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“Tree breeding for sustainable industrial forests”

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Paraserianthes falcataria is the fastest growing tree native to Indonesia, Haiti and Papua New Guinea. The plant even thrives in marginal land, where it grows symbiotically with nitrogen-fixing *Rhizobium* and phosphorus-promoting mycorrhizal fungi. Therefore, the tree is a suitable species for industrial timber estates in southeast Asian countries. The wood of *Paraserianthes falcataria* has been used for furniture, veneer, pulp and light-construction materials. The mean annual increment of a *Paraserianthes falcataria* plantation for producing construction wood is up to 45 m_3/ha, therefore this species as well as another species, *Acacia mangium* were selected by the Indonesian government for the development of the industrial forest estates and reforestation. To promote the establishment of a sustainable industrial forest using *Paraserianthes falcataria*, the yield and quality of wood should be enhanced by tree breeding programs.

We demonstrate the production of transgenic *Paraserianthes falcataria* for the first time.“**Production of transgenic *Paraserianthes falcataria* expressining polar cellulose**” This study was performed in collaboration with the Research center for biotechnology, LIPI. Poplar cellulase (*PaPopCel1*) was over-expressed in a tropical Lenguminosae tree, sengon (*Paraserianthes falcataria*), by the *Agrobacterium tumefaciens* method (Hartati et al. 2008). *PaPopCel1* over-expession increased the length and width of stems with larger leaves, which showed a moderately higher density of green color than leaves of the wild-type plants. Based on a carbohydrate analysis of cell walls, the leaves of the transgenic plants contained less wall-bound xyloglucan than those of the wild-type plants. These findings support the hypothesis that the paracrystalline sites of cellulose microfibrils are attacked by poplar cellulase, which loosens xyloglucan intercalation, resulting in an irreversible wall modification. This process could be the reason why the over-expression of poplar cellulase promotes plant growth.

Hartati S., Sudarmonowati E., Park Y. W., Kaku T., Kaida R., Baba K., and Hayashi T. (2008) Over-expression of Poplar Cellulase Accelerates Growth and Disturbs the Closing Movements of Leaves in Sengon. (2008) *Plant Physiology*, **147**, 552-561