**Effect levels and forms (liquid versus granular) of phosphorus on two stock (*Matthiola incana*) cultivars**

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Phosphorus is one the major essential elements in plant growth and development. Despite the well known roles of phosphorus in plant nutrition, plant responses to phosphorus fertilizers in many cases have not been found out yet. So, in present study different levels and form of phosphorus fertilizer as liquid or granular were applied to investigate the quantitative and qualitative response of two white and red cultivars of stock flower (*Matthiola incana* L.)under greenhouse conditions. The experimental was done based on completely randomized design with four replications. The treatments were control (without P application), granular superphosphate fertilizer at four levels (0, 50, 100 and 200 mg.kg-1) of soil, liquid form of superphosphate at four levels (0, 50, 100 and 200 mg.kg-1) of soil which were dissolved in 50 ml of d-water, and bio-fertilizer phosphate (Barvar-2) in an amount of 100 g in 200 ml of water. The results showed that there were significant differences among treatments for most of yield and quality traits. In both cultivars, application of 200 mg/kg soil phosphorus in liquid form and then in granular and biofertilizer forms (respectively) resulted in significantly higher amounts for most of plant parameters such as number of flowering stems, inflorescent length, number of flowers in inflorescent, number of petals in flower, the length of flowering stem, leaf number and chlorophyll content compared to control and other treatments. Regarding these traits 200 mg granular and then biofertilizer were the next best treatments, respectively. The leaf content of phosphorus was significantly higher in 200 mg/kg soil liquid form as well, However, regarding fresh and dry weight of roots, the highest amount was recorded in biofertilizer treatment. Phosphorus levels of 50 and 100 mg/kg soil, especially in granular form, were resulted in lower amount of yield and quality parameters. In conclusion, to reach a target yield and quality, lower rate of liquid form of superphosphates compared to granular form, is required. However, biofertilizer treatment due to its improvement of growth as well as zero contamination of soil is preferred.

**Key Words**: bio-fertilizer, granular, liquid, morphological traits, phosphorus.