

An alternative method for determination of total primary production in different ages of secondary vegetation in NE Amazon

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The “capoeira” (secondary vegetation) is a common example of modified area in the Amazon rainforest, however is an efficient form to recover the potential of agricultural productivity. In this direction, the accompaniment of the increment of primary productivity, in such a way aerial as underground, in these modified ecosystems, becomes the important tools to assist in the agreement of the cycle of nutrients and water as well as in carbon accumulation.

The objective of this work is to supply an efficient tool of accompaniment of the primary productivity following the leaf area index (LAI) and the root increment index (RII) in three different ages of “capoeira”. This work was carried through in the Igarapé-Açu, Pará, in producer’s fellow areas (SHIFT – project ENV25). The dominant ground are Ultisols (Kandiudults-USDA-soil taxonomy). The LAI was evaluated not destructively, a time per month, through the analyzer of canopy LAI-2000, Li-Cor, that it measures through an optic sensor the diffuse light attenuated by the canopy, and converts it, through mathematical procedures, in values of leaves area (m²)/soil area (m²). The monthly measurement was carried through in three parcels of 50mx50m in the “capoeira” of 6 and 10 years old (average height 3.5m and 6.5m, respectively), and in three parcels of 30mx30m in the “capoeira” of 1 year old (average height 1.5m). The root increment, was estimated by ingrowths-bags, with 2mm of mesh, full with subsoil previously bolted (mesh of 2mm), installed to the depths of 0-10cm, 30, 50, 100, 200, 300, and 400cm. The bags had been initially installed in the beginning of the less rainy and rainy period. Six months after de installation, the bags was removed from different depths, and dried at 105 °C. The material was weighed, and washed in current water with assist of bolter (mesh 2mm), and the collected root material was dried at 65 °C until constant weight. The RII was calculated considering: $RII = \text{total root weight (g)}/\text{soil density inside of the bag (g/cm}^3\text{)}$.

The data from LAI during one year of measurement had shown that “capoeira” of 10 years old demonstrated greater LAI during all the year. However, our hypothesis did not confirm for “capoeira” of 6 and 1 year old, being that the “capoeira” of 1 year had presented many times bigger LAI of the one than 6 years old. Also we can observed that the “capoeira” of 1 and 6 years tend to reduce LAI (1.40 and 1.53 m²/m², respectively) in accordance with the reduction of rains. Already the “capoeira” of 10 years, had not exactly presented a sharp reduction in this period (0.95 m²/m²). The results of root increment showed not to exist a clear variation in the root growth between the winter months (rainier period) and summer (less rainy period), in the three ages of studied “capoeira”. However, the data show, for all the studied ages, existed an intense root growth in depth, mainly in the depth of 4 m, where it had greater root development in the period less rainy. These result suggest mechanisms of absorption of nutrients and water in deeper layers of the ground, for “capoeira’s” species. We can’t found a relation between LAI and RII for “capoeira” of 10 and 6 year old, however we found a positive correlation, between 100 and 400 cm of depth, in “capoeira” of 1 year old.