B11G-0104   Tree Diametric Increment and Litterfall Production in an Eastern Amazonian Forest: the Role of Functional Groups

Back to: Raimundo Oliveira Junior

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Tree growth is a biotic variable of great importance in understanding the dynamics of tree communities and may be used as a tool in studies of biological or climate modeling. Some climate models predict more recurrent climate anomalies in this century, which may alter the functioning of tropical forests with serious structural and demographic implications. The present study aimed to evaluate the profile of tree growth and litterfall production in an eastern Amazon forest, which has suffered recent climatic disturbances. We contrasted different functional groups based on wood density (stem with 0.55; 0.56-0.7; >0.7 g cm^{-3}), light availability (crown illumination index; high illuminated crown - IIC1 until shaded crown – IIC5), and, size class (trees 10-22.5; 22.6-35; 35.1-55; 55,1-90; >90 cm dbh). Tree diameter increment was monthly measured from November 2011 to September 2013 by using dendrometer bands installed on 850 individuals from different families. Litterfall was collected in 64 circular traps, oven dried and weighed, separated into leaves, twigs, reproductive parts and miscellaneous. During the rainy season the sampled trees had the highest rates of tree diametric increment. When analyzing the data by functional groups, large trees had faster growth, but when grouped by wood density, trees with wood density up to 0.55 and between 0.56 and 0.7 g cm^{-3} had the fastest rates of growth. When grouped by crown illumination index, trees exposed to higher levels of light grew more in comparison to partially shaded trees. Maximum daily air temperature and precipitation were the most important environmental variables in determining the diametric increment profile of the trees. Litterfall production was estimated to be 7.1 Mg $ha^{-1}.year^{-1}$ and showed a strong seasonal pattern, with dry season production being higher than in the rainy season. Leaves formed the largest fraction of the litterfall, followed by twigs, reproductive parts, and finally miscellaneous. These results show that the profile of tree diametric growth and litterfall production are recorded at close intervals in the preterit analyzes in the same study area and highlights the efficiency of functional groups in determining the tree growth profile.

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