Light quality and quantity in the four most important phytogeographic formations of the State of São Paulo along 2003

Marta Regina Almeida Muniz

Abstract

The objective of this study was to verify the possible differences of the light patterns during the winter of the year of 2003 (June 21 to September 23) for different conditions of the vegetation mosaic, including the four main forest formations of the state of São Paulo (Semideciduous Seasonal Forest - Floresta Estacional Semidecidual, Sub-Montane Ombrophilous Dense Forest - Floresta Ombrófila Densa Sub-Montana, Xeromorphic Coastal Dune Forest Resting - Floresta de Restinga and Advanced Succesional Stage of Forest - Forest Savana). The tested hypothesis was that differences exist so much inside as among each of those formations by PPFD (Photosynthetic Photons Flux Density) received during the winter, even considering that this station presents the smallest variation widths of the solar radiation along the days. This research project was inserted in the Biota Thematic Project /FAPESP - Permanent Plots (1999/09635-0), which maintains a permanent plot of 10.4 hectares in four different conserved fragments of Semideciduous Seasonal Forest, Sub-Montane Ombrophilous Dense Forest, Xeromorphic Coastal Dune Forest (Restinga) and Advanced Succesional Stage of Forest (Forest Savana), located in the municipal districts of Gália, Sete Barras, Ilha do Cardoso/Cananéia and Assis, respectively. Inside each of those plots were chosen parts, for which the following conditions of the vegetation mosaic were considered: Semideciduous Seasonal Forest and Sub-Montane Ombrophilous Dense Forest: Center of Large Gap, Internal Edge of Large Gap, External Edge of Large Gap, Center of Small Gap, Understorey far 10 meters from the Boundary of Large Gap (1m in direction to the gap), Understorey far 20 meters from the Boundary of Large Gap (1m in direction to the gap) and Understorey under Evergreen Canopy. To the Forest of Restinga, the studied conditions were: Center of Large Gap, Internal Edge of Large Gap, External Edge of Large Gap, Center of Small Gap, Understorey far 20 meters from the Boundary of Large Gap (1m in direction to Understorey) and Understorey under Deciduous Canopy. For the Forest Savana, the studied conditions were: Center of Large Clearing, Internal Edge of Large Gap, External Edge of Large Gap, Center of Small Gap,Understorey far 10 meters from the Boundary of Large Gap (1m in direction to the gap), Understorey under Deciduous Canopy. For each condition of the mosaic, in each of those formations, it was installed a sensor of quantum coupled to a datalogger, which registered the Photosynthetic Photons Flux Density (PPFD) for every minute along all winter station days. Starting from the instantaneous values of PPFD, daily total PPFD was calculated. Using those data it was possible to make cluster's analysis, ordering, regression and temporary series. The analyses of temporary series revealed significant differences among the conditions of the vegetation mosaic of the Sub-Montane Ombrophilous Dense Forest and the Forest Savana. In the Sub-Montane Ombrophilous Dense Forest significant difference was not verified among the conditions in Center of Small Gap, Understorey far 10m from the Boundary of Large Clearing and Understorey under Evergreen Canopy, while for the other studied conditions significant difference was verified among them. For Forest Savana, the analysis showed that the conditions of Center of Large Gap and Internal Edge of Large Gap didn't differ to each other, opposite to the observed for the other conditions of the vegetation mosaic of Forest Savana. For Semideciduous Seasonal Forest and the Restinga, the analysis of temporary series didn't reveal significant differences among the studied conditions of the vegetation mosaic. This fact can be explained by the great variability of the data, what does with that the analysis don't get to show the possible differences among the studied conditions of the vegetation mosaic of those formations. Comparing all the four studied formations, the analyses revealed that the Center of Large Gap of the Forest of Restinga didn't differ significantly of the Center of Large Gap of Forest Savana, but among the other formations there were significant differences when considered this condition of the mosaic. For the other conditions, all the formations showed significant differences, this means that, all the conditions considered in the study are different for the four studied formations. Although the differences observed among the conditions of each forest formation not always were shown significant, for the plants that live in that mosaic, those differences are probably significant, once studies already accomplished show that the species that compose the vegetation mosaic present different behavior in relation to the light, where exist species that preferably germinate and grow up in the clearings; denominated pioneers, as well as to those that complete its life cycle in more shaded atmospheres (Understoreys);

denominated secondary and primary. The obtained results allow to conclude that for the station of the winter, the conditions of the vegetation mosaic found in Cerradao and in the Sub-Montane Ombrophilous Dense Forest present differences by PPFD. For the Forest of Restinga and Semideciduous Seasonal Forest, the conditions of the mosaic don't differ by PPFD. The conditions of the vegetation mosaic differ among the four studied formations, except the condition of Center of Large Clearing, shown equal so much at the Forest of Restinga as in Forest Savana. It is worth to stand out that this study aimed to differentiate situations of the mosaic using PPFD, which is a climatic data, and just during the winter station, where the variations relating to the solar radiation are smaller in relation to the other seasons. So, these results can be different for the other seasons, as well as if considered the whole year

Key-words: Light, florest

FICHA CATALOGRÁFICA ELABORADA PELA BIBLIOTECA DO INSTITUTO DE BIOLOGIA – UNICAMP

Muniz, Marta Regina Almeida

Estudo do regime de luz nas quatro principais formações fitogeográficas no estado de São Paulo durante o inverno do ano de 2003 / Marta Regina Almeida Muniz. –Campinas, SP:[s.n.], 2004.
Orientador: Ricardo Ribeiro Rodrigues
Co-orientador: Sergius Gandolfi
Dissertação (mestrado) – Universidade Estadual de Campinas.

M925e

Instituto de Biologia

1. Luz. 2. Florestas. I. Rodrigues, Ricardo Ribeiro. II. Gandolfi, Sergius.
III. Universidade Estadual de Campinas. Instituto de Biologia. IV. Título.