

## ASSESSING OF THE TOLERANCE OF *PINUS HALEPENSIS* MILL. SEEDS TO WATER AND SALINE STRESS AT THE GERMINATION STAGE

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### Abstract

Arid and semi-arid ecosystems cover a large part of the southern fringe countries of the Mediterranean basin. Drought and salinization are the major processes of steppe land degradation. The objective of this work was to investigate the tolerance to water and saline stress of Aleppo pine (*Pinus halepensis* Mill.) seeds at the germinating stage. The adopted methodology used increasing concentrations under a controlled temperature of 20 °C for 30 germination days of seeds. Germination responses of seeds to different degrees of salt stress caused by NaCl (1, 2, 3, 4, and 5 g·L<sup>-1</sup>) and the water stress caused by polyethylene glycol (–0.05, –0.25, –0.5, –1, and –2 bars) under a temperature of 20 °C showed that salt and water stress have decreased the percentage of seed germination of Aleppo pine seeds for a period of 30 days. In the control treatment (distilled water) with no stress the seeds showed a germination rate of 89 % for salt stress and 90 % for water stress. The results of the study showed that salt and drought have a depressive effect on the germination rate of Aleppo pine with a tolerance of 4 g·L<sup>-1</sup> and –1 bars for the stresses used.

**Key words:** Aleppo pine, drought, germination tests, NaCl, Polyethylene glycol (PEG), semi-arid.

### Introduction

Algeria is one of the most water-deficient regions in the world, and the water resources are subjected to strong natural, climatic and anthropogenic pressures (Bellal 2011). The water deficit is more than 20 % for the western region, 13 % for the central and 12 % for the eastern part of the country (Ould Amara 2000, Bouguerra 2001). Arid and semi-arid area cover very large surface and are characterized by a high rainfall irregularity. These areas re-

ceive an annual average rainfall between 100 and 300 mm for the arid and between 300 and 600 mm for the semi-arid one (Le Houerou 1995, Nedjraoui 2003, Ramade 2003). Besides, they are characterized by very restrictive edapho-climatic conditions, thus posing challenges to survival of some indigenous plant species, which are subjected to constant stress by the severe environment.

In these regions, the availability of water, salinity and some other soil characteristics are among the main factors limiting