African Journal of Biotechnology Vol. 5 (10), pp. 855-861, 16 May 2006
Available online at http://www.academicjournals.org/AJB
ISSN 1684–5315 © 2006 Academic Journals

*Full Length Research Paper*

# Responses of three tomato cultivars to sea water salinity 1. Effect of salinity on the seedling growth

**Hajer, A. S., Malibari, A. A., Al-Zahrani, H. S.* and Almaghrabi, O.A.**

Department of Biological Sciences, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia.

Accepted 20 February, 2006

**The effect of sea water salinity (1500, 2500 and 3500 ppm) on the growth of tomato (*Lycopersicon esculentum*) cultivars (Trust, Grace and Plitz) was studied. The sea water salinity delayed seed germination and reduced germination percentage especially with increasing salinity level. Chlorophyll b content was higher than chlorophyll a, and both of them decreased with increasing salinity. The seedling height increased with time but decreased with increasing salinity in all cultivars. Seedlings fresh and dry shoot and root weights were decreased with increasing salinity. The growth of stem, leave and root after over 80 days of exposure to sea water salinity was affected by sea water dilution especially those of trust and grace cultivars. The grace cultivar was less affected by sea water salinity on the germination stage, while the plitz cultivar has good tolerant to sea water salinity for prolonged period.**

**Key words:** Tomato cultivars, *Lycopersicon esculentum*, salinity, germination, chlorophyll and growth.

## INTRODUCTION

It is well documented that the amount and quality of irrigation water available in many of the arid and semi-arid regions of the world are the main limiting factors to the extension of agriculture (Beck, 1984; Munns, 2002). Saline-sodic irrigation water, coupled with the low annual rainfall and high evaporation and transpiration in the arid and semi-arid regions, have resulted in accumulation of soluble salts in the soil solution and of cations (especially sodium ions) on exchange sites, which can alter the structure and, consequently, affect the soil hydraulic conductivity (Sameni and Morshedi, 2000).

The build up of sodium salts in irrigated regions is of particular concern since 14% of cultivated land that is irrigated supplies approximately half of the world's food (Christiansen, 1982), This has prompted researchers to study the impact of salinity on plant crops. Several studies showed external signs of salt toxicity due to irrigation with saline water such as sclerosis, leaf burning and poor vegetative growth (Gornat et al., 1973; Flowers et al., 1977; Adler and Wilcor, 1987).

Since the tomato (*Lycopersicon esculentum*) is a major food plant, and it is moderately sensitive to salinity (Ayers and Westcot, 1985), extensive research is necessary to develop growing conditions in moderate salinity to produce good vegetative growth. The proposed experiments were performed in soil-less culture under a greenhouse setting. The effect of different concentrations of salinity was determined by growing test plants irrigated with fertilizer mix and various concentrations of diluted sea water. This procedure was performed on three tomato cultivars to determine which of these cultivars have the greatest tolerance to salinity.

The effect of salinity concentration on plant growth has been studied in different tomato cultivars. Adler and Wilcor (1987) found that salinity adversely affected the vegetative growth of the tomato, and it reduced plant length and dry weight. Salinity also reduced the fresh and dry shoot and root weight of tomato (Shannon et al., 1987). Increased salinity over 4000 ppm led to reduction in dry weight, leaf area, plant stem, and roots of tomatoes (Omar et al., 1982). The reduction of dry weights due to increased salinity may be a result of a combination of osmotic and specific ion effects of Cl and Na (Al-Rwahy, 1989). The leaf and stem dry weights of tomato were also reduced significantly in plants irrigated with saline nutrient solution in contrast with control plants (Satti and Al-Yahyai, 1995). Byari and Almaghrabi (1991) found that

*Corresponding authors E-mail: hmobarak2002@yahoo.com.