

## RESPONSE OF SWEET PEA TO SALINITY STRESS AND *RHIZOBIUM* INOCULATION

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**ABSTRACT:** Two pot experiments were conducted at the Experimental Farm of Efficient Productivity Institute, Zagazig University during the two successive seasons of 2002/2003 and 2003/2004 to study the effect of irrigation with saline water at four concentrations (0, 1500, 2500 and 3500 ppm) and three *Rhizobium leguminosarum* inoculation rates (0, 10, and 20 g *Rhizobium* inoculants/ Kg seed) and their interactions on survival percentage, growth, flowering and chemical composition of *Lathyrus odoratus* plant.

As salinity level increased up to the highest level 3500 ppm gradually reduced survival (%), growth and flowering (plant height, branches and leaves production/ plant, plant fresh and dry weights, cluster No/ plant, and flowering stalk length). These effects were associated with reductions in leaf tissue contents of chlorophyll, total N and total carbohydrate. Only 2500 ppm salinity level enhanced flowering date comparing to control (tap water) and the low (1500 ppm) or high (3500 ppm) salinity levels.

Seed inoculation with *Rhizobium leguminosarum* increased leaf chemical constituents of N, chlorophyll and carbohydrate. This was reflected as an enhancing effect on vegetative growth and consequently flowering. Generally, there were no significant differences between the two tested rates of inoculation (10 and 20 g inoculants/ Kg seed).

When *Rhizobium* inoculation was interacted with salinity stress, salinity reduced the enhancing effects of inoculation comparing to inoculation under non saline conditions. Contrary, inoculation enhanced plant salinity tolerance as compare to non inoculated plants. Since, inoculation increased percentage of survived plants, vegetative growth (plant height, branch and leaf No/ plant, and plant fresh and dry weights) and flowering (cluster No/ plant, and flowering stalk length) as well as leaf chemical constituents (chlorophyll, total N and total carbohydrate) under irrigation with salinized water comparing to non inoculation under the same salinity level.

**Key words:** *Lathyrus odoratus*, saline water irrigation, *Rhizobium leguminosarum* inoculation, plant growth, flowering and leaf chemical composition.