Acacia: Characteristics, Distribution and Uses

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Book Description:

Acacia: Characteristics, Distribution and Uses opens with a chapter describing the wood of *A. melanoxylon* grown in Portugal in view of determining its technological quality for use in the construction and furniture industry. The characterization includes stem features, wood anatomical characteristics, chemical composition, wood density and mechanical properties.

Next, the authors aim to describe and analyze common characteristics among Acacia s.l. species and to trace some parallelisms of their performance throughout several ecosystems that hold such species. It is well-known that Acacia s.l. species have the ability to fix atmospheric nitrogen and may modify soil chemistry and physics by enabling microorganisms/soil fauna to alter the microhabitat beneath the tree, and such characteristics are significant in the recovery of ecosystems.

The potential of Acacia mangium, an exotic species, for restoration of a degraded land in Mt. Makiling Forest Reserve (MMFR), Philippines was also examined. Results suggested a general trend of changes in *A. mangium* plantation which was once a grassland dominated by Imperata cylindrica and *Saccharum officinarum*. Both (stems ha^{-1}) and basal area (m^2 ha^{-1}) increased significantly in 2010-2018 (P=0.001).

The authors discuss the way in which NMR spectroscopy applied to the study of gum exudates has become important since the 1990's in Venezuela. Analytical and structural studies of 23 species belonging to different genera and families have been reported through the combination of classic methodology for carbohydrates and NMR spectroscopy.

The footprints left by evolution in the distribution of characters among current organisms have been one of

...uction of ancestral ... species throughout evolutionary time.

Pollinosis, also known as pollen allergy, hay fever or seasonal allergic rhinitis is one the most common respiratory disorders throughout the world. The inhalation of Acacia pollen is one of the main causes of respiratory allergic diseases in semiarid countries such as Iran, Saudi Arabia, and the United Arab Emirates. This book suggests that the recognition of allergenic components of pollens is essential for component-resolved diagnosis, the design of patient-specific immunotherapy, and the explanation of sensitization mechanisms to various allergens. The authors analyze Acacia-Pseudomyrmex mutualism which includes 15 species of acacias and a group of 10 species of mutualistic ants whose geographical distribution is similar. This relationship is frequently cited as an example of coevolution, a term that has been used to refer to the reciprocal change of interacting species where each of them acts as an agent of natural selection with respect

to the other and where the reciprocal selection would result in congruent phylogenies. The concluding chapter characterizes the *A. melanoxylon* wood pulping performance regarding yield and kappa number as well as the pulp and paper properties. The application of fast spectroscopic technologies for pulp quality determination is also described.

Chapter 1.

STEM AND WOOD CHARACTERIZATION OF *Acacia melanoxylon* AS AN INTRODUCED SPECIES IN EUROPE

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SUMARY

Acacia melanoxylon R. Br., known as blackwood, is a valued timber species for solid wood products applied in building and carpentry, prized for its heartwood characteristics and pleasant wood aesthetics. *A. melanoxylon* grows naturally in Australia over a wide latitudinal range from north Queensland to Southern Tasmania. The species was introduced in several countries where it showed good growth and adaptation. In Europe it was planted as an ornamental and now spreads in many countries. In Portugal, blackwood and other Acacia sop. were introduced through state afforestation programs in dry and poor sandy soils, and subsequently spread to other regions; it is now present in pure and mixed stands, mainly with maritime pine, with an estimated area about 5000 ha.

The blackwood stem is straight and shows a small taper. The heartwood occupies a large proportion of the stem volume (e.g over 60% in the lower stem region) while sapwood width is constant with little variation within and between trees. The wood shows distinct growth rings with dense latewood bands. The wood anatomy is characterized by small solitary or radial grouped vessels, homogeneous rays and low parenchyma proportion. The chemical composition shows a low lignin content and a high content of polar extractives in the heartwood. Blackwood is a medium-density hardwood with basic density between 465 kg/m^3 and 654 kg/m^3. The mechanical properties show potential to supply the industry with valuable hardwood timber.

This chapter describes the wood of *A. melanoxylon* grown in Portugal in view of determining its technological quality for use in the construction and furniture industry. The characterization includes stem features (growth ring, sapwood and heartwood): wood anatomical characteristics, chemical composition, wood density and mechanical properties. A brief summary of the information available on bark is also made regarding chemical features, taking into account its valorization integrated in a full resource use approach.