

Thickness assessment and weight modeling of cork in Tunisia: case study of Ain Snoussi forest



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Keywords

Cork thickness

Industrial stoppers

Productivity

Non-linear regression

Debarking operation

Quercus suber

cork

NWFP

Cork

Scale

National

Objective

Estimate reproduction cork thickness as a criterion to examine the commercial value and to fit a non-linear model for predicting cork weight to guide the forest decision makers toward a reasonable harvest.

The objective is to guide forest decision-makers towards a reasonable cork harvest by:

- ▣ examining the thickness of cork as a criterion for estimating commercial value
- ▣ evaluating the intensity of the debarking operation on the tree
- ▣ establishing a non-linear model for predicting cork weight.

Context

Despite the economic importance of cork, research on its growth and production are rare in Tunisia. Many factors influence cork production, including genetic variability (Ferreira *et al.*, 2000), site fertility (Montero, 1987), dendrometric parameters, and conditions of the debarking operation. In Tunisia, little research has been devoted to the practice itself of debarking and even fewer are cork production models. It is in this context that this study is inscribed in order to contribute to a better evaluation of the cork production and to help the decision of the manager by practical silvicultural tools.

✓ Results

Based on the analysis of reproduction cork samples taken from 233 trees selected in Ain Snoussi cork oak forest, to the end of the rotation cycle, situated in Northwestern Tunisia, the results showed:

1. A low mean cork thickness (23.8 ± 2.3 mm) considered unfit for stoppers. Moreover, thickness was estimated to be below the required limit for stoppers production (27 mm) in 69% of cork samples.
2. A low cork productivity average equal to 5.16 ± 0.59 kg per m² of stripped surface.
3. Only 2% of the debarked trees samples showed eligible values of intensity of stripping (IS); within the recommended range for good harvest (34-36). 75% of the samples showed IS values below 34. Besides, a model was fit between reproduction cork weight (P) and three principal tree parameters: circumference over bark (COB) at breast height, debarking height (DH) and cork age (CorkA).

$$P = b \cdot \exp(\text{COB} \times \text{DH})^c \cdot \exp(\text{CorkA})^d$$

The statistical values of the non-linear model for parameters b, c and d were estimated, respectively, at:

- Estimated values: 0,018602, 0,267528 and 0,264453.
- Standard error (ES): 0,00564, 0,0101 and 0,0299
- t values: 3,30, 26,44 and 8,83
- Approximate value of $P > |t|$: 0,0021, <0,0001 and <0,0001

→ Future developments

To improve the model the number of samples should be increased to improve the accuracy of the cork weight predictions, represented in part by the standard error of the model.

An ongoing study on cork production in several forests will fit another model predicting cork thickness using tree parameters.

💡 Recommendations

It is recommended to extend cork rotation in this forest to increase cork thickness and to monitor efficiently the cork debarking operation with a reasonable value of intensity of stripping. Indeed, by means of the explanatory parameters of the established model it would be conceivable to define the duration of the rotation period that best suits each forest.

It is crucial to control the debarking operation which strongly influences the quantity and the quality of the cork. Training for the workers carrying out this operation is recommended.

⚠️ Impacts and weaknesses

Impact: the model is an efficient tool for the forester since it makes it possible to predict the weight of reproduction cork using easy-to-measure tree variables.

Weaknesses: the number of samples used to adjust the model was relatively limited. Data used to fit this model were collected from one site only.



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Further information

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About INCREDIBLE Project

INCREDIBLE project aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region.

