RESEARCH PAPER

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Inducting salt tolerance and its effect on growth and germination of maize (*Zea mays* L.) genotypes

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Maize (*Zea mays* L.) is one of the most important cereal crop of worlds agricultural economy. It ranks third in production in the world being suppressed only by rice and wheat. It is proudly called as 'Queen of Cereals' and 'King of Fodder' and miracle crop. It is called as a moderately sensitive to salinity and considered as the most salt sensitive of the cereals. Hence, the evaluation of NaCl tolerance was considered of interest to determine the possibility of using these germplasms in corn tolerance improvement. The present work was conducted to determine whether salt tolerance could be induced in maize at germination stage. All seed samples were used for further experiments. At the end of work tolerant, moderately tolerant and sensitive genotype were found for salt stress.

Key words : Germination, Maize, Salinity, Salt tolerance

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INTRODUCTION

The problem of salinity becomes more and more serious in the world limiting crop production (Munns, 2002), more non productive land and affecting 20% of agricultural cultivated land and 50 % of the crop plant through out world suffers from excess salinity or salt stressed (Szabolcs, 1994; Flowers and Yeo, 1995). High salt concentrations in soils negatively affect corn growth and consequently produce a large drop in yield (Ashraf and Mcneilly, 1989).

The effect of saline stress on corn has been well studied. It has been shown to affect water relations (Cramer *et al.,* 1992), permeability of root cortex (Hasegawa *et al.*, 2000) and many physiological parameters *viz*., cell wall rheological properties (Cramer *et al.,* 1992), leaf bioelectrical activity and ionic balance (Ashraf and Mcneilly, 1989; Shobala *et al.,* 1998).

It was also reported that high concentration of soluble salts in soil and salt stress unfortunately affect plant growth and productivity during all developmental stages. Greenway and Munns (1980) and Khan (1993) reported that high concentration of salts cause reduction in germination percentage and delay in germination of seeds of many species. Epstein *et al.* (1980) reported that salinity decreases seed germination, retards plant development and reduces crop yield. Shokohifard *et al.* (1989) reported that salt stress negatively affects seed germination either through osmotically or through the accumulation of Na and Cl ions.

The physical parameter studied has no much correlation to that of salinity (Pesqueira *et al.*,2003) and therefore change in plant growth or yield compared with a control is the most reliable indicator of the tolerance to the saline stress (Cramer *et al.,* 1992). Most of reports are based on experiments with NaCl and hence studies to examine salinity effects on the initial growth of plants have usually carried out with individual salt (especially NaCl) (Tavili and Biniaz, 2009; Grant, 2003) but little information exits concerning the effect of other salt on the seed germination.

In present study the objective is to screen the maize genotype, a crop known for its highest salt sensitivity (Ashraf, 1994; Fortmeier and Schubert, 1995) by studying the effect of salt (especially NaCl) on seed germination and growth.

RESEARCH METHODOLOGY

Zea mays L. belongs to graminae family and third