



## Effect of Salinity and Drought Stresses on Germination Stage and Growth of Black Cumin (*Bunium Persicum Boiss*)

H. R. Saedi Goraghani<sup>1\*</sup> - A. Ranjbar Fordoei<sup>2</sup> - M. Soleimani Sardo<sup>3</sup> - M. J. Mahdavi<sup>4</sup>

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### Introduction

Range plants have important and crucial roles in medicinal industry and together with scarcity and low quality of the water and soil resources, prevent a quick recovery of the soil plant covering. Because of these restrictions, it is important to consider the use of salt and drought tolerant species for plantation and to preserve plant cover. In this sense, the use of native species such as black cumin (*Bunium persicum* Boiss) may be of interest due to their medicinal characteristics and potential ability to adapt to adverse conditions (dry and saline conditions). Black cumin (*B. persicum*) as a medicinal plant plays a vital role in Iranian medicine so there is a need to know about the factors affecting their growth and propagation.

### Materials and Methods

To investigate the effects of drought and salt stresses on germination and growth in black cumin two separate experiments were conducted. Drought stress was applied through incubation in four different concentrations of PEG 6000 that provide solutions with water potentials ranging from -0.2 to -0.8 MPa (including control and four levels of dryness). Salinity treatments (including control and four levels of salinity) were prepared by adding molar concentrations of NaCl to provide a range of salinity from 50 to 300 mM. Germination percentage and speed was calculated by computation of germinated seeds every day. Growth parameters (rootlet, shoot and seedling length total), allometric index and seed vigourity were obtained accordingly.

### Results and Discussion

Seeds under both drought and salt stress showed significant reduction in germination percentage, germination rate, radicle length, plumule length, and allometric and seed vigor indices. This trend was much pronounced under high levels of NaCl and low levels of water potentials, so that germination at  $\psi_s = -0.6$  MP was completely stopped.

### Conclusions

Assessment of drought and salt stresses on germination and growth in black cumin is very important in the management of its planting. With increasing salinity and drought levels, the germination reduced significantly. Although due to higher germination of seeds in different levels of salinity rather than drought, this species seems to be more sensitive to drought stress.

**Keywords:** *Bunium persicum*, Drought stress, Germination, Salt stress

1- Ph.D of Range Management, University of Tehran, Iran

2- Associate Professor, Faculty of Natural Resources and Earth Sciences, University of Kashan, Iran

3- Ph.D of Combating Desertification, Faculty of Natural Resources, University of Jiroft, Iran

4- Ph.D of Combating Desertification, Payame Noor University (PNU), Iran

(\* - Corresponding Author Email: Hamidsaidi65@yahoo.com)