

# **Influence of Forest Management Regimens on Wood Quality of *Gmelina arborea* Roxb.**

**Hector Gonzalez Rubio.** (*hg433@mizzou.edu*)

## **Abstract**

The National Corporation of Forest Research (CONIF) has been developing a special research program to improve the use of forestry species of commercial use for the national productions. Some plantations from the incentive system there were deficiencies during the plantations process and tending time. Lack of management has resulted in plantations of low quality. Even though some stand do not reach the growth average, other stands presented excellent growth and yield due in part to the effect of the weather and soils quality.

The basic properties of *Gmelina arborea* roxb such as physical and mechanical properties, anatomy, performance in industrial process and utilization are not yet clearly established to use it as a hardwood wood in the national market. Most of the national wood market of *G. arborea* comes from landowner's forest without good quality due not suitable management, so the only utility of this wood is fiber board and plywood which have the lowest price in the market. Lack of knowledge about management regimes and its effects in the wood quality, as well as the site effect, limits the integral use of *Gmelina arborea* roxb as a forest resource in Colombia. It is necessary looking forward a better solution for the market of *G. arborea* allowing improves its use in other markets when the wood price will be favorable for landowners. This research examines how wood properties in *G. arborea* plantations should be better applying management regimes during the cut cycle and in different climatic regions of the country.

The study was carried out in three geographic regions in Colombia, The North, the Northwest and the Central Regions. Based in the categorization, three stands for each of the three regimes (no management, intermediate, and intensive) were selected, for a total of 9 plantations at 3, 7 and 11 years old. At each stand, three plots were raised by age and within each one the mean basal area tree which representing the most frequent height in the plantation was selected.

The specific gravity, heartwood percentage, modulus of rupture and elasticity were obtained at 1.3 m diameter breast height (dbh), at middle high (h/2) and one more where the diameter reaches no less than 10 cm (4 inches). The experimental design (split-split-split plot design) was assessed in four factors: Locations (North, northwest and central), Age of plantations (3, 7 and 11 years old), Management regimens (No management, intermediate, intensive) and Response variables (Specific gravity, heartwood percentage, Modulus of rupture, and modulus of elasticity). The specific properties of wood are directly related to specific gravity. This was seen in statistic bending within the different treatments. Plantations with no management presented the highest MOE and MOR values in bending. The other management regimens were very lower values than no management.

High variation in specific gravity from the base to top was found for whole the ages, regimes and regions, where the specific gravity decreased with increasing tree height. There is a reduction was either found in the modulus MOR and MOE from the base up to top of the trees.

The effect of the management regime in the properties of the specie (Physical and mechanicals properties) should be a guide to apply in order of getting decision in the use of the wood for different sort of products. It was interesting to know the possible differences in wood properties that could arise in *G. arborea* from one climatic region compared to another. We can conclude that the best values in the mechanical properties were found in dry regions rather those in humid regions. In general terms, *G. arborea* has similar and lightly greater mechanicals properties that those reported for other writers in others countries, which could be inferring that this wood should have the same use listed in the bibliography resources. Some reason of the variability in the wood properties correspond with the presence of juvenile wood in the wood sampled, dry conditions, wood tension, spiral fiber, carry out or wood handling.