and secondary local climate information. Each polygon of the soil map was associated with a database, which allowed the definition of the land limitation degrees (DN, water deficiency, oxygen deficiency, erosion susceptibility and management impediments) for the pine cultivation. The management units classes of pine cultivation were defined by a set of criteria, considering the different land limitation degrees achieved for each land polygon (from soil map). The most important land limitation degree for pine growth in the pilot area was the management impediments, due to limitations of the soil depth, terrain slope and rocky fragments. The following quantitative data from the management units were obtained in the pilot area: 111.6 ha of Lowly suitable (24.8% of the area); 282.0 ha Upper marginal (62.6% of the area); and 57.2 ha Lower marginal (12.7% of the area).

Biodegradable containers in the production of *Pinus maximinoi* seedlings.

Leticia Miranda[1], Fabricio Antônio Biernaski[1], James Stahl[1]
[1]Klabin S/A, Telêmaco Borba, Brasil (lemiranda@klabin.com.br; fbiernaski@klabin.com.br; jstahl@klabin.com.br)

Pinus maximinoi is an important and promising species in Brazilian forestry. This species has a sensitivity to physical impediments during its root system formation, requiring adjustments in its silviculture management. Biodegradable containers, specifically the paperpot system have been an alternative for seedlings production. However, the paper degradation range may affect the survival of the seedlings after planting, causing impediments to roots expansion. Therefore, the objective of this work was to evaluate five commercial papers with different degradation times in the production of *P. maximinoi* seedlings. Five types of paperpots were tested, three of them of Ellepot® brand, with durability times: (T1) + 12 months, (T2) 8-12 months, (T3) 4-6 months, one of Plantpaper® (T4) brand, and one of BCC® brand (T5), both without specification of durability. At 135 and 210 days of nursery, the quality of the seedlings and the level of the papers degradation was evaluated, using a percentages scale with four levels. At 210 days, the seedlings were planted in the field for future evaluations. The degradation levels were statistically different at 1% of significance in both evaluation periods. The T5 reached 100% degradation at 210 days, while the T4 paper showed no signs of degradation at the same period. T3 was the most promising paper, with an average of 54 and 75% degradation at 135 and 210 days respectively. The other two papers had 54% of degradation average at the end of the seedling production cycle.

The determinants of optimal leaf area in eucalypt plantations

Rose Brinkhoff[1], Mark Hovenden[1], Mark Hunt[1]
[1]School of Natural Sciences and ARC Training Centre for Forest Value, University of Tasmania, Sandy Bay, Australia (roseb2@utas.edu.au, mark.hovenden@utas.edu.au, mark.hunt@utas.edu.au)

It is well understood that stand leaf area index (LAI) is extremely responsive to fertiliser application in Australian temperate *Eucalyptus* plantations. At energy-limited but nonwater-limited sites a high LAI is beneficial for maximising productivity and there is limited evidence to suggest that some of the leaf area may operate below the light compensation point and act primarily as a nutrient store. Conversely, on seasonally water limited sites, a high LAI has the potential for negative consequences for rotation-length plantation growth. The dynamics of these relationships, particularly the role that fertiliser application plays, are not yet well understood, and thus constitute an impediment to developing accurate, informed management prescriptions. In our study a range of fertiliser experiments in *Eucalyptus nitens* and *E. globulus* plantations were established along a temperature and precipitation gradient in southern Australia. We explored the relationship between nitrogen and phosphorus fertiliser treatments and stand LAI, the vertical distribution of leaf area and the longevity of N and P stored in leaves. We also explored differences in photosynthesis and respiration as a function of light, temperature and nutritional status.The outcomes of this research will include robust assessments of how the costs and benefits to plantation production of an increase in LAI are related to climatic conditions. This will facilitate the development of fertiliser prescriptions better tailored to local climatic conditions and assist with our understanding of how plantation nutrition may explain part of the inter-rotation productivity decline that has been observed at some water-limited sites across the estate.

