3.11 PRZEMYSŁAW BARŁÓG, WITOLD GRZEBISZ
Poznań University of Life Sciences, Department of Agricultural Chemistry and Environmental Biogeochemistry, Wojska Polskiego 71/F, PL – 60625 Poznań

EFFECT OF SODIUM APPLICATION ON NUTRITIONAL STATUS OF SUGAR BEET PLANTS AT CRITICAL STAGES OF GROWTH

Effet de l'application de sodium sur l'état nutritif de betteraves sucrières durant des phases de croissance critiques / Effekt der Natriumapplikation auf den Ernährungszustand von Zuckerrüben in kritischen Wachstumsphasen

ABSTRACT

Sugar beet yield and quality depend on N management in the crop during the season. It is well documented that N uptake, and utilization by sugar beet depends on supply of other nutrients. This crop belongs to the group of plants classified as a natrophile (Na includer). On Na-poor soils, Na fertilization is a beneficial factor for an adequate sugar beet growth and yield. In the light of the scientific literature, a positive role of Na is attributed only to replacing K in its non-specific functions. However, in plant species of the family of Chenopodiaceae, including sugar beet, Na seems to have much more specific functions. For example, the higher growth rate of plants in the presence of Na, provided ample supplies of K, is observed. It has been documented that sodium application increases water content in leaves, participates in regulation of stomata activity, and thus improving water status of plants under water stress. Sodium enters plant root cells either through high-affinity potassium transporters or nonselective cation channels. It has been argued that Na^+ inhibits the K^+, Ca^{2+}, and other ions uptake. Beet plants, using this mechanism increase amount of K in expense of Ca and Mg, but at the same time lower share of Na. So far, most researchers have agreed with the favorable role of Na in an optimum K/Na ratio development. The next, unrecognized area of Na impact of sugar beets refers to its effect on N nutritional status. The sugar beet requirement for N sharply increases in the period of rows covering. This growth stage should be therefore used to predict sugar beet yield. An adequate nutrient ratio in tissue samples at this stage controls the yield of sugar beet. So far, the study implicitly showed that at the 7th leaf stage, high-yielding plants differed from others in K/N, K/Ca, K/Mg, K/P, N/Na and Ca/Na ratios.