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Title: GENETIC IMPROVEMENT OF *Eucalyptus benthamii* AT EMBRAPA

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Thema: 2. Producing for development

Subtheme: 2.4 Maintenance and increase of productive capacity of forests

Abstract of the paper: *Eucalyptus benthamii* has been indicated for planting in the Southern Region of Brazil at altitudes ranging from 800-1,400m normally prone to frosts of up to -6°C. Technological assessments of its wood (density, calorific power, lignin content) have showed aptitude for energetic purposes. It has been observed a continuous expansion of the planted area during the last five years and recent estimates indicated that 10,000ha are currently occupied by this species. The genetic improvement program carried out by Embrapa has completed 20 years, and the first experimental field (0.5ha) was established at Colombo-PR (25°19'S; 49°09'W; 941m) in 1988. Successive thinnings allowed transforming that area in a "Selected Mother Trees" category of Seed Collection Area, containing 130 plants at present. A second seed production field, originated from the latter, is located in Ponta Grossa-PR (25°09'S; 50°04'W; 880m). This Clonal Seed Production Area (1.09ha, 160 plants) was formed by planting rooted stems of 16 clear-cut trees after selection at the age of eight years for growth rate, stem form and sanity. As the original population (Wentworth Falls-NSW, Australia: 33°48'S; 150°24'E; 150m) exhibits a narrow genetic basis (7-10 trees), Embrapa has decided to make efforts to enlarge it. To do so, 30 progenies from Kedumba Valley-NSW (33°49'S; 150°23'E; 140m), six from Bents Basin-NSW (33°52'S; 150°38'E; 40m) and also seedlots in bulk from Crossley SSO (33°28'S; 145°00'E; 90m) and SSO Barclays Deniliquin (35°01'S; 145°13'E; 100m) were imported from CSIRO in 2005, contributing to achieve an appropriate basis available for the institutional multi-generation recurrent selection program. In order to evaluate the performance of these new introductions, a progeny test was initially established in Ponta Grossa in 2007. The assessment for DBH (20 months) showed the following statistical-genetic parameters: mean=6.17cm; $h^2_a=0.40$; $h^2_{mp}=0.82$; $CV_{gi}(\%)=17.12$; $CV_{gp}(\%)=8.56$. These results oriented the first precocious thinning by the elimination of approximately 30% of the trees with lesser individual additive values, besides those ones forked, broken and diseased. Concerning the hybridization strategy, controlled crosses of *E. benthamii* (as male parent) with *E. grandis*, *E. urophylla* and *E. pellita* were performed in 2008, originating about 30,000 seeds, whose respective plants will be assessed periodically for a multiple number of traits in field trials to be established in 2009. The development of research to improve the massive propagation protocols is of great importance for clonal silvicultural systems, allowing significant productivity and quality gains to the future plantations of *E. benthamii* and its hybrids.

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