Eucalyptus camaldulensis and *Eucalyptus pellita* stands, in the savannah region, in Brazil, in several tree spatial arrangements. Root dry matter for every quadrat of 0.5 m × 0.5 m in this area was obtained through interpolation. Coarse roots (diameter >2 mm) decreased sharply with the distance from the tree in all spatial arrangements, being this difference greater for *E. pellita* than for *E. camaldulensis.* Fine roots (diameter <2 mm) distribution was more uniform than for coarse roots for both species in all tree arrangements studied. Average fine roots dry matter was 80 and 136 g/m^2 in the largest (9 m × 9 m) arrangement studied for *E. camaldulensis* and *E. pellita*, respectively. These results indicate that the distance between tree rows in agroforestry systems should be large enough to maintain reduced competition for growth resources with crops or pasture allowing higher production of all components of the system.

Behavior of roots of savanna species in the Pantanal wetlands, Brazil. Salis, S. (*EMBRAPA, Brazil; salis_sm@yahoo.com.br*), Lehn, C. (*Instituto Federal de Educação, Ciência e Tecnologia Farroupilha, Brazil; crlehn@gmail.com*), Mattos, P., Bergier, I., Crispim, S. (*EMBRAPA, Brazil; patricia.mattos@embrapa.br; ivan.bergier@embrapa.br; sandra.crispim@embrapa.br*).

The objective of this study was to determine the maximum depth variation, structure, diameter, and biomass of the roots of common woody species in two savanna physiognomies in the Pantanal wetland, Brazil. The root systems of 37 trees and 34 shrubs were excavated for measurements and estimating the root biomass through the allometric relationship with diameter at soil level. Regression equations to estimate root biomass of the common species were also developed. The root systems of savanna woody species usually range from 3 to 19 m in depth. However, it was observed that these savanna species in the wetland have different behavior. The average length of rooting system in savanna woodland was 0.8 ± 0.3 m and 0.7 ± 0.2 m in open woody savanna. All the regression analyses showed a level of significance of $P < 0.05$ and R^2 values close to or above 0.8. Shorter root systems of lower biomass were observed in comparison to those recorded in well-drained savannas. This was regarded as a response to the water table effect, particularly during the wet season. This effect is important when considering the biomass and carbon stocks of wetland savannas in national and global carbon inventories.

Mycorrhizal communities in *Imperata cylindrical* invaded and non-invaded commercial *Pinus taeda* stands. Trautwig, A., Eckhardt, L. (*Auburn University, USA; antrautw@gmail.com; eckhalg@auburn.edu*), Hoeksema, J. (*University of Mississippi, USA; hoeksema@olemss.edu*).

Pinus taeda comprises >50% of the growing stock in commercial forests, totaling more than 1.2 billion seedlings. *Imperata cylindrica*, a highly noxious weed, has been shown to reduce tree vigor in *P. taeda* plantations. This species is known to produce allelopathic exudates that may influence the community dynamics of *P. taeda* symbionts like mycorrhizal fungi and which have to date not been adequately quantified. In November 2013 and May 2014, roots were sampled at an intensively managed site in Greene County, Mississippi, on Westervelt property in *I. cylindrica* invaded and non-invaded plots. Roots were measured for percent colonization, and then separated by morphotype for molecular analysis of the internal transcribed space (ITS) region. Spatial analyses allowed quantification of the patchiness that is often present in mycorrhizal networks and normalization of data across stands. We will provide a baseline for assessing ectomycorrhizal fungal community dynamics during the stages of invasion, and quantify differences between invaded and non-invaded plots and the ecological effects of some of the absent species in invaded plots (i.e., as it pertains to disease, nutrition, and second degree invasion). We hypothesize that there will be less species diversity in *I. cylindrica* invaded plots due to fewer plant species and allelopathic exudates.

Free air humidity manipulation (FAHM) experiment in Estonia provides new knowledge of climate change effects on northern forests. Tullus, A., Sellin, A., Ostonen-Märtin, I., Kukumägi, M., Hansen, R. (*University of Tartu, Estonia; arvo.tullus@ut.ee; arne.sellin@ut.ee; ivika.ostonen@ut.ee; mai.kukumagi@ut.ee; raili.hansen@ut.ee*), Lutter, R., Tullus, T., Tullus, H. (*Estonian University of Life Sciences, Estonia; reimo.lutter@emu.ee; tea.tullus@emu.ee; hardi.tullus@emu.ee*), Lõhmus, K., Sõber, A., Kupper, P. (*University of Tartu, Estonia; krista.lohmus@ut.ee; anu.sober@ut.ee; priit.kupper@ut.ee*).

Global warming will bring more precipitation in northern latitudes and warmer air can hold more water vapour, meaning that air humidity will increase. The free air humidity manipulation (FAHM) research facility was established in Estonia (58°14′N, 27°18′E) in 2006–2007 to study effects of elevated (*about* 7% over the ambient) atmospheric humidity on the growth and functioning of silver birch (*Betula pendula* Roth) and hybrid aspen (*Populus tremula* L. × *P. tremuloides* Michx.) forests. As expected, under elevated humidity conditions transpiration flux through the trees decreased, which in turn affected soil water potential and mineral nutrient supply to the leaves. Responses to elevated humidity interacted with other climate variables and varied among the studied tree species. Mainly due to differences in belowground production and soil respiration, young forest stands under elevated humidity acted as C sinks, while control plots were C sources after the first 2 experimental years. To conclude, the expected climate-change-induced increase in the growth rate of trees at northern latitudes (boreal areas) due to the earlier start of growing season in spring or higher carbon assimilation rate could be smaller than expected if temperature rise is accompanied by a rise in atmospheric humidity.

Precipitation frequency controls interannual variation of soil respiration in a subtropical forest. Wang, H. (*Chinese Academy of Sciences, China; wanghm@igsnrr.ac.cn*), Wang, Y. (*Tianjin Normal University, China; wangyidong58@gmail.com*).

Forest carbon pool is generally affected by environment fluctuations on an annual scale. However, factors that control the interannual variation of soil respiration (R_S) have not been sufficiently investigated. Interannual variation of R_S was studied using a 6-year data set in a subtropical plantation in China. The results showed that seasonal variation of R_S was significantly affected by soil temperature and soil water content (SWC). R_S in the dry season (July–October) was constrained by seasonal drought. Mean annual R_S was estimated to be 736 ± 30 g C/m^2/year, with a range of 706–790 g C/m^2/year. Although this forest was characterized by a humid climate with high precipitation (1 469 mm/year), the interannual variation of R_S was attributed to the changes of annual mean SWC (R^2= 0.66, P = 0.03), which was affected by annual rainfall frequency (R^2= 0.80, $P < 0.01$) and not rainfall amount (P = 0.84). Consequently, the precipitation pattern indirectly controlled the interannual variation of R_S by affecting soil moisture in this subtropical forest. In the context of climate change, interannual variation of R_S in subtropical ecosystems is expected to increase because of the predicted changes of precipitation regime.