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The relationship between seed weight, germination and biochemical reserves of maritime pine (*Pinus pinaster* Ait.) in Morocco

Nadya Wahid · Lahouari Bounoua

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Abstract Seed germination and biochemical reserves of maritime pine (*Pinus pinaster* Ait.) were studied with the aim of providing germination information for reforestation and conservation programs. Ten natural populations were used to assess variation in seed weight, germination characteristics and biochemical reserves and to examine the relationship between these characteristics. The analysis of variance showed highly significant population effects for seed weight, germination characteristics and protein content in both seeds and the female gametophyte. The mobilization of protein content in female gametophyte during seed germination differed more among populations than sugar content, suggesting that protein content was more sensitive to environment effects than sugar content. A strong positive correlation between germination capacity and the protein content in both seeds and female gametophyte indicated that the best populations in term of germination capacity may also be the richest in protein content. Seeds that were heavier and had a lower speed of protein content mobilization in the female gametophyte appeared to be better adapted to drought conditions. The results also suggested that as much as possible of the potentially valuable genetic variation among populations of this species should be preserved for reforestation and conservation purposes.

Keywords Maritime pine · Seed weight · Germination capacity · Biochemical reserves

Introduction

Maritime pine (*Pinus pinaster* Ait.) is the most important forest tree species in the Atlantic-Mediterranean region. In Morocco, it is the most abundant tree species and represents an

N. Wahid (✉)
Institut National des Plantes Médicinales et Aromatiques, Université Sidi Mohamed Ben Abdellah, BP 159, Taounate 34000, Maroc
e-mail: wahid2na@yahoo.fr

L. Bounoua
Biospheric Sciences Laboratory Code 618, NASA Goddard Space Flight Center (GSFC), Greenbelt, MD 20771, USA