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Three-year storage of oriental beechnuts (*Fagus orientalis* Lipsky)

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Abstract Oriental beech (*Fagus orientalis*) is one of the main tree species in Turkey. In this study, 3-year storage of oriental beechnuts from eight Turkish provenances was researched. Beechnuts were stored at -6°C in sealed containers. The average germination percentages of over all provenances were 91.67, 75.92, and 76.75%, prior to initial storage, after 1 year in storage, and after 3 years in storage, respectively. There were significant decreases in the germination percentages of seven provenances while one provenance retained its high initial germination ability over a 3-year storage period. The loss of viability initiated from the radicle and the plumula in stored beechnuts. The average mean germination times were 10.43, 10.22, and 11.89 weeks prior to storage, after 1 year in storage, and after 3 years in storage, respectively. The beechnuts stored for 3 years germinated significantly later than both fresh beechnuts and beechnuts stored for 1 year in terms of average mean germination time. This study showed that oriental beechnuts can be stored in a dormant state for at least 3 years at low temperature (-6°C) with a low moisture content (about 6–7%).

Keywords Beechnut · Storage · Beech · *Fagus* · Seed

Introduction

Oriental beech is one of the most common forest tree species in Turkey. Due to its anthropogenic degradation over many centuries, most of the oriental beech (*Fagus orientalis* Lipsky) forests of Turkey have regenerated from sprouts rather than seeds, hindering genetic regeneration. Therefore, the regeneration of oriental beech forests in Turkey from seeds is a current challenge that should be overcome.

Seed storage of forest tree species is an important issue in terms of ex situ conservation as well as continuous work in nurseries and regeneration activities over a broader time period. Seed storage behavior and conditions vary from species to species, even within species and provenances (Bewley and Black 1994; Hong and Ellis 1996; Schmidt 2000; Yilmaz 2005). The response of a seed to drying and storage is generally expressed by the terms 'orthodox' (desiccation tolerant) and 'recalcitrant' (desiccation sensitive) (Roberts 1973). Orthodox seeds can be stored for years with a lower moisture content (MC) in cool conditions. Intermediate seeds (Hong and Ellis 1996), however, have less seed longevity than orthodox seeds and generally need special conditions to preserve their viability and quality. The determination of the storage behavior of the oriental beechnut was needed for the continuous work in the nurseries and fields since mast years occur every 3–5 years (Suner 1978). Beechnuts collected during mast years should be stored properly, conserving germinability and quality.

Seeds of many hardwood species are sensitive to desiccation and, therefore, are difficult to store. Studies carried out on the beechnuts of *F. sylvatica* (Suszka 1966, 1974; Bonnet-Masimbert and Muller 1975; Suszka and Zieta 1977; Muller and Bonnet-Masimbert 1980) and *F. crenata* (Koyama et al. 1997; Koyama 2000; Koyama et al. 2002;

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