

# Effect of Different Concentrations of Boron and Calcium on Quantitative and Qualitative Characteristics of 'Easy Lover' Rose Flower

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## Abstract

Today business of cut flower and ornamental plants production is of major importance in the industrial world. Rose (*Rosa hybrida* L.) makes up about 33% of the total cut flower production throughout the world. Rose is one of the most important ornamental crops in Iran that is widely cultivated in soilless culture. The growth and quality of roses is greatly influenced by nutrient management. Hence it is essential to have knowledge of the plant's mineral requirements in order to ensure a good yield and to avoid nutrient wastage. Calcium (Ca) is an essential macronutrient element for normal plant development, which participates in numerous physiological and biosynthesis processes. Calcium is involved in cellular growth and differentiation, cell wall formation, enzymatic activity, and membrane permeability. Boron (B) is an essential element for plant growth and is essential to effective fulfillment of the function of Ca in the root environment. However, good fertilizer management for greenhouse crops must take into consideration the crop requirements. Thus the aim of this study was to investigate the effect of B and Ca concentrations and their interaction on quantity and quality of cut rose. In this experiment, Easy Lover cultivar of rose grafted on the rootstock *Rosa canina* was used. The plants had been grown in a greenhouse. The roses were planted in pots containing a mixture of cocopeat and perlite (1:1 v/v) and subjected to nine nutrient solutions for 7 months. A 3 × 3 factorial experiment was arranged in a randomized complete block design with four replications and two plants per replication. Treatments were consisted three levels of B (25, 50 and 75 µM) and three levels of Ca (2.5, 5 and 7.5 mM). During the experiment, the number of harvested flowers, length and diameter of stem, flower, and peduncle were assessed. In addition, to determine Ca and B concentration, petals and fully developed leaves of plant were separately sampled from different treatments. At the end of the experiment, the number, length, diameter, area, fresh, and dry weight of the roots were determined. Results showed that B and Ca levels affected root development. Boron concentrations, resulting in thickness, elongation, and more branches of the root system. Results also found that the roots of the plants supplied with high Ca concentrations were superior to those supplied with low Ca concentrations. Interaction of B and Ca concentration on root number, length, and diameter were significant. By increasing B and Ca concentration in nutrition solution length and diameter of flowering stem increased. Regardless of the B concentration, the Ca treatment significantly affected number of flowering stem. However, highest level of Ca was less effective than other concentrations. A significantly interaction between B and Ca concentration was observed for number of flowering stem. Flower length and diameter, and pedicle diameter were not affected by treatments. Increasing B concentration in nutrient solution increased B and Ca concentration in both leaf and petal. Increasing Ca concentration in nutrient solution increased Ca concentration in both leaf and petal. The Ca application had an antagonistic effect on concentration of B in both leaf and petal. In conclusion the results demonstrated that B and Ca were successful in increasing length and diameter of stem and improving root development of 'Easy Lover' cut rose grown on a soilless culture. Boron application had a synergistic effect on uptake of Ca, and Ca had an antagonistic effect on uptake of B concentration in leaf and petal.

**Key words:** Rose, Easy Lover, Boron, and Calcium.