The analyses of some components of the substances that are part of osmotical components has been carried out. In both clones determination of total amino acids showed increased concentration due to drought. Furthermore, the proline (widely considered as amino acid stress marker) content increases also in both clones during drought condition. Those data indicate that both clones react to stress increasing amino acids concentration. The determination of total soluble sugars (sucrose plus reducing sugars) indicate no general significant increase during stress period in both clones comparing the level in the control samples The analyses carried out did not explain what are the components of high osmotic potential measured in control Ulloi. Further analysis will be developed considering other carbohydrates (fructan, threalose), organic acids as possible osmolytes.

Considering the wide differences in osmotic potential measured between Ulloi and Nyirsegi young control trees used for experiment, leaves from large number of trees, 2 and 35 years old has been collected in black locust plantations. This in order to subject them to osmotic measures and evaluate the statistical significance between the two clones. The Table 2 reports data from which it is possible to see that the two varieties have significant osmotic component concentration.

Table 2. **Osmotic potential measured in leaves of 35 year old and 2 year old Ulloi and Nyirsegi trees (mOsm / g F W)**

	35 years old trees (n 21)	2 years old trees (n 36)
Nyirsegi	1,016 ± 0,04542	1,358 ± 0,03239
Ulloi	3,149 ± 0,03584**	3,774 ± 0,05942**

** significant different at $P < 0,05$

The studies give indication that comparing different tree genotypes is possible to have indication of the presence between them of a different degree of resistance to flooding or drought stressses. The use of daily course stem diameter evolution seems to be an indicator of stress status. Experiences indicate that flooding or drought could have negative effect on cambial activity and consequently on wood formation. The negative effects may have consequence also in the successive growing seasons. Furthermore there are evidence that flooding or drought act in different ways and different intensity also in relation of tree species or genotypes. The use of physiological and biochemical markers can contribute to obtain indication useful for selection of stress resistance aptitude. In particular ethylene or ethanol presence and evolution can be markers for hypoxia resistance and osmotic potential seems relateted to drought conditions in young trees. Long time experiments are necessary to evaluate the response on older trees and the stresses consequence on wood characteristic and quality.

CAMBIAL ACTIVITY IN CERRADO SPECIES OF SOUTHEASTERN BRAZIL

Marcati C. R. [1]***, Wiedenhoeft A. C.*** [2]

[1] Unesp – Universidade Estadual Paulista FCA, Departamento de Recursos Naturais. Fazenda Lageado - Rua José Barbosa de Barros, nº 1780, CP 237, 18603-970, Botucatu, SP, Brazil, +55(14)38117162, carmen@fca.unesp.br;
[2] Center for Wood Anatomy Research, Forest Products Laboratory, One Gifford Pinchot Dr., Madison, WI, 53726-2398, USA.

Studies on seasonal activity of the vascular cambium and how that activity is influenced by environmental factors (temperature, rainfall, soil moisture, daylength), phenology, and plant habitat provide critical data for understanding the growth dynamics of trees. It is generally assumed that, in temperate trees, cambial activity is influenced primarily by temperature and daylength, and that in tropical trees, rainfall and available water are more important factors in the control of cambial activity.

Distinctly seasonal cambial activity occurs in many tropical and subtropical regions that experience severe annual dry seasons, including regions of Brazil [31, 32, 4, 19, 6, 10, 20, 21], but most of the detailed studies from such regions have been conducted on Indian taxa [13, 14, 15, 8, 9, 1, 18, 29, 23, 24, 25, 26, 30]. The period of cambial activity in tropical trees typically is longer than that of temperate trees – in some tropical species extending throughout the year [11, 17].

Because of the paucity of detailed information on cambial activity in Brazilian species, the present work was aimed at providing information on cambial activity in relation to water availability in 1, 2, and 3

year old branches of ten species (*Acosmium subelegans* (Mohlenbr.) Yakovlev, *Bowdichia virgilioides* Kunth and *Machaerium villosum* Vogel, Leguminosae-Faboideae; *Annona coriacea* Mart, Annonaceae; *Byrsonima verbascifolia* (L.) DC, Malpighiaceae; *Diospyros hispida* A. DC, Ebenaceae; *Gochnatia barrosi* Cabrera and *Piptocarpha rotundifolia* (Less.) Baker, Asteraceae; *Pouteria torta* (Mart.) Radlk, Sapotaceae; *Roupala montana* Aubl, Proteaceae) from the cerrado of Brazil.

The area of study is a remnant of cerrado of São Paulo State (23° 02' 55, 5'' S and 48º 31' 26, 1'' W), Pratânia municipality, at an altitude of approximately 700 m above mean sea level. Cerrados, savanna-like ecosystems, are characterized by limited water availability during the dry season, high irradiation levels, low fertility and acidic sandy soil, high incidence of herbivores, and periodic fires [7, 12, 16].

Three or four individuals were sampled for each species and branch age at the beginning of the rainy season (October), during the rainy season (February and March) and dry season (June), and at the end of the dry season (September).

The material was fixed in CRAF III (10 % chromic acid, glacial acetic acid, 37 % formaldehyde and distilled water; Berlyn and Miksche [3] for about 10 days.

Transverse sections were obtained with the use of a sliding microtome. The sections, about 15 μm thick, were clarified with sodium hypochlorite (50 %) then double stained with aqueous 1 % safranin [5] and aqueous 1 % astra blue [27] (1: 9). Some sectioned material was embedded in synthetic resin (Entellan®).

Smaller fragments (ca. 0,5 cm3) of the branches were dehydrated and embedded in plastic resin (Historesin®), according to Bennett [2], and transverse, radial, and serial tangential sections about 5 μm thick were obtained with the use of a rotary microtome. The sections were stained with toluidine blue, in acetate buffer, pH 4,7, producing a metachromatic stain [22].

Cambial activity was underway in one 1-year-old branch of eight (*Annona, Bowdichia, Diospyros, Gochnatia, Byrsonima, Machaerium, Piptocarpha* and *Roupala*) of the ten species in September, which corresponded with the first rainfall at the end of the dry season. However, the cambium was dormant in all of the other 1-year-old branches of all ten species. The cambium was still dormant or activity had just begun in the 1-year-old branches of *Byrsonima, Pouteria, Bowdichia, Diospyros,* and *Gochnatia* in October at the beginning of the rainy season. Thus, no clear relationship existed between the initiation of cambial activity and water availability in these cerrado species. The first rainfall in September (around 5 mm in 2004, and 12 mm in 2005) was too sparse to replace the water in the soil at the end of the dry season. By October, the 1, and 2 year old branches of all species showed clear cambial activity. In most of our plants, cambial activity was initiated in 1-year-old branches earlier than in the 2-year-old branches, and in the 2-year-old branches earlier than in the 3-year-old ones, suggesting that cambial activity might spread basipetally in these taxa.

Cambial activity began to decline in February, and by March, the cambium was dormant in all ten cerrado species; that is, during the rainy season when water was readily available in the soil. Thus, unlike many tropical trees in which cambial activity continues for most or all of the year, in these cerrado trees and shrubs the cambium was dormant for six to nine months, with the onset of dormancy taking place during the rainy season. The nutrient poor, acidic sandy soils [16], of the cerrado may be limiting factors for cambial activity. It is important to note that Rossatto *et al.* [28] also found cessation of above-ground growth to occur in savanna species of the cerrado region of central Brazil (near Brasília) prior to the end of the wet season, when water was still abundant. They suggested that cessation of above-ground growth at a time of active photosynthesis may reflect a shift in assimilate allocation to roots and reserves.

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