

Structural Traits of an Eight Year Old Secondary Forest in the Central Amazon

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In 1992, a 17 ha agro-ecological field trial was established at the experimental site of EMBRAPA Amazônia Ocidental, situated 28 km north of Manaus, Amazonas, Brazil. The area, which was covered by an 8 year old secondary forest, had been slashed and burned in the conventional manner. A secondary forest of 1 ha was left standing as a reference. The area of 100 x 100 m was divided into 10 x 10 m plots and floristical and structural data of the vegetation of these plots were collected, such as

- 1 Floristical composition of each of the plots, covering all the vascular plants (woody and herbaceous plants of all ages);
- 2 Diameters of all the trunks of each species occurring in the plots with a diameter (BHD) > 2 cm;
- 3 Additional species lists of all woody species with a stem diameter < 2 cm and of the herbaceous species occurring in the plots.

In addition, all the species occurring in the "1 ha secondary forest" were classified on the basis of growth-form types, using a growth-form system specially designed for the vegetation under study. The use history of the forest is known on the whole and the vegetation changes have been observed since 1992. The site has therefore become a considerable scientific value for applied ecological research activities in the region.

The variation of the vegetation within the 1 ha area had been analyzed with the aid of multivariate analyses (PCA) of the floristical composition of the plots. Conclusions were drawn from the floristical and structural analyses concerning the key environmental factors leading to the vegetation studied.

The survey revealed a total number of 404 species in the study area. The tree layer was dominated by *Vismia guianensis* (Aubl.) Choisy, and this species was also the most frequently occurring tree species in the experimental site. The comparison of the frequency tables with the most frequently occurring species shows that the species

composition of the herb layer is very distinct from the tree layer. The comparison of the growth-form spectra of the herb and the tree layer reveals that the spectra of herb and tree layer are similar. Only the growth-form types with herbaceous species ("WH" to "UH" in the graph) are absent in the tree layer or represented by only few species.

There are obviously no environmental gradients or boundaries in the experimental site, e.g. of soil qualities. The floristic gradients and spatial patterns must therefore be interpreted as the result of the history of the sites (= use history, mainly former disturbance events), plant distributions by chance and the result of interactions and interspecific competition of the species. The analyzed data set represents a moment in the progressive secondary succession of the tropical secondary forest. Comparative studies of different sites combined with long-term studies would be the only reliable way to accumulate knowledge on the paths of succession, the coordinated variance of the species and the autecological behavior of single species in the successional sequence.

Nevertheless, the analysis of the strata for all plots of the sites permits views into the past and the near future of the vegetation under study. Examples: In the tree layer, *Miconia tomentosa* (Rich.) D. Don ex DC. spreads by seeds which were mainly imported by birds, whereas *Goupia glabra* Aubl. is a remain of the primary forest which survived the slashing and burning as roots and stumps and regenerated vegetatively afterwards. In the herb layer, the grass *Homolepis aturensis* (Kunth) Chase invaded the site after slashing and burning, whereas the tree species *Gutteria guianensis* (Aubl.) R.E. Fries and the palm tree *Oenocarpus bacaba* Mart. are part of future stages of succession. The distinct species composition in the two strata leads to the conclusion that succession might not necessarily proceed step by step and continuously, but discontinuously, i.e. with periods of stagnation and rapid progression.