

We are unable to supply this entire article because the publisher requires payment of a copyright fee. You may be able to obtain a copy from your local library, or from various commercial document delivery services.

From Forest Nursery Notes, Summer 2008

127. © Drying and soaking pretreatments affect germination in pedunculate oak.
Doody, C. N. and O'Reilly, C. *Annals of Forest Science* 65:509. 2008.

Drying and soaking pretreatments affect germination in pedunculate oak

Colin N. DOODY, Conor O'REILLY*

School of Biology and Environmental Science, University College Dublin, Belfield, Dublin 4, Ireland

(Received 9 September 2007; accepted 2 April 2008)

Abstract –

- Pedunculate oak (*Quercus robur* L.) acorns are recalcitrant so they are difficult to store. Therefore, deterioration in quality during storage may reduce seedling yield and quality. In an attempt to address this, the effects of drying and soaking treatments on acorn germination were assessed.
- After harvesting on two occasions in October, the moisture content (MC) of acorns were adjusted using the following treatments: (1) fresh state or control (46–48% MC); (2) soaked in fresh state (46–48%); (3) dried (40–42%) (standard method); and (4) dried and then soaked (46–48%). The treated acorns were allowed to germinate at 15 °C, both before and after storage at –3 °C.
- Treatment effects were generally consistent for each harvest date. Compared to the untreated controls, soaking alone and drying followed by soaking significantly increased germination both before and after storage. Storage reduced germination, except for the dried and soaked acorns.
- The results confirmed that drying and soaking improved acorn germination, but this was not mediated through an effect on acorn MC. In a separate nursery experiment, acorns given this treatment resulted in higher seedling yields and better quality plants than those given the standard treatment (dried to 40–42% MC).

Quercus robur / pretreatment / storage / harvest date

Résumé – Séchage et trempage, des prétraitements qui influencent la germination du chêne pédonculé.

- Les glands du chêne pédonculé (*Quercus robur* L.) sont difficiles à stocker. En conséquence, la détérioration de leur qualité pendant le stockage peut réduire la production et la qualité des semis. Pour répondre à ceci, les effets de prétraitements de séchage et de trempage sur la germination des glands ont été évalués.
- Après récolte à deux occasions en octobre, la teneur en eau (MC) des glands a été ajustée en utilisant les traitements suivants : (1) état frais ou témoin (46–48 %MC), (2) trempage à l'état frais (46–48 % MC), (3) séché (40–42 % MC) (méthode standard), (4) séché puis trempé (46–48 % MC). Les traitements permirent une germination des glands à 15 °C, aussi bien avant qu'après un stockage à –3 °C.
- Les effets des traitements furent en général cohérents pour chaque date de récolte. Comparés aux traitements témoins, le trempage seul et le séchage suivi par un trempage ont accru significativement la germination aussi bien avant qu'après stockage. Le stockage réduit la germination sauf dans le cas des glands séchés et trempés.
- Les résultats confirment que le séchage et le trempage améliorent la germination des glands, mais ceci n'est pas obtenu par l'intermédiaire d'un effet sur la teneur en eau des glands. Dans une expérimentation séparée en pépinière, ces traitements entraînent une plus grande production de semis et une meilleure qualité des plants que ceux issus du traitement standard (séché à 40–42 % MC).

Quercus robur / prétraitements / stockage / date de récolte

1. INTRODUCTION

The seed¹ of pedunculate oak (*Quercus robur* L) are “recalcitrant”, which means that they are intolerant of desiccation and cannot be stored over more than about one winter without loss of seed viability (Gordon, 1992). Therefore, pre-treatment and storage protocols that enhance germination and maintain viability of acorns are of interest to nurseries.

* Corresponding author: conor.oreilly@ucd.ie

¹ The one seeded (occasionally two seeded) fruit of the oak is the acorn (Bonner and Vozzo, 1987), but for convenience the terms ‘acorn’ and ‘seed’ will be used interchangeably in this paper.

Seeds of the white oak group, of which pedunculate oak is a member, mature within one year (Suszka et al., 1996). Acorns increase steadily in size as they mature and their colour changes from green to brown during this process. Abscisic acid (ABA) concentrations also change during maturation (Finch-Savage and Clay, 1994). Acorns also lose water during maturation, with the most rapid decline occurring towards the end of maturation (Bonner and Vozzo, 1987). Therefore, acorn maturity and moisture content (MC) at the time of harvesting may influence acorn storability.

While the seed of ‘orthodox’ species can be stored for years if dried to low MC, oak acorns cannot be dried to a low MC without losing viability (Gordon, 1992). Acorns are usually