

Research Paper :

Relative salinity tolerance of chick pea (*Cicer arietinum*) genotypes

K.B. POLARA, K.B. PARMAR, S.M. DADHANIA, N.K. TIMBADIA AND N.B. BABARIA

Accepted : January, 2010

See end of the article for authors' affiliations

Correspondence to :

K.B. POLARA

Department of
Agricultural Chemistry
and Soil Science,
Junagadh Agricultural
University, JUNAGADH
(GUJARAT) INDIA

ABSTRACT

A lysimeter experiment was conducted during *Rabi* season of 2004 and 2005 to evaluate five varieties of chick pea with five salinity levels (EC_{iw} -0.5, 2.0, 4.0, 6.0 and 8.0 dSm^{-1}) at Junagadh Agricultural University, Junagadh. The grain and fodder yields decreased significantly with an increasing in the salinity of irrigation water during both the year as well as in pooled. Among the varieties of chick pea, variety GG-4 gave significantly the highest grain and fodder yield in all the salinity levels of irrigation water. The variety GG-4 recorded highest mean grain yield (17.38 g), mean salinity index (71.2%), minimum Na/K ratio (0.34) in fodder and minimum yield reduction (46.2) at high salinity levels.

Key words : Chick pea Varieties, Saline water irrigation, Yields

The chick pea being an important pulse crop in Gujarat is going out of cultivation particularly in *Bhal* and *Ghed* area of coastal belt where soil salinity and poor groundwater are critical issues for cultivation of crops. Therefore, there was need to identify the salinity tolerance variety of chick pea. With this in view the present experiment was conducted.

MATERIALS AND METHODS

A lysimeter (45cm diameter and 75cm height) experiment was conducted (2004 and 2005) with five levels of saline water (EC_{iw} S_1 -0.5, S_2 -2.0, S_3 -4.0, S_4 -6.0 and S_5 -8.0 dSm^{-1}) and five genotypes (V_1 -GG-1, V_2 -GG-2, V_3 -GG-3, V_4 -Kak-2 and V_5 -Dahod yellow) of chick pea in factorial CRD with three replication at JAU, Junagadh. The saline water of 2.0, 4.0, 6.0 and 8.0 dSm^{-1} were prepared by dissolving sulphate and chloride of Na, Mg and Ca at 15:2:1 and $Cl:SO_4$ at 2:1 ratio. Four syntax drums of 500 liter capacity each were used for irrigating of chick pea crop. The experiments soil was clayey in texture, having $EC_{2.5}$ 0.3 dSm^{-1} , pH 7.9, $CaCO_3$ 85 gkg^{-1} and O.C. 6.6 gkg^{-1} . The RD of N @ 20 $mgkg^{-1}$ and P_2O_5 @ 40 $mgkg^{-1}$ was applied in each pot in form of urea and DAP. Ten seeds of chick pea were sown, which were thinned to upto five plants. At maturity, crop was harvested and grain and fodder samples were analyzed for Na and K content as well as soil EC and pH were also determined by adopting standard procedure (Jackson, 1973)

RESULTS AND DISCUSSION

The grain and fodder yields were decreased

significantly with an increase in EC_{iw} from 2.0 to 8.0 dSm^{-1} during in individual year as well as in pooled. (Table 1). The average grain yield of 18.0 and 16.08 $g\ pot^{-1}$ obtained at EC_{iw} 0.5 (control) and 2.0 dSm^{-1} , respectively and which were also significantly different. The average grain yield decreased from 11.1 to 52.0 per cent with an increasing in the EC_{iw} from 0.5 to 8.0 dSm^{-1} . Almost similar trend was also observed in fodder yield of chick pea. The yields of chick pea was probably decreased due to increased soil EC from 0.48 to 1.66 dSm^{-1} as a result of salt accumulation through saline irrigation water in medium black soil. Irrespective of salinity (EC_{iw}), the varieties were also performed significant effect on grain and fodder yield during in individual year as well as in pooled. The variety GG-4 produced highest grain (16.90, 20.44 and 18.67 $g\ pot^{-1}$) and fodder (18.78, 22.40 and 20.59 $g\ pot^{-1}$) yields during 2004, 2005 and pooled, respectively. Similar result were also reported by Khandelwal *et al.* (1990).

In case of interaction, the variety GG-4 gave significantly the highest grain (24.25 $g\ pot^{-1}$) yield at control i.e. 0.5 dSm^{-1} and it was minimum with GG-1 at S_5 (EC_{iw}) level (Table 2). In general, variety GG-4 showed better performance at all salinity levels (EC_{iw}) as compared to remaining varieties.

The soil $EC_{2.5}$ after harvest of crop was significantly increased with increase in salinity levels (Table 1). The soil salinity ($EC_{2.5}$) build up in root zone increased with an increase in salinity of irrigation water ranging from 0.48 to 1.66 dSm^{-1} . but the reverse trend was observed in case of soil pH.

The results further showed that the variety GG-4