Shade area and microclimate under the canopy of Cerrado trees in silvopasture systems / *Área de sombra e microclima sob a copa de árvores do Cerrado para sistemas silvipastoris*

Diego' Fonseca[1], Silvia Pereira[2], Valdemir Laura[1,2,,3], Ariadne Mastelaro[4], Fabiana Alves[3,,4], Roberto Almeida[3]
[1]Universidade Federal de Mato Grosso do Sul, Campo Grande, Brasil; [2]Universidade Anhanguera , Campo Grande, Brasil; [3]Embrapa Gado de Corte, Campo Grande, Brasil; [4]Universidade Federal do Paraná, Curitiba, Brasil (diegorezendes1@gmail.com; silviarahe@gmail.com; valdemir.laura@embrapa.br; aripmvet@gmail.com; fabiana.alves@embrapa.br; roberto.giolo@embrapa.br)

Em dezembro de 2015 implantamos um arboreto com 13 espécies arbóreas nativas do Cerrado (24 mudas de cada espécie) em uma área de aproximadamente 1,0 ha, na Embrapa Gado de Corte, Campo Grande – MS. Medimos a temperatura, a umidade relativa do ar e a radiação solar sob a copa de quatro indivíduos de oito espécies e a pleno sol, entre maio e junho de 2018. A partir dos dados coletados, calculamos os Índices de Temperatura e Umidade (ITU) e determinamos a porcentagem de bloqueio de radiação solar sob a copa das árvores. Adicionalmente determinamos a área projetada de copa às 12h00 em junho de 2018 com base das dimensões das árvores e o ângulo de elevação do sol. Comparamos as dimensões das árvores e área de sombra entre as espécies, e o índice de temperatura e umidade (ITU) entre espécies e ao longo das horas do dia, através da Análise da Variância (ANOVA) e teste Tukey a 5%. Pterogyne nitens e Peltophorum dubium, apresentaram maiores dimensões e maiores áreas de sombra projetada, dois anos e meio após plantio. Não houve diferenças ($p > 0,05$) entre as espécies e a pleno sol para ITU; diferindo apenas ao longo do dia ($p < 0,05$), com menores valores ao final da tarde. Em relação a porcentagem de bloqueio de radiação, *P. nitens* está entre as espécies com maior bloqueio enquanto *P. dubium* de menor bloqueio de radiação. Com base nessas características *P. dubium* e *P. nitens* são as espécies de maior potencial para uso em sistemas silvipastoris.

Survival of *Eucalyptus* spp. clones in different spacing arrangements in the semiarid region of Pernambuco, Brazil / *Sobrevivência de clones de Eucalyptus spp. em diferentes espaçamentos com condições climáticas extremas no semiárido pernambucano*

Rinaldo Luiz Caraciolo Ferreira[1], José Antônio Aleixo da Silva[1], José Wesley Lima Silva[1], Marilia Regina Costa Castro [2]
[1]Universidade Federal Rural de Pernambuco, Recife, Brasil; [2]Instituto de Educação, Ciência e Tecnologia de Pernambuco, Recife, Brasil (rinaldo.ferreira@ufrpe.br; jaaleixo@uol.com.br; wesleylima_[16]silva@hotmail.com; mariliarcastro@uol.com)

O Polo Gesseiro do Araripe, situado no semiárido pernambucano, é uma região bastante afetada pelas mudanças climáticas e grande consumidor da vegetação nativa com fins energéticos para indústria do gesso. Florestas de eucaliptos foram implantadas na região para atender a alta demanda energética da indústria gesseira, responsáveis por 95% da produção nacional. Desta forma, objetivou-se com esta pesquisa avaliar a sobrevivência de clones de *Eucalyptus* spp. em diferentes espaçamentos em condições de seca extrema. Os dados foram provenientes de um experimento inteiramente aleatório com três clones de *Eucalyptus*