

Potassium nitrate-fed alfalfa plants were more salt tolerant, when grown under NaCl imposed salinity conditions

The interaction between the effects of nitrate (NO_3) and sodium chloride (NaCl) concentration on growth, water relations, nitrogen (N) contents and N fixation were investigated in alfalfa (

Medicago sativa

L. cv. Magali).

The plants were grown hydroponically in a growth chamber, in the presence or absence of 3 mM potassium nitrate (KNO_3) and exposed to various concentrations of NaCl. During the first 20 days, i.e., before nodule emergence, the nutrient solution was complemented with 2 mM urea. After this period, the plants were transferred to a new nutrient solution either without N or with 3 mM potassium nitrate (KNO_3), a concentration that inhibits completely nodulation (Serraj et al., 1992. J. Plant Physiol.140: 366-371). At this stage, the plants were exposed to salinity by adding NaCl to the growth medium (final concentration 0, 25, 50, or 100 mM).

Increased salinity resulted in a significant decrease in shoot (Figure 1) and root biomass, relative water content and water potential. N_2 -fixing alfalfa plants are more salt sensitive than NO_3 -fed plants, as with KNO_3 . Nitrogenase activity measured by acetylene reduction activity was substantially inhibited by NaCl, and this inhibition was significantly correlated to the inhibition of shoot growth and total N contents.

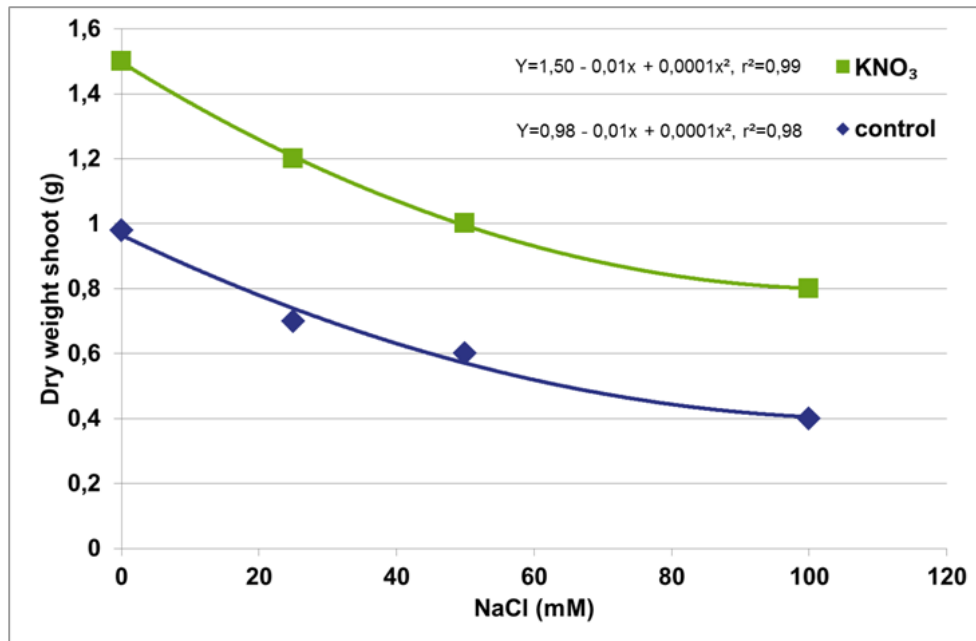
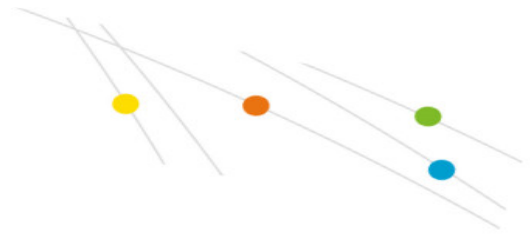


Figure 1. Effect of NaCl concentration on alfalfa shoot growth in the presence (KNO₃) or absence (control) of 3 mM KNO₃.