Wood quality and assortment determination through non-destructive acoustic analysis: a case study in chestnut coppices in Aspromonte National Park (Southern Italy)

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Chestnut is one of the most important species for timber production in Italy, even if the related woody supply chain is not able to enhance enough the market value of the woody assortments. The internal production is negatively conditioned by the market demands, mainly due to the absence of enough information on the wood quality. The acoustic technologies applied to predict the mechanical properties of timber are well-established practices in forest research. In this context, experimental trials have been applied in the "Aspromonte National Park" (Southern Italy) to identify and verify the wood quality in the early stages of chestnut growth and among their cutting cycle of 18-20 years. Specifically, in a chestnut coppices characterized by an homogeneous stand density and a good site index, we aimed to evaluate the biological response to the applied silviculture, analysing the dendrometric parameters and estimating the wood quality in the first years of growth and at different ages, taking also into account the wood assortments and amounts available. The study was focused on three experimental areas characterized by different slopes. The results showed similarities on the wood quality, even if significant differences among the average annual increment parameters for hectare were observed. This study then provided relevant results useful to support the wood supply chain of the chestnut through information on the quality of woody products.

Management of African economic trees for new research, the review of *Entandrophragma* genus (Meliaceae)

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Entandrophragma genus includes exclusively African species (10 to 12), five of which are on the IUCN Red List. Characterized by a taxonomic evolution that has resulted in an important synonymy of species names (36-37) and insufficient ecological knowledge, it is the richest in valuable species exploited as timber in Africa. This important exploitation is likely to compromise their durability in the absence of sustainable management. Our study is mainly based on scientific data (e.g., publications), economic data (production and export statistics) and legal data (laws and regulations); on management plans and inventory reports. The heavy industrial exploitation as artisanal does not always proceed in the respect of a validated management plan, nor of the duration of the rotations which would make it possible to reach a rate of reconstitution likely to perpetuate the resource which these species represent. Their sustainable management requires the development and respect of management measures to make their exploitation sustainable in the long term. This exploitation must be based on an adequate management of natural stands and on reforestation as well as on conservation measures. The research to be developed must focus on their growth rate (eg, in the face of climate change), the analysis of stable rings and isotopes, the evaluation of their stocks (production, biomass, carbon), their spatial distribution and molecular phylogeny, the improvement of their natural regeneration, their reproduction, phenology and anatomy, as well as the reinforcement of other relevant lines of research to guarantee the durability of these forest species.

Functional trait plasticity as an empirical basis to improve our understanding about the productivity and functioning of mixed-species stands

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In order to promote mixed forests, forest managers need to be provided with empirical evidence of how tree species mixing improves forest productivity and resilience. However, there is still a limited understanding about how intra-specific variability influences tree species interactions and their role in regulating forest ecosystems. Interactions between different species may cause plastic adjustments in the phenotype expression of functional traits related to tree resource-use efficiency, which in turn alters ecosystem productivity. We examined the effects of tree species mixtures on leaf trait plasticity in a case study at the BIOTREE diversity experiment. We analyzed the intra-specific variability of leaf functional traits (specific leaf area, nitrogen content) in monocultures and mixed stands of three important species in Central Europe (*Fagus sylvatica*, *Quercus petraea*, *Picea abies*). Results showed a significant effect of the species mixture on the trait distributions, indicating that intra-specific variability of key leaf traits was already influenced at young development stages by inter-specific interactions in mixed stands. Further research findings on the links between leaf trait plasticity and tree species interactions will provide a basis for the parameterization of process-based forest growth models, improving the prediction of growth dynamics and functioning in mixed forests. This will help to identify the most efficient tree mixtures for sustainable forest management in order to increase the forest managers' acceptance for mixed forests.

The Classification of forest types for ecological forest management in the deciduous and mixed forests of South Korea

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South Korea is classed as having a temperate climate with four distinct seasons and belongs to the vegetative zone of the temperate deciduous forests. According to the forestry statistics in 2016, the area of deciduous forest is 2,029,000 ha (33.4%) and the area of natural mixed forests is 1,706,000 ha (28.1%). In order to classify the forest types with similar ecological attributes, the NFI (National Forest Inventory) vegetative data for 2,814 sampling points were used. The forest types were grouped by TWINSPAN (Two-way Indicator Species Analysis) according to the importance value of tree species in the upper layer. The correlation between forest types and environmental factors was analyzed by CCA (Canonical Correspondence Analysis). The sampling points were classified into ten forest types such as *Quercus mongolica - Tilia amurensis* forest, *Q. variabilis - Q. serrata* forest, *Pinus densiflora - Q. variabilis* forest, etc. The species composition, stand structure and growth characteristic of each forest type are described to establish the foundation of ecological forest management. The correlation between