

Seasonal rhythms of tropical tree species in contrasting soil conditions in southern Brazil

Gil Cardoso Fernanda C.¹, Marques Márcia C.M.¹,
Marques Renato² & Paulo C. Botosso

¹Departamento de Botânica, Universidade Federal do Paraná, Curitiba, Brazil

²Departamento de Solos e Engenharia Agrícola, Universidade Federal do Paraná, Curitiba, Brazil

³Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Florestas, Colombo, Brazil

The great variety of phenological patterns in tropical forests must not be explained only by climatic factors. Considering that soil water availability influences plant water status and total metabolism, soil conditions are also expected to be important for the regulation of plant reproductive and vegetative activities over time. Phenological (flushing, leaf fall, flowering and fruiting) and diameter growth (measured with fixed dendrometer bands) data were performed every fifteen days over one year for 120 trees of two tree species (*Senna multijuga* and *Cytharexylum myrianthum*) in the Atlantic Forest in Southern Brazil. We investigated if phenological patterns and diameter growth can be distinct in soils contrasting in humidity and nutritional characteristics: Gleisil (more humidity and poor in nutrients) and Cambisil (higher drainage and intermediate nutrient values). Each species' phenological patterns were alike and marked by seasonality on the phenophases, in both types of soil. However, the frequency, peak and intensity of the phenophases in the two soil types were distinct. Phenophases were strongly correlated ($0.43 < r_s < 0.93$) with climatic variables (mean temperature and rainfall) and day length, but weakly correlated ($0.42 < r_s < 0.60$) with the water table depth. Diameter growth was significantly correlated with flushing and fruiting ($0.44 < r_s < 0.82$). Mean cumulative growth for *C. myrianthum* was lower in the Gleisil than in Cambisil, while there was no difference in growth between soils for *S. multijuga*. There were strong correlations between diameter growth and all the climatic variables, but they were stronger with day length ($0.86 < r_s < 0.93$). These results show, for the first time, that variations in soil characteristics are important factors affecting phenological patterns and growth in tropical tree species.