EFFECT OF BRACKISH GROUNDWATER ON THE PRODUCTIVITY OF COARSE AND FINE TEXTURED SOILS IN RELATION TO KINETICS OF STEADY-STATE

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ABSTRACT

Concrete pipe lysimeters study was conducted to assess the period approaching steady-state with 13 brackish waters of various SAR_{iw} and EC_{iw} levels and their deleterious effects in sandy clay loam (SCL) and sandy loam (SL) soils. The results showed that 45 irrigations of waters varying in EC from 2.3 to 9.4 dS m^{-1}, and SAR levels of 15, 30 and 60 (mmol L^{-1})$^{0.5}$ were able to change EC_e from 1.6 to 8.2 dS m^{-1} and SAR from 1.8 to 23.6 (mmol L^{-1})$^{0.5}$ in SCL soil; and EC_e from 1.4 to 7.4 and SAR from 1.6 to 21.8 in SL soil, respectively. If the irrigation frequency interval is to be set up after eight days on an average, the most of these soils can be safely planted in 336 days, however, this period can be prolonged considerably if the seedling establishment of each crop is done with canal water and the brackish water is used for the rest of the period. The yield of first crop of wheat was not affected in all treatmeents when grown in brackish water treated soils.

INTRODUCTION

The abundant underground water reserves of the arid and semi-arid regions remain largely unexploited due to the high concentration of salts in these waters and the osmotic pressure of the soil solution while high SAR or RSC water can cause imbalance of the ions in soil solution and thus can increase the exchangeable sodium percentage of soil to more than 15 to disperse the soil which could affect plant growth due to the resulting poor soil physical properties. The soil with higher clay contents are subjected to more deterimental effects than those with less clay contents (Yadav and Girdhar, 1980). Therefore, the adoption of appropriate irrigation management practices requires an adquate knowledge of the type of soils and their response towards different quality, quantity and frequency of such brackish irrigation waters as well as the type of salts added to the soil and their dynamics in the system. Gupta (1980) suggested that under high rainfall (650-750 mm per annum) and adequate drainage condition, waters having RSC as high as 10 me L^{-1} and adjusted SAR upto 20 can be used successfully on sandy loam soil without any problem.

The present lysimeter studies were conducted to know that how much time a particular type of brackish