

Spatial and temporal change of the spontaneous vegetation in an agricultural field experiment

Preisinger, Helmut ⁽¹⁾, Coêlho, Luiz F. ⁽²⁾, Gasparotto, Luadir ⁽³⁾ and Lieberei, Reinhard ⁽¹⁾

⁽¹⁾ Universität Hamburg, Deutschland, ⁽²⁾ INPA, Manaus, Brasil,

⁽³⁾ EMBRAPA Amazônia Ocidental, Manaus, Brasil

The objective of the SHIFT field trial carried out on an area of 17 ha at the experimental site of EMBRAPA Amazônia Ocidental near Manaus, Amazonas, Brazil, is to endeavor to re-use an abandoned agricultural site using mixed cropping systems and to survey some of the main ecological interactions between the growth of the useful plants, the spontaneous vegetation in the field, and management and site factors. The field trial consists of 90 plots and 5 blocks, with 5 plantation systems and 2 fertilization levels. A vegetation science approach was taken to survey the spontaneous vegetation of all the plots, with the resulting data representing the *spatial variation* within the experimental area. Four vegetation surveys were carried out (in 1993, 1995, 1998 and 2000), so the data represent a *temporal sequence* of vegetation. The analysis of the temporal sequence requires a quantitative data set. However, it is not possible to estimate cover for all of the species in the plots of 1.600 m² each. Therefore, two different data set were collected:

1. Flora presence-absence data and
2. Estimate of cover of the seven growth-form types representing the vast majority of flora (1. Phanerophytes, 2. Nano-phanerophytes, 3. Graminoid tussock or rhizomatous herbs, 4. Graminoid stolon herbs, 5. Broad-leaved herbs, 6. Rhizomatous herbs and 7. Lianas).

The data sets were in part analyzed with the aid of multivariate techniques (PCA and RDA). From the ordination models obtained, hypotheses on causal connections between floristic composition, structural traits of vegetation and environmental key factors were developed. The lecture presents some of the results of the vegetation survey with regard to the following items:

1. Spatial gradients in the experimental area,
2. Temporal change to the species numbers in the experimental plantation and differences in species numbers in the different plantation systems,
3. Temporal changes in growth-form structure of the spontaneous vegetation in the plots and of the different plantation systems, and
4. Effect of the two fertilization levels on the spontaneous vegetation.