

Comparative Ability of Three Alfalfa Cultivars to Take up Potassium from Phlogopite

M. S. Mousavi Dastenaee and H. Khademi^{1*}

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Abstract

Few investigations have been carried out on the ability of different plants to take up non-exchangeable potassium (K). The objective of this investigation was to examine the ability of different alfalfa cultivars to absorb K from phlogopite. An experiment was carried out with a completely randomized design with 3 alfalfa cultivars including Pickseed 2065 (MF), Rehnani (R) and Hamadani (H) grown in a quartz sand medium containing <53 micron sized phlogopite under complete and K-free nutrient solutions for a period of 6 months. During the growth period, the shoot was harvested 4 times. At the end of the experiment, the root was also separated from the growth medium and collected. Plant samples were extracted using the dry ash method and their K concentration was determined. Under the K-free nutrient solution, the highest shoot and root K concentration and uptake were found for the MF cultivar. The shoot and root K concentration in this cultivar were respectively 1.6 and 1.5 times higher than those in the R cultivar and 1.8 times greater than those in the H cultivar. The K uptake in the shoot and root of the MF cultivar was respectively 1.6 and 1.9 times higher than that of the H cultivar and 1.6 and 1.5 times higher than that of the R cultivar. Thus, in addition to other parameters, the type of plant variety should be taken into account when K requirement is evaluated.

Keywords: Potassium release, Mica, Phlogopite, Alfalfa cultivars.

1. Dept. of Soil Sci., College of Agric., Isf. Univ. of Technol., Isfahan, Iran.

*: Corresponding Author Email: hkhademi@cc.iut.ac.ir