Abstract

Wheat and barley seedlings growing in pots in a greenhouse, with a non-saline sandy loam soil were irrigated, by saline waters, S_1, S_2, and S_3, having $EC_i = 3$, 9, and 15 mS cm^{-1}, respectively. Each solution has three potassium concentrations, $K_1 = 6$, $K_2 = 11$, and $K_3 = 16$ meq L^{-1}, and all incorporated N (90 mg L^{-1}) and micro-nutrients. Irrigation was provided to realize 0.2 and 0.5 leaching fractions (L).

At maturity, dry matter of plant tops (Y), grain yield (G), and evapotranspiration (ET) of both crops responded significantly to the S, L, and K treatments. There were different interactions, however, between the crops indicating some effect of plant species. In both, a decrease in Y with increasing salinity was associated with a corresponding decrease in ET. In the most saline S_3 treatments, where the available water to plants was the lowest, an ample K supply produced substantial improvements in salinity tolerance of both crops. Under these conditions, changes in Y and ET were independent of each other. Increasing K supply, reduced the rate by which Y decreased with respect to S. Barley accumulated dry matter more efficiently (in terms of ET Y^{-1}, g per g) particularly under L = 0.2. This efficiency for both crops did not respond to the water salinity but rather to the potassium concentration of the waters.

The whole experiment was also carried out under two levels of phosphorus application (35 and 70 mg P kg^{-1} soil). Neither growth nor water-use efficiency were significantly affected by the higher rate of phosphorus application.