SUMMARY

5. SUMMARY

The status of the available (DTPA-extractrable) micronutrients (Fe, Mn, Zn and Cu) in the soil under salinity condition was investigated. Studies envolved a survey study of 48 soil samples, 40 plant samples (barley and cabbag) and 20 saline water samples collected from parts of Egypt irrigated with saline waters, and relating results of salinity with micronutrients in soils and plants. It also envolved 3 greenhouse pot experiments (60-day duration) under conditions of variable salinity and organic matter additions.

Experiment 1 envolved irrigating sorghum plant grown in a non-saline clay loam with a non-saline water and a saline water (EC of 0.32 and 4.01 dS/m respectively).

Experiment 2 envolved cultivating sorghum plant in a non-saline soil (the same soil of experiment 1) and a saline soil (both being clay loam, with EC of saturation extract of: 3.16 dS/m and 12.20 dS/m) both irrigated with the non-saline water (of 0.32 dS/m).

Experiment 3 envolved cultivating barley plant in a non saline clay soil (EC= 1.35 dS/m "saturation extract") irrigated with two agricultural drainage waters (a diluted and non diluted saline drainage water) having salinity levels of 7.22 and 14.36 dS/m, respectively and under no-leaching (L0) or different leaching fractions; (half of the leaching (L1) or full value of the leaching (L2) requirements); leachates were collected (where leaching was allowed). A treatment having irrigation with distilled water (with no leaching) was conducted.

Results may be summarized as follows;

1. Survey study:

Soils irrigated with saline water (agricultural drainage water and well water) showed greater available Fe, but no trend with regard to Mn, Zn or Cu. Increased Fe availability was associated mostly with soil organic matter followed by soil salinity.

2. Pot experiments:

2.1. Dry weight of plants and micronutrient uptake:

Salinity of irrigation water decreased dry weight of sorghum or barley plants and also decreased uptake of micronutrients.

2.2. Iron in soil and leachate.

Irrigating the non-saline soil with saline water gave greater available Fe, while the saline soil irrigated with non-saline water contained less inherent available Fe. Under irrigation with saline waters and leaching conditions, soils contained less available Fe, and more intense leaching was associated with greater amount of Fe found in leachates.

2.3. Manganese in soil and leachate.

There was more available Mn in the soil irrigated with saline water. The lower contents of available Mn in the saline soil was a reflection of the basic differences between the two soils. Under conditions of irrigation with saline water, the soil contained more available Mn. Allowing leaching caused a decrease in soil available Mn and leachates contained more Mn.

2.4. Zinc in soil and leachate.

There was less available Zn in the soil under irrigation with saline water, as well as lower contents of available Zn in the saline soil. The successive increasing of water salinity caused more available Zn in the soil, while under leaching conditions there was less available Zn due to more Zn removal from the soil.

2.5. Copper in soil and leachate.

There was slightly less available Cu in the soil irrigated with saline water. The saline soil contained higher available Cu. Under irrigation with saline water and leaching conditions, less available Cu was found. This was due to the losses of Cu by leaching.