Clonal propagation of *Paulownia elongata* and evaluation of genetic fidelity

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Introduction. *Paulownia elongata* is a forest tree native to China, with multiple uses in the wood industry (1). Plantations are difficult to establish from seeds and cutting in the field (2), thus different techniques for *in vitro* propagation have been developed in order to accelerate their production and to obtain pathogen-free plants (3). Although the *in vitro* propagation and development of this species is very favorable, the genetic variation that may occur as a result of multiple factors inherent to the tissue culture procedure and the plant genotype itself cannot be ignored. This variation can be detected by morphological or molecular markers (4). In this study, we used RAPD markers to evaluate the genetic fidelity of *Paulownia elongata* plants, propagated *in vitro* from axillary buds.

Methods. In the present study, we established a protocol for the propagation of *P. elongata* using axenic nodal segments obtained from *in vitro* germinated seedlings. These segments were cultured on MS medium supplemented with benzyladenine (BA) 1.5 mg/L as a growth regulator. Axillary buds proliferated and produced plants. From the plants obtained, new explants were cut and the propagation cycle was repeated. After five propagation cycles, DNA was extracted from plants by the method of Zhang modified (5) and the genetic fidelity was evaluated through RAPD markers using random decamer primers.

Results. We selected 20 plants propagated through axillary buds proliferation after the fifth propagation cycle. DNA was extracted from these plants and the genetic fidelity was evaluated by RAPD markers. Out of 10 primers screened, only three produced clear and reproducible bands, giving a total of 22 scored bands. The banding profile obtained was recorded as presence/absence in a binary matrix from which similarity was calculated. A dendrogram was built from the similarity data and a bootstrap analysis was performed. Two well-defined groups were observed from this analysis.

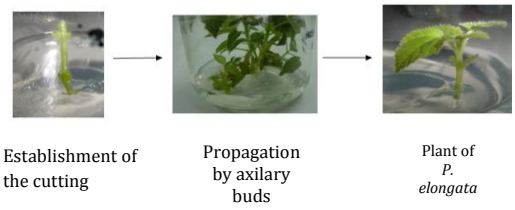

Fig.1 Regeneration of *P. elongata* by axilary buds.

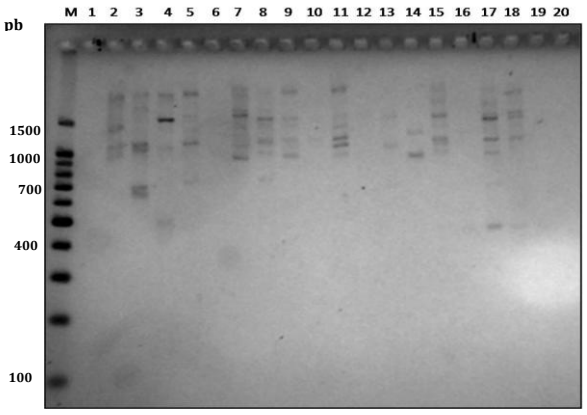

Fig.2 Products amplified by the selected primers.

Conclusions. A low level of genetic variation was observed in micropropagated *P. elongata* plants when RAPD markers were used for the evaluation. The use of a more polymorphic molecular marker may be necessary to ensure detection of the genetic variation produced by this propagation technique.

References.

1. Zhu Z. H., Chao C. J., Lu X. Y., Xiong D. Y. 1986. Asian Network of Biological Sciences. International Devel Res Center, Canada.
2. Bergmann B., A. Moon H. K. 1997. Plant Cell Rep. 16(5): 315-318.
3. Olmos S.E., Lavia G., Di Renzo M., Mroginski L., Echenique V. *In Vitro Cell. Dev. Biol.—Plant* 38:617–622.
4. Sánchez-Chia Neiva., Jiménez V. M. 2009. Agronomía mesoamericana 20(1): 135-151.
5. Zhang D-X., Hewitt G.M. 2001. A Karp, PG Isaac DC Ingram eds. Klumer Academic Publishers.