DESICCATION IN MEDITERRANEAN OAK ACORNS: DOES MORPHOLOGY INFLUENCE GERMINATION RATE?

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INTRODUCTION AND AIM

Acorns from Mediterranean oaks are recalcitrant seeds, which means that decreasing moisture content affects their viability[1]. The objective was to **determine the relationship between seed morphology (length divided by diameter: LD) and water loss in acorns of five Mediterranean *Quercus* species**. The following hypotheses (H) were formulated:

a. Greater water loss occurs with more elongated acorn morphology (Fig1).

b. Longer acorns have a thinner pericarp (Fig 2).

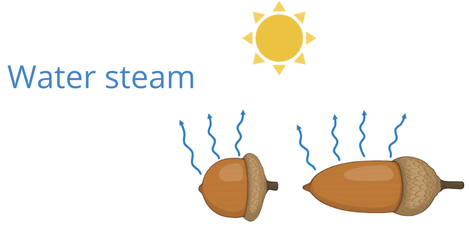


Fig 1. Hypotheses a

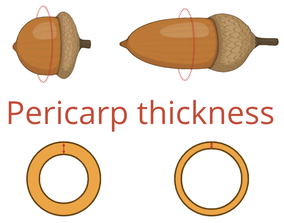


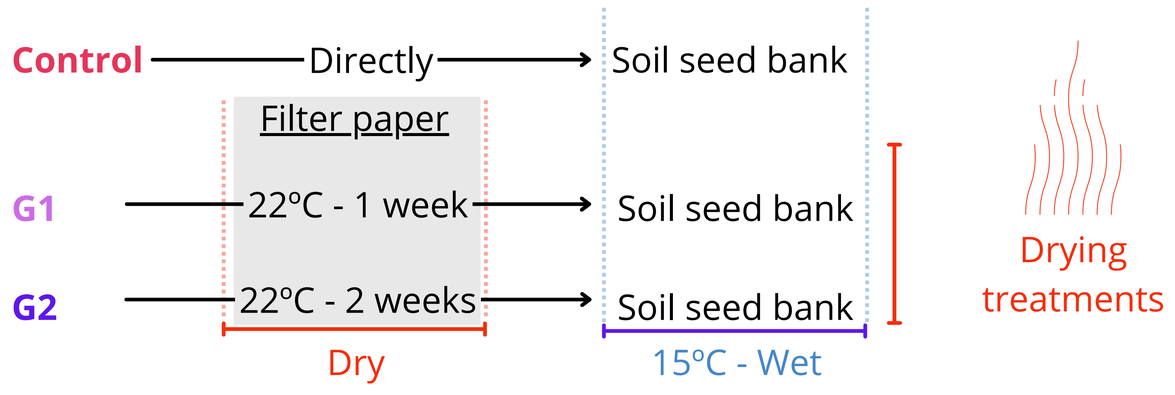
Fig 2. Hypotheses b

Selected species:

Q. coccifera, *Q. ilex, Q. faginea*, *Q. suber* and *Q. pyrenaica*.

MATERIALS AND METHODS

a. Water loss and viability: 769 acorns



Measures on acorns:

