Effect of biological and superphosphate fertilizers as granular and liquid forms on growth and development of two cultivars of *Matthiola incana*

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Abstract

This pot experiment was conducted under greenhouse conditions to evaluate the effects of different levels and forms of phosphorus fertilizers on quantitative and qualitative traits of two cultivars of *Mathiola incana*, based on a completely randomized design with eight treatments and four replications. Treatments were application of granular and liquid forms of triple superphosphate, both at three levels (50, 100 and 200 mg/kg soil), a biofertilizer (100g/2000ml Barvar-2) and control (without any fertilizer application). Results showed that application of 200 mg/kg soil of liquid phosphorus (PL3 treatment), granular form (PG3 treatment), and biofertilizer (PB treatment) significantly increased all plant growth characteristics (morphologic and physiologic), compared to control plants. The highest chlorophyll a and b contents in both cultivars were obtained in 200 mg/kg of liquid fertilizer treatment (PL3) and 200 mg/kg of granular form (PG3). The highest leaf phosphorus concentration was measured in PL3, PG3 and PB treatments. In both cultivars, the highest shoot fresh and dry weights, length of flowering stem, inflorescence length and number of flowering buds in inflorescence were obtained in PL3, PG3 and PB treatments. The highest root fresh and dry weights were obtained in PB and then PL3 treatments, showing significant difference with other treatments ($P \leq 0.01$). In this study, the highest values of measured traits were observed in higher concentrations of liquid phosphorous treatments, compared to granular form. However, the Barvar2 biophosphate treatment (PB) has also led to significant growth improvement and highest fresh and dry weight of root, and therefore is recommended for production of *Mathiola incana*.

Keywords: Biofertilizer, Liquid phosphate fertilizer, Granular phosphate fertilizer.

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