Dendrochronology applied to urban afforestation management

Claudia Fontana1,2
1Instituto Federal Catarinense, Lucerna, Brasil; 2Claretino, Blumenau, Brasil (claudiafontanaricio@gmail.com)

Trees in urban area present their own responses to environmental pressures when compared to those in native forests. Monitoring these trees is essential for urban planning and security. Jacaranda mimosofolia D. Don is an exotic species in Brazil but widely used in urban afforestation. Tree falls of this species in urban area have been related to fungal infection. In this work, a dendrochronological study of a wood disc of J. mimosofolia that fell in an urban square (Joaçaba, Santa Catarina state) was carried out. The tree was flowering and apparently healthy. A disk with a diameter of 58 cm was collected one meter above the ground. It was polished (sands from 80 to 2000 grains) and five radii were dated, photographed with a reference scale and the growth rings measured in image software.

Dating was checked in Cofecha and dendrochronological parameters were generated in Arstan. The estimated age was 37 years, and the correlation between the radii was r = 0.563 and the sensitivity of 0.255 (Cofecha), with rbar = 0.451 (standard chronology). The average width-rings was 7.96 mm (0.74 to 16.89 mm). Areas with rot caused by fungi and routes caused by termites were observed. One hypothesis is that the fungal infection occurred for some injury between the tree’s 17 and 20 ages (years 1998 to 2001) facilitating insects entry. The rot compromised about 2/3 of the disk, causing tree weakening and probably its fall.

Dendroecology and wood anatomy of a rare species Dinizia jueirana-facao (Fabaceae), “Tabuleiros” Atlantic Forest, Brazil

Claudia Fontana1, Luiz Santini-Junior2, Caroline Américo da Silva2, Juliano Morales Oliveira1, Mario Tomazello-Filho1, Paulo Cesar Botosso1,2
1Instituto Federal Catarinense, Lucerna, Brasil; 2Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, Brasil; 3Unisinos, São Leopoldo, Brasil; 4Embrapa Florestas, Colombo, Brasil (claudiafontanaricio@gmail.com; luizsantinijr82@gmail.com; caroline.americo.silva@usp.br; julianooliveira@unisinos.br)

The great diversity of tree species present in the tropics results from the high quantity of rare species in the present. Therefore, understanding their ecology is critical to the conservation of these complex tropical ecosystems. Dendrochronology can retrieve valuable information from tree rings analysis. We characterize the wood anatomy of Dinizia jueirana-facao, a rare tree species recently described, occurring only in semi-deciduous Atlantic rain forest in Espírito Santo State, Southeastern Brazil. Preliminary results of dendrochronological studies are also presented. For microscopic analysis of growth-ring boundaries and dendrochronology, we prepared samples of five adult trees by standard techniques in each area. Dinizia jueirana-facao has growth rings visible to the naked eye, but sometimes with difficulty, demarcated by thin marginal parenchyma bands. It shows fiber wall thickness variation sometimes resulting in distinct tangential fiber zones in the latewood. Confluent parenchyma bands are especially frequent sometimes masking the tree-ring boundaries. Despite difficulties in some samples, we crossdating five trees (10 rays). The correlations within the trees were 0.40 up to 0.80, among trees of r = 0.538, rbar = 0.277, EPS = 0.81 and mean sensitivity of 0.551. Although preliminary, the results obtained so far demonstrate the dendrochronological potential of the species can already be verified. The high synchronicity and sensitivity of the growth rings in the investigated population shows that this rare tree species is affected by recurrent variations in the environment. After completing crossdating, we will test the chronology with local and global climate data.

Dendroanatomy of Copaifera pubiflora and the prospect of oleoresin production

Patricia da Costa1,2, Mateus Natan Lee Cardoso1, Tomaz Longhi-Santos1, Renata Cristina Bovi1
1Embrapa Roraima, Boa Vista, Brasil; 2Universidade Federal do Parnaíba, Cariri, Brasil; 3Universidade Estadual Paulista “Júlio de Mesquita Filho”, Instituto de Geociências e Ciências Exatas, Rio Claro, Brasil (patricia.da-costa@embrapa.br; 20102622@gmail.com; longhijafdr.br; bovic@gmail.com)

Copaifera pubiflora Bentham. (Fabaceae) is a medium-sized tree species recorded in Brazil, only in Roraima State, Southeastern Brazil. Preliminary results of dendrochronological studies are also presented. For microscopic analysis of growth-ring boundaries and dendrochronology, we prepared samples of five adult trees by standard techniques in each area. Copaifera pubiflora has growth rings visible to the naked eye, but sometimes with difficulty, demarcated by thin marginal parenchyma bands. It shows fiber wall thickness variation sometimes resulting in distinct tangential fiber zones in the latewood. Confluent parenchyma bands are especially frequent sometimes masking the tree-ring boundaries. Despite difficulties in some samples, we crossdating five trees (10 rays). The correlations within the trees were 0.40 up to 0.80, among trees of r = 0.538, rbar = 0.277, EPS = 0.81 and mean sensitivity of 0.551. Although preliminary, the results obtained so far demonstrate the dendrochronological potential of the species can already be verified. The high synchronicity and sensitivity of the growth rings in the investigated population shows that this rare tree species is affected by recurrent variations in the environment. After completing crossdating, we will test the chronology with local and global climate data.

Prediction of tree-ring widths using climate data-time-series modeling approach

Dejan Stojanovic1, Milena Kresoja1, Tom Levanić1, Bratislav Matovic1, Vladimir Djordjevic1, Sasa Orlovic1, Srdjan Stojnic1, Mirjana Stevanovic1,4
1University of Novi Sad, Faculty of Forest and Nature Conservation, Belgrade, Serbia; 2University of Novi Sad, Faculty of Sciences, Department of Mathematics and Informatics, Novi Sad, Serbia; 3Austrian Forest Institute, Ljubljana, Slovenia; 4University of Belgrade, Faculty of Physics, Institute of Meteorology, Belgrade, Serbia; 5University of Novi Sad, Faculty of Agriculture, Novi Sad, Serbia; 6University of Göttingen, Faculty of forest sciences and forest ecology, Chair of forest and nature conservation policy Göttingen Germany (dejan.stojanovic@uns.ac.rs; milena.kresoja@ijmni.uns.ac.rs; tom.levanici@gozdjsi.si; bratislav.matovic@gmail.com; vjd@ff.bg.ac.rs; sasao@uns.ac.rs; srdjan.stojnic@uns.ac.rs; mizavodj@gwdg.de)

Dendrochronology is a scientific discipline that performs dating of historical events allowing better understanding of environmental processes and human induced changes including past weather, forest fires, landslides, insect outbreaks, etc. Tree-rings, central paradigm of Dendrochronology, may be well used also