Effect of salinity on some growth indices and total protein content of alfalfa genotypes inoculated with *Sinorhizobium meliloti* strains under greenhouse conditions

A. Fazaeli[1]* and H. Besharati[2]

(Received: January 2-2011 ; Accepted: March 7-2012)

Abstract

This greenhouse experiment was carried out to evaluate the effects of salinity and bacterial inoculation on some growth indices and total protein content of alfalfa (*Medicago sativa*) using a factorial completely randomized design with three replications. The effect of three salinity levels (0, 6 and 12 dS/m) induced by a mixture of NaCl, $CaCl_2$ and $MgCl_2$ salts on growth indices and protein content of three alfalfa genotypes (Hamadani, Gharahyonjeh and Gharghalogh) at three levels of inoculation with *Sinorhizobium meliloti* bacteria (no inoculation, inoculation with salinity-tolerant strain and inoculation with salinity-sensitive strain) was investigated. After the isolation and purification of alfalfa-symbiotic-bacteria from alfalfa fields in Tehran province, two isolates of *S. meliloti*, one salinity-resistant and the other one salinity-sensitive, which are effective in symbiosis with alfalfa, were selected. Analysis of the results showed that by increasing the salinity level, the shoot and root dry weight, number of active nodules, and nitrogen (N) concentration were decreased significantly ($P<0.01$). Inoculation with salinity-resistant strain of *S. meliloti* caused significant increase in shoot and root dry weight, number of active nodules, and N concentration of plants. Moreover, under saline conditions, the salinity-resistant *S. meliloti* strain increased significantly most alfalfa growth-indices and yield compared to control (without inoculation) and inoculation with salinity-sensitive bacteria. There was no significant difference among alfalfa genotypes in yield and other growth indices under saline conditions. In general, the R59 isolate seems to be the best isolate of *S. meliloti* for greenhouse-grown alfalfa in saline conditions.

Keywords: Nitrogen fixation, *Sinorhizobium meliloti*, Salinity.

[DOR: 20.1001.1.20089082.1391.3.1.2.0]

1. Dept. of Soil Sci., Zanjan Univ., Zanjan, Iran.
2. Soil and Water Res. Institute, Karaj, Iran.
*: Corresponding Author, Email: atefehfazaeli@yahoo.com