Fresh and dry weight |Length and diameter (LD) | Germination

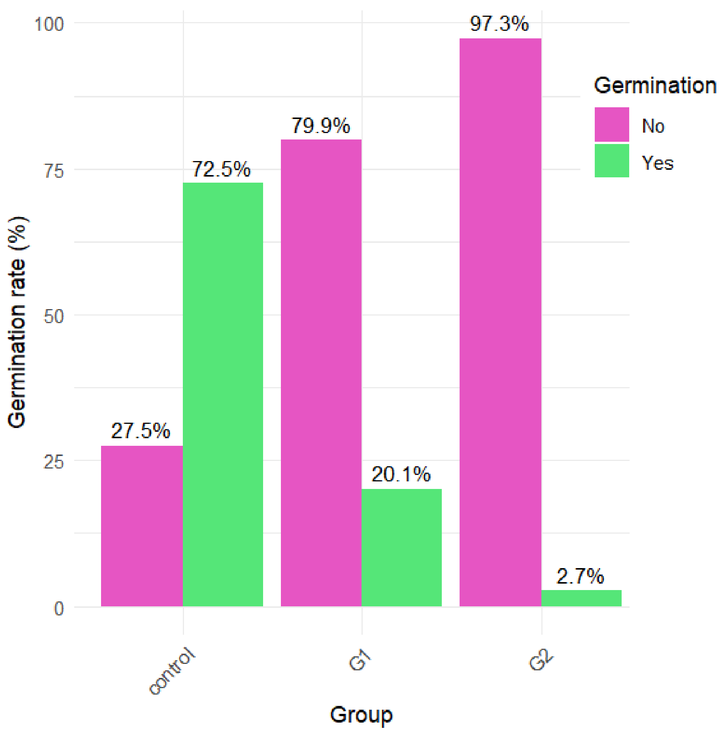
b. Pericarp thickness: 100 acorns

Fresh acorns —pericarp extraction→ **Pericarps** —80º - 2days→

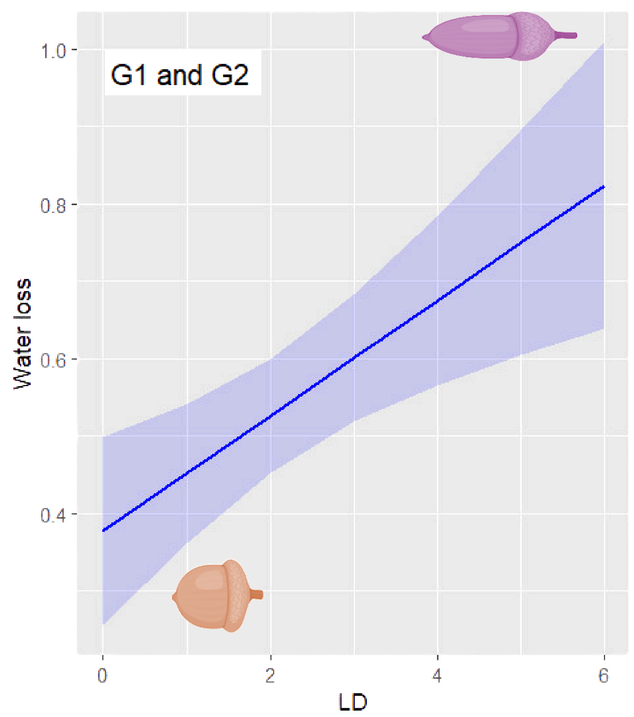
Measures on fresh acorns and pericarps:

Thickness and weight of fresh and dry pericarp |Fresh acorns LD

RESULTS AND DISCUSSION

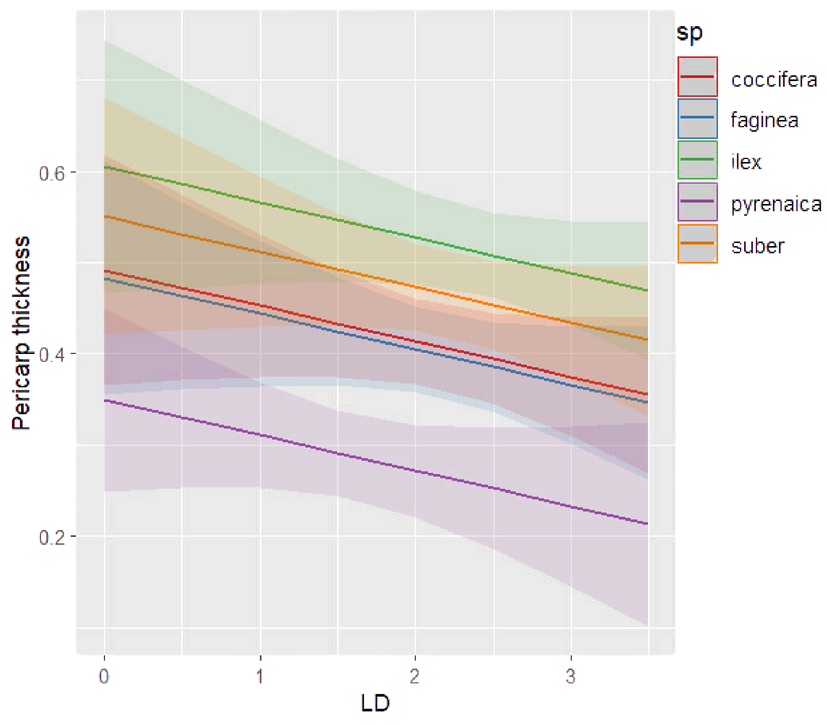


The control acorns exhibited the highest germination capacity, and were designated as the "fresh group" due to their elevated moisture content. The G2 acorns exhibited the lowest moisture content and viability, indicating that the duration of desiccation is a critical factor influencing germination capacity[1].



Both groups of acorns have the same tendency: the higher the LD, the more water is lost. This may be attributed to the fact that there is a greater surface area exposed to the loss of water.

For LD (P=0.00114), G2 (P<0.001) and fresh weight (P<0.001) the relationship is statistically significant. So drying time and weight are also important, the more water content they have, the more they can lose[1].



*Q. pyrenaica** is the species with the thinnest pericarp and *Q. ilex*** the thickest. Both show statistically significant correlations between pericarp thickness and LD. For all species, a trend can be observed: as pointedness increases, thickness decreases. P<0.001*, P=0.0010**

Q. pyrenaica is distributed in areas where dryness is not a major problem, so a thinner coat is sufficient to keep moisture. By contrast, *Q. ilex* has a wide distribution and a thicker shell may ensure greater protection against water loss[2].

CONCLUSION

The germination capacity of the species included in this study is affected by water loss during periods of drought, because periods of drought cause moisture loss. Morphology is also important, as an elongated shape favours greater water loss, possibly due to the amount of surface area exposed, and a thinner pericarp may offer less resistance to evaporation.

1. Ganatsas, P., & Tsakaldimi, M. (2013). A comparative study of desiccation responses of seeds of three drought-resistant Mediterranean oaks. Forest Ecology and Management, 305, 189-194. https://doi.org/10.1016/j.foreco.2013.05.042
2. Gil-Pelegrín, E., Ángel Saz, M.A., Cuadrat, J. M., Peguero-Pina, J. J., & Sancho-Knapik, D. (2017). Chapter 5 Oaks Under Mediterranean-Type Climates: Functional Response to Summer AridityIn E. Gil-Pelegrín, J. J. Peguero-Pina, & D. Sancho-Knapik (Eds.), Oaks physiological ecology: Exploring the functional diversity of genus Quercus L. Springer. https://doi.org/10.1007/978-3-319-69099-5