

**Performance of mustard genotypes in saline water irrigation in semi arid zone of Western Uttar Pradesh**

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The mustard (*Brassica juncea*L.) is an important rabi oilseed crop grown in across the Northern plains of India. Uttar Pradesh is the second largest mustard producing state in the country. Saline soil is a serious problem which affects the yield of agricultural crops by decreasing both the growth and photosynthesis. It was found that production of dry matter is severely reduced with salinity in glycophytes, but is still maintained in halophytes. Halophytes plants respond to salinity by accumulating Na<sup>+</sup> and Cl<sup>-</sup>, particularly in the older leaves. Excessive salts in soil adversely affect the crop growth and yield (Munns and Tester, 2008). Salinity is also considered as the major abiotic stress that restricts the economic and efficient utilization of available land resources by affecting adverse soil fertility and crop productivity and quality. The present study was carried out using various genotypes for saline water irrigation in of western Uttar Pradesh.

The experiment was conducted at the experimental farm of AICRP-Management of Salt Affected Soils and Use of Saline Water in Agriculture, Raja Balwant Singh College, Bichpuri, Agra during 2012-13 in micro-plots.

The soil profile (0-90 cm) had an initial pH 8.5, ECe 1.9 dS m<sup>-1</sup>, CEC 8.6-14.7 %, CaCO<sub>3</sub> < 1%, organic carbon < 0.5%. The land of experimental site is well drained and fairly permeable and water table always remained below 13.8 m during the study period. The plots of 2.5 m x 2.5 m size were lined with polythene sheets up to the depth of 90 cm. The average rainfall in the area is 650 mm with more than 75% occurring during rainy season. The ten newly evolved mustard genotypes viz., CS-700-3-3-2-6, TM-196, Kranti(NC), CS-13000-3-2-2-5-2, CS-2009-105, CS-54(NC), CS-2800-1-2-3-5-1, RH-749 (filler), RH-406 (filler) and DRMR-1531(fillers) were tested along with irrigation water salinity of 12 dSm<sup>-1</sup>. Sowing was done during last week of October. The saline water was prepared synthetically by dissolving desired amount of NaCl, Na<sub>2</sub>SO<sub>4</sub>, CaCl<sub>2</sub> and MgSO<sub>4</sub> salts and SARI was kept 10 (mmol/l)<sup>1/2</sup>. Tap water was used for normal treatment of salinity. A uniform dose of 120 kg N, 60 Kg P<sub>2</sub>O<sub>5</sub> and 60 kg K<sub>2</sub>O ha<sup>-1</sup> through urea, diammonium phosphate and muriate of potash, respectively was applied to each treatment.

Table 1: Yield and yield attributing characters of mustard as affected by saline water irrigation

Genotype	Germination (%)	Days of 50% Flowering	Plant height (cm)	No. of Primary Branches	No. of Secondary Branches	No. of Siliqua per Plant	Grain yield (q ha <sup>-1</sup> )
CS 8000-1-2-8	73.8	62.0	169.9	5.3	5.5	258.8	11.41
CS 1100-1-2-1-4	72.5	60.6	154.9	5.4	8.7	278.0	10.45
CS 2200-3-4	72.5	65.3	154.3	6.4	7.9	259.6	10.34
CS 2009-105	64.2	67.7	167.3	5.4	6.4	269.4	12.64
CS 2100-3-6	65.7	65.7	159.9	6.2	8.9	288.5	10.96
CS 9000-1-2-2-1-2	75.8	64.7	185.4	6.5	9.9	272.3	12.69
CS 13000-3-1-1-4-2	66.3	67.0	167.4	4.4	5.6	235.0	10.51
CS 2800-1-3-1-1	74.5	60.7	179.2	6.2	7.9	279.8	12.80
CS 13000-3-1-1-2-1	74.6	64.0	174.5	4.9	6.5	272.1	10.05
CS 15000-1-2-2-2-1	68.5	62.0	164.8	5.2	4.5	228.8	12.16
CS -54(Check)	73.3	63.3	163.1	5.0	5.3	263.5	11.25
Kranti (Check)	75.3	62.7	174.0	5.8	6.7	262.2	10.98
CD at 5%	NS	NS	14.2	NS	3.2	50.1	1.5

The irrigations were applied light and frequent to keep the salt distribution uniform in whole plot soil. All the agronomic practices were adopted for growing good crop. The observations were recorded for selected five plants of each genotype viz. germination percent, plant height, primary branches and secondary branches per plant, siliqua per plant, seed yield.

The data on yield and yield attributes are presented in Table 1. It is evident that germination percent, days of 50% flowering and primary branches and secondary branches per plant did not differ due to various genotypes. But plant height, siliqua plant<sup>-1</sup> and seed yield were significantly affected by genotypes. The significantly higher yield was produced in genotype CS-700-3-3-2-6 (14.77 q ha<sup>-1</sup>), and minimum in TM-196 (11.90 q ha<sup>-1</sup>). The rest of the genotypes were statistically at par with respect to seed production. Similar results were observed by Bhudyal and Chauhan (2011), Tripathi and Tripathi (2003) and Chauhan (2015) in mustard crop.

The data on soil salinity build up at sowing and at harvest are present in Table 2. The salinity was higher in upper layers at sowing time. The concentration of soluble salts further increased at harvest from 7.1 to 10.8 dSm<sup>-1</sup> with

irrigation water. There was a decline trend in soluble salt concentration with depth at both stages of crop growth.

Table 2: Electrical conductivity in pre sowing and post harvest soil

Soil depth (cm)	At sowing	At harvest
0-15	7.1	10.4
15-30	5.5	8.1
30-60	4.3	7.1
60-90	3.5	6.2

The data on soil salinity build up at sowing and harvests are present in Table 2. The salinity was higher in upper layers at sowing time. The concentration of soluble salts further increased at harvest from 7.1 to 10.8 dS m<sup>-1</sup> with irrigation water. There was a decline trend in soluble salt concentration with depth at both stages of crop growth.

From the results, it may be concluded that the significantly higher grain yield was produced in genotype CS-700-3-3-2-6 and minimum in TM-196. The rest of genotype s produced yield between 11.41 to 10.05 q ha<sup>-1</sup> under saline water irrigation in Western Uttar Pradesh.

## REFERENCES

- Bhudyal and Chauhan, S.K. (2011) Effect of different fertilizer levels on mustard (*Brassica campestris*) varieties under saline irrigation. *Annals Agriculture Research New Series* 32 : (1&2): 61-62.
- Chauhan, S.K. (2015) Effect of saline water irrigation on different mustard genotype TECHNOFAME- A journal of multidisciplinary advance research **4**: 99-100
- Munns, R., Tester, M.(2008) Mechanism of salinity tolerance. *Annual Reviews of Plant Physiology* **59**: 651-681.
- Tripathi, A.K and Tripathi, H.N. (2003) Influence of N levels on growth and quality of Indian mustard (*Brassica juncea*) cultivar. *Farm Science Journal* **12**: 171-172.