Highest yields obtained with potassium nitrate under saline and non-saline growing conditions in Chinese cabbage and lettuce

The purpose of this study was to test the response of Chinese cabbage (*Brassica campestris* L. Pekinensis group cv. Kazumi) and lettuce (*Lactuca sativa* L. cv 'Salinas') to the combination of salinity and KNO_3 levels. The experiments were conducted in an unheated greenhouse using an aero hydroponic system. A standard nutrient solution was used as a control (EC = 1,8 dS/m) or salinized by a combination of 34 mM NaCl and 9 mM $CaCl_2$ (EC = 6 dS/m). Three levels of potassium nitrate (1, 5 or 10 mM) were added and plant performances of Chinese cabbage and lettuce were checked at 51 – 63 days after transplanting.

In Chinese cabbage, salinization of the nutrition solution resulted in the development of severe toxicity symptoms. The fresh weight of the Chinese cabbage was significantly increased by the addition of KNO_3 to the nutrient solution under both saline and non-saline conditions. The highest yield of both total fresh and dry weight was found for the 5 mM KNO_3 treatment (Figure 1). A further increase of the KNO_3 concentration did not result in increased salt tolerance.

In lettuce, grown under saline conditions the fresh weight increased only for the 5 mM potassium nitrate treatment (Figure 2). A response curve to salt stress within an EC range of 1,25 – 11,25 dS/m showed that the threshold value (the salinity level beyond which yield reduction takes place) was between 4,70 and 5,35 dS/m in the 5 and 10 mM treatments. In lettuce, grown under non saline conditions, the fresh weight

increased with increased potassium nitrate levels.

Leaf analysis of the plants revealed a clear pattern of increase in K and N (Kjeldhal) and decrease in Na and Cl contents as a direct response of the KNO_3 treatments. The highest yields of fresh weight of both crops were obtained from the 5 mM KNO_3 treatment, under both saline and non-saline conditions.

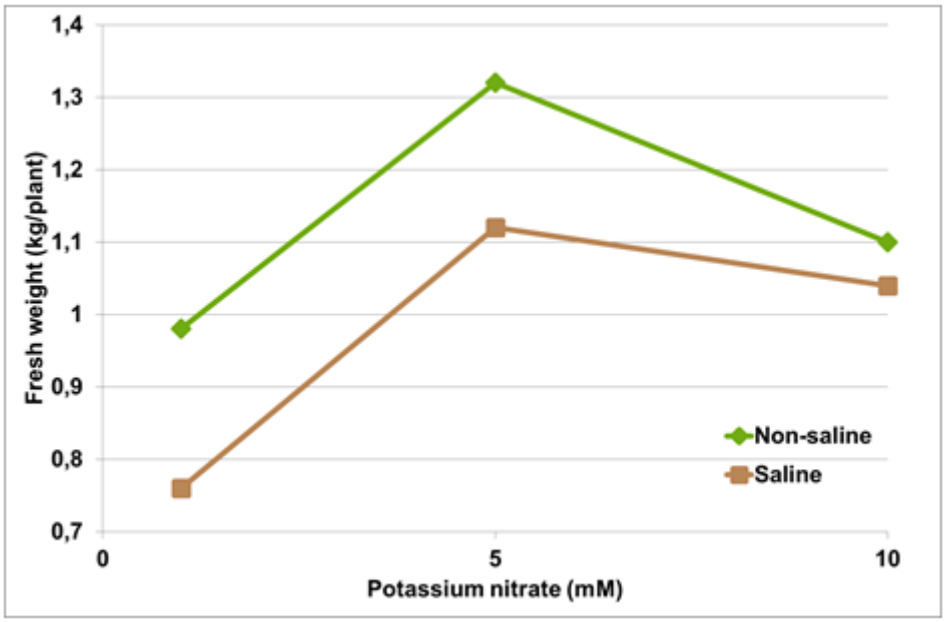

Figure 1. The effect of saline conditions and potassium nitrate on the fresh weight of Chinese cabbage tops at harvest.

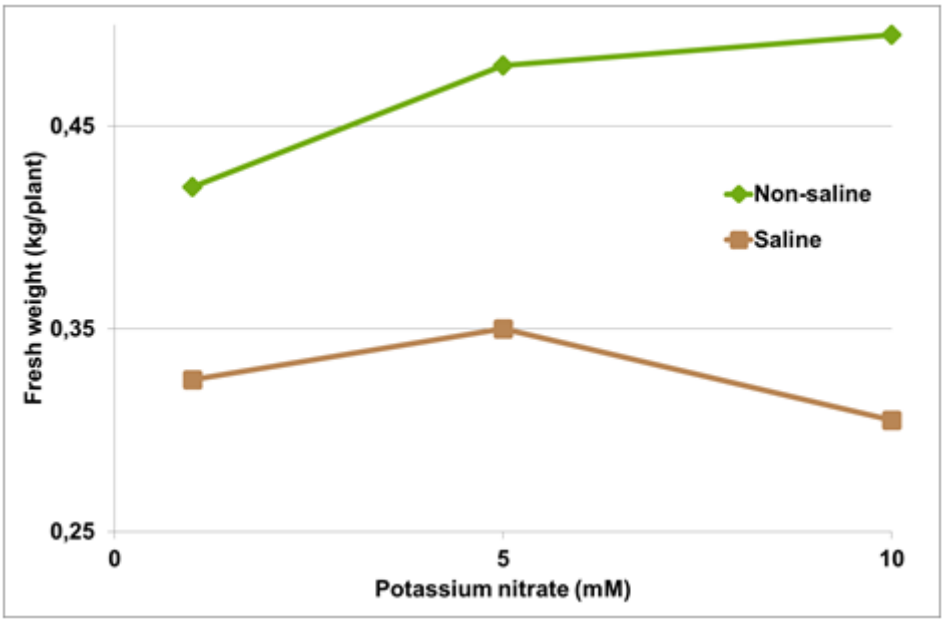

Figure 2. The effect of saline conditions and potassium nitrate on the fresh weight of lettuce heads. Samples taken 63 days after transplanting during harvesting.