

Tree diameter growth model for cork oak stands in Portugal

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ABSTRACT

Tree diameter growth is influenced by several factors such as the environment (soil and climate), stand characteristics, tree size, and intra-tree competition. The interaction between individuals in the Mediterranean region has more impact on the competition for water and soil nutrients rather than the one for light. In the case of cork oak forests, tree diameter growth models may improve forest management by (i) predicting the tree status in the future and (ii) helping to determine the age at which a cork oak tree may be debarked for the first time. The goal of this work was to develop a model for the estimation of the tree diameter growth considering at the same time its surround environment, its stand characteristics and the tree intra-specific competition. The dataset used for this study, includes different stand stages of the development, stand characteristics, debarking rotation intervals (from 9 to 14 years) on permanent plots spread along the distribution area of the cork oak in Portugal. This wide dataset enhanced the awareness to develop a more accurate tree diameter growth model that can predict throughout different stand stages and its characteristics. A diameter growth model developed as a function of tree and stand characteristics was compared to a model developed from a potential growth function multiplied by a modifier function expressing competition. It was expected some improvement in the precision of the latter, although differences may not be relevant.

Keywords: cork, diameter increment, modifier function, competition indices