XXIII Congresso de Iniciação Científica da Unicamp 2015
17 a 19 de Novembro
Campinas
Brasil

AGE-RELATED TREND OF ACOUSTICS PROPERTIES IN EUCALYPTUS CLONES

Raquel Gonçalves (PQ), Rafael Gustavo Mansini Lorensani (PG), Gabriela Müller Cesar (IC)

Abstract
Find tools to anticipate the knowledge of wood properties is very important for the forest sector. To this anticipation, is necessary that these tools allow tests directly on trees and in earliest ages. Besides, it is necessary that the differentiation among trees be maintained along years. Therefore, the objective of this research was to analyze the age-related trend of the velocity of ultrasonic wave propagation in two different species of clones. For the tests, we used 71 seedlings (3 months old) and 360 trees in different ages, of two species of Eucalyptus clone. The results showed that the velocity of wave propagation in longitudinal direction (VL) grows with age and maintain the differences between clones from seedling to the cutting age.

Key words: velocity of wave propagation, seedling, trees

Introduction

Find tools to be used to predict the properties of the wood, from tests directly in trees and in earliest ages, is a nowadays challenge. However, it is necessary to know the age-related and if the differences among properties, measured in early ages in different species, are maintaining. Many researchers showed that the velocity of ultrasound wave propagation grows with age, but the results are based on specimens and not directly in trees. Some papers had discussed the variation of velocity in trees as a function of the age, but using aged trees[1]. There are also similar discussion, but the youngest trees has 3 years old[2]. The objective of our research was to evaluate, using two different clones, the age-related trends of longitudinal ultrasound velocity from seedlings (3 months) to 72 months year's old trees (cutting age in paper and pulp companies). For the tests, we used 71 seedlings and 360 trees (30 per age for each clone).

Results and Discussion

Although we have tested the trees with 12, 24, 36, 48, 60 and 72 months, we note that the results of velocity were influenced by the site of plantation. This statement was confirmed by the strength and stiffness tests obtained in another research using the same trees. So, we expurgated these data of our analyze of the age dependence. Using the data presented in table 1, the Linear regression (Figure 1) was statistically significant (P-value = 0,0000) with R = 0,99 and R=0,98 for clones IPB2 and IPB7 respectively.

The IPB2 seedling presented longitudinal velocity of ultrasound wave propagation greater than the IPB7 and this behavior was maintained until the cutting age (72 months).

Table 1. Sample used in the regressions analyzes.

Clone	Seedlings	trees					
age	**3**	**12**	**24**	**36**	**48**	**60**	**72**
IPB2	51	30	30	-	30	30	30
IPB7	20	-	30	-	-	30	30

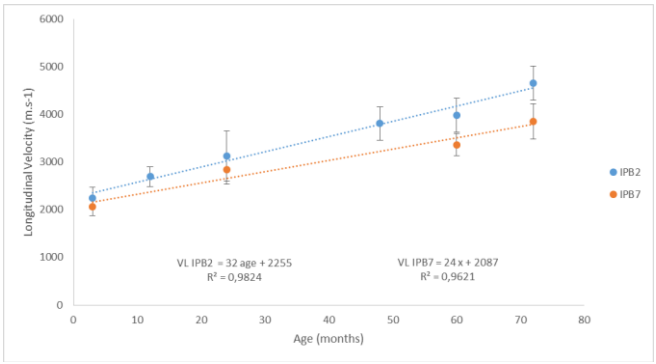

Figure 1. Linear regression for longitudinal velocity and age. *Errors bars corresponding to the standard deviation of the sample

Conclusions

The velocity of wave propagation in longitudinal direction (VL) grows with age and maintain the differences between clones from seedling to the cutting age.

Acknowledgement

We thank CNPq and FAPESP for scholarships (FAPESP Proc. 2013/03449-9) and International Paper and FAPESP (Proc. 2012/22599-9) for research support.

[1] Apiloaza L.A. 2009. Very early selection for solid wood quality: screening for early winners. Ann For Sci 66:601
[2] Merlo, E.; Santaclara, O. 2012. Wood quality screening with acoustic methods in 3 years old pinaster pine progenies. Madera Plus Calidad Forestal S.L.