

Evaluation of growth components of rubber tree using structural equation modeling (SEM) with longitudinal data

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This work was conducted to evaluate the behavior of different growing rates of *Hevea brasiliensis* in height and diameter over four subsequent periods with alternating of average temperature and total precipitation. In order, to detect individuals genetically capable of develop in different weather conditions. Genotypic values were predicted by BLUP methodology of growth values for purposes of analyzing correlations between longitudinal values, as well as, path analysis and structural equation modeling, to infer aiming the effects of direct and indirect causalities on the total increments values. The experiment was established in a randomized complete block design with four replications, having 272 square plots (270 progenies and 2 parental) with four clones of each individual. This was done at Edouard Michelin Plantation, which is an area characterized by subtropical climate with periods of drought and low temperature throughout the year. It was found that all components of periodic growth for both traits were positive and significantly correlated with total increments. The correlation values between the heights and diameters in the first two periods suggests that initially these two traits were not directly related, but in the two subsequent periods were obtained positive and significant correlation values, indicating the presence of interaction. The structural model presented adjusted probability of 90.29%. Among the last two periods of growth, the effects of periodic indirect height values showed a negative sign with magnitude more substantial than others, indicating reversal growth capacity of certain individuals in these two periods. Periods of climate with both higher temperature and higher rainfall had great influence in the total increment than periods of drought and cold; nevertheless, such less favorable periods presented individuals with reasonable growth potential, corroborated by significative positive correlations between individuals of these periods, indicating the existence of potential genes for further growth even in less favorable conditions. Only the direct effects were statistically significant. Financial Support: CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior