

The Response of Cotton Cultivars to Salinity

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Introduction

Most crop plants suffer a decline in growth when exposed to saline conditions although cotton is classified as a salt-tolerant crop. Although there has been extensive study of the effect of salinity on cotton at germination and during seedling growth there is less information on the effects of salt on the overall growth of the cotton plant. The effect of salinity on yield has been considered but there is limited information on the effect on fibre quality. Several cultivars are being studied to examine the effects of different salts on various stages of development of the cotton plant.

Methods

Preliminary experiments on the effects of different salts on the germination of cotton seeds have been carried out using a modification of a method described by Gladish and Rost (1993). The inner walls of 100 mL glass beakers were lined with Whatman No 1 paper and the beakers filled with vermiculite. Salt solution was added to the vermiculite until there was liquid reaching about 1 cm from the bottom of the beaker. Cotton seeds sterilized by soaking for 15 min in dilute bleach, followed by washing well with tap water, were placed between the beaker wall and the lining paper. The beakers were wrapped in dark plastic, weighted with a glass marble and placed in a water bath at 25°C. Radicle growth was marked regularly on the outside of the beaker until the radicle reached the bottom of the beaker. Radicle length at various times was measured.

Results

Germination of four cotton cultivars, Sicala V2, Siokra V15, Pima S1 and Pima S7 from CSIRO Plant Industry (Narrabri) were examined in the presence of 0.1% to 2% (1.5 to 34 dS/m) solutions of NaCl, KCl and CaCl₂. For all four cultivars examined, increasing levels of NaCl were much more inhibitory than similar levels of KCl, which was slightly more inhibitory than CaCl₂. The Pima S7 cultivar was more tolerant of high salt concentrations than Pima S1 and some Pima S7 seeds germinated at the highest (2%) NaCl concentration. Siokra V15 was more tolerant than Sicala V2, and most seeds of these cultivars eventually germinated at 2% NaCl. In all cultivars initiation of germination was delayed at higher salt concentrations and the rate of radicle development after germination was reduced at higher salt concentrations.

Gladish D K and Rost T L (1993) *Env Exp Bot* **33**, 243-258

This work is supported by an Australian Postgraduate Award (to NB) and the CRCSCP (for preliminary studies)

