size separated by polythene sheets upto 90 cm depth were used in experimentation. Three, levels of salinity of irrigation water, control (EC 2), EC 6 and EC 12 dS/m formed the main plot and combination of three levels of nitrogen (30, 60 and 90 kg/ha) and three levels of phosphorus (15, 30 and 45 Kg P_2O_5/ha) formed sub-plots of split plot design. The treatments were replicated thrice. The ratio of Na:Mg:Ca was kept as 60:25:15 whereas for $Cl:So_4:HCo_3$ as 2:1:1. The SAR of irrigation water varied from 5 to 15 and RSC was absent. Mustard (T-59) was sown with a row spacing of 30 cm. Three irrigations, each of 6 cm depth were applied including pre-sowing irrigation. Half of nitrogen as urea and full dose of phosphorus as superphosphate were applied, basally and remaining half dose of nitrogen was top dressed about a month after sowing. The plant samples were collected at pod formation stage (about 100-110 days after sowing) and analysed for N and P contents. The post-harvest soil samples were also collected from 0-15, 15-30 and 30-60 cm depths and analysed for EC, pH, water soluble cations and anions.

Irrigation with saline water (EC 12 dS/m) produced as good yield as control (EC 2 dS/m). Application of phosphorus also did not influence the grain yield signficantly in both the years (Table 1). Increasing nitrogen levels caused significant increase in grain and dry matter yield. On an average, application of 60 and 90 kg N/ha resulted in 37 and 80 per cent more grain over 30 kg N (7.55 q/ha). The observations for growth characters revealed that increase in grain yield with high nitrogen was mainly

The soil salinity build up increased with increasing salinity of water and maximum build up was recorded at surface while pH decreased with increasing salinity in both the years (Table 2). Contents of water soluble cations (Ca^{++}, Mg^{++}, Na^{+}) and anions (Cl^{-}, SO_4^{-}) increased with increasing ECe. The amounts of K^{+}, CO_3^{--}, HCO_3^{-} did not change much with salinity. The surface (0-15 cm) ECe increased about 2 times to EC of irrigation water in both the years. The soil SAR was also found to increase with increase in SAR of irrigation water.

The irrigation upto water salinity EC 12 dS/m did not affect the mustard yield but appreciable salt accumulation was there for salt ions to interact with fertilizers. The non-significant effect of interaction of EC with N and P are in conformity with the findings of Bernstein et al. (1974) that salinity per se rarely causes or aggravates nutrient deficiency. Abrol (1974) interpreted that fertilization under saline conditions may follow the recommendations for crops under non-saline condition whenever the salinity is not high as to inhibit the response of its direct limiting effect on growth.

It may, therefore, be inferred that for mustard crop irrigated with EC 12 dS/m water the fertilizer (N and P) requirement would be equivalent to low salinity (EC 2 dS/m) water.

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