Optimized protocols for *in vitro* morphogenesis of several woody plants

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Conventional micropropagation can be considered as the first approach towards *in vitro* germplasm preservation. Advantages of *in vitro* storage include the sterile preservation of materials, no risk of infections by insects or damage through unfavorable weather conditions, less work needed for collections, and the varieties are available all year round. Hereof, the *in vitro* technology is considered as one of the most efficient methods of *ex situ* conservation [1, 2].

Micropropagation of many broad-leave species has been accomplished [3, 4, 5]. However, with some exceptions traditional *in vitro* methods are not as yet practical or commercially viable for most forest trees. Numerous forest trees and bushes are still recalcitrant to establishment *in vitro*. Therefore, improvement in current procedures and their scaling-up is required.

In the current study the attempt was made to describe the development of micropropagation protocols for cloning of threatened woody plants *Amygdalus georgica* Desf., *Populus euphratica* Oliv. and *Castanea sativa* Mill. These species are economically and ecologically important as they are included in the Red List of Georgia and yield valued products. *Prunus tenella* Batsch. (listed as *Amygdalus georgica* Desf. in the Red List of Georgia) (Rosaceae) is endemic to country and is recorded among the one hundred fourteen endemic species of the Caucasus eco-region. In the Red List Georgian almond is specified as endangered species (EN) and features very high risk of extinction in the wild on the basis of extremely small distribution range. Trans Caucasian poplar *Populus euphratica* Oliv. (Salicaceae) is included in the Red List of Georgia as critically endangered taxon (CR). The population counts about 300 mainly male individuals grown on both sides of the valley. European chestnut *Castanea sativa* Mill. (Fagaceae) filed into the Red List of Georgia due to the decreased distribution range and habitat fragmentation. The *in vitro* seedlings, zygotic embryos and axillary buds were used as initial explants. The effects of different growth regulators and culture media were tested on organogenesis. All woody species were successfully propagated in this work displaying diverse response to culture conditions and explants sources. The results clearly show that the selection of plant material for clonal propagation should be done carefully. Vegetative parts collected after dormancy has been broken are beneficial in both terms of proper hormonal balance and elimination of contamination risks.

All species selected were relic or/and endemic and have the great value to forest ecosystems for maintaining genetic resource diversity. Therefore, further optimizing feasible *in vitro* protocols for micropropagation of rare woody perennials would have the great value for conservation of selected valuable lines and rapid mass production providing the maintenance of genetic resource diversity and offsetting the pressure on natural populations.

References

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