# A brief report on micropropagation of a rare ornamental shrub—the red form of Magnolia delavayi

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Some years ago the red flowered form of *Magnolia delavayi* Franch. was found in the Hua-Fu mountains of Mou-Din County in Yunnan province of China. At that time, only one plant naturally grew among the mixed forest of *Magnolia delavayi* and *Manglietia insignis*. It is said that it is a natural hybrid between these species, but so far we have no more evidence. The Kumming Institute of Botany (Academia Sinica, Kumming, Yunnan, China) has carried out its introduction and cultivation from seed, and good results have been achieved although the progeny shows a very wide range of variation in flower color. Last year we started a project of vegetative propagation of the selected red form, including a study of micropropagation methods. So far there is no international report on the micropropagation of the red form of *Magnolia delavayi*, and we are here reporting our preliminary results to TMS members.

Materials and Methods:

The explants used were terminal buds which were cut from the vigorous plant inside the Institute in early spring. The explants were washed with clean water and the surface was cleaned by using 70% alcohol. Explants were then soaked in a 0.1% solution of mercuric chloride for 5 minutes. The sterilized explants were again washed five to ten times in distilled water.

The explants were placed on the media of Murashige & Skoog (MS) and Vacin & Went (VW) with different combinations of benzyladenine (BA), 0.50—5.00mg/L, plus naphthaleneacetic acid (NAA), 0.05—0.50mg/L, for culturing under various conditions of temperature and lighting.

Results and Discussion:

1. Effect of the media on shoot differentiation.

When the sterilized buds were cultured on the MS and VW media with the combination of BA 0.50—5.00mg/L plus NAA 0.05—0.50mg/L, a brown secretion appeared on the MS medium one week later, and the buds turned yellow and died twenty days after culturing. Explants in the VW medium had less brown secretion, and new shoots with red-edged leaflets started to differentiate ten days after culturing.

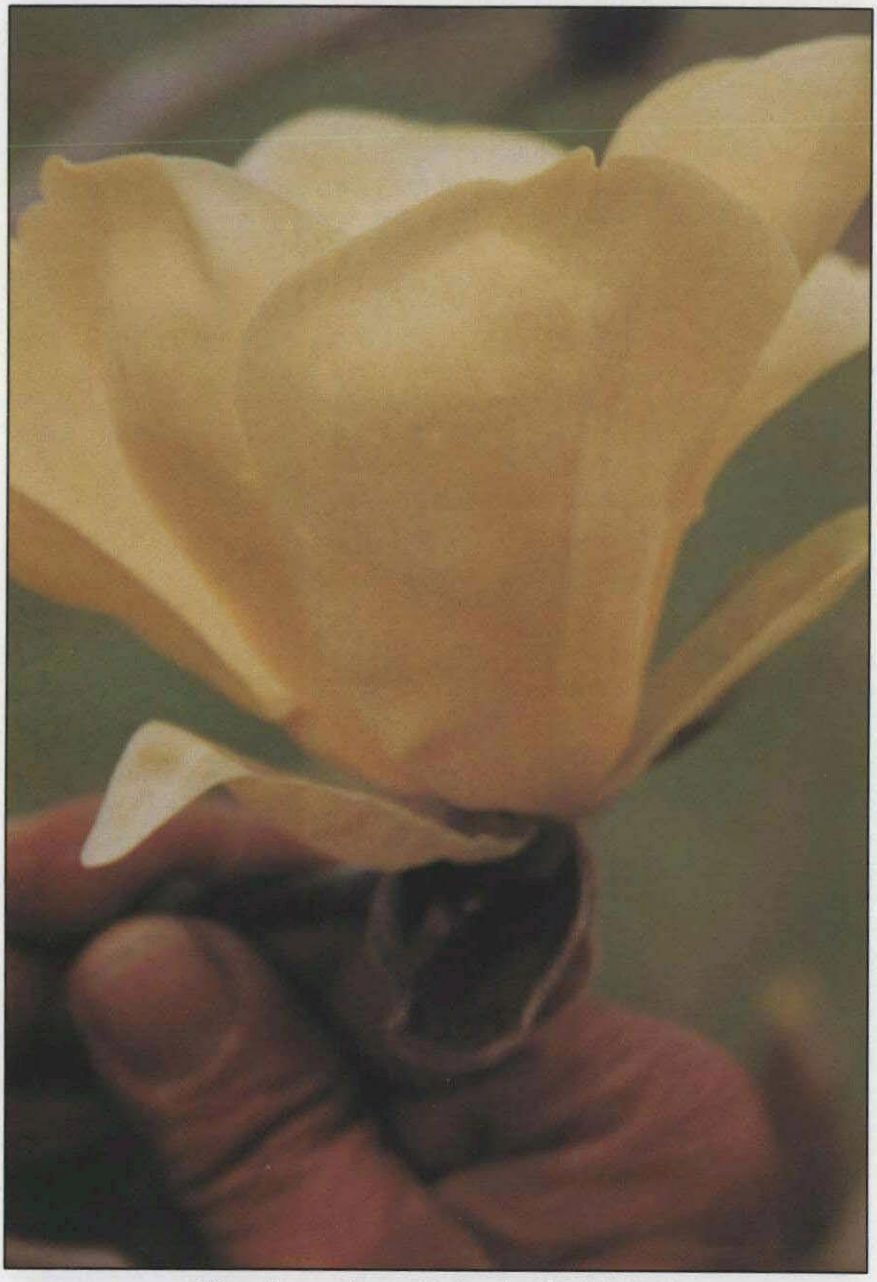
The VW medium could induce the pink callus which gradually changed to black, and new shoots grew out when recultured. The main difference between MS medium and VW medium is that VW medium contains less nutrients. For culturing the red form of *M. delavayi* it is important that its medium contain low-salt elements, meaning that the low-salt medium is suitable for its micropropagation. We have tried 1/4 MS medium and achieved similar results as with VW medium.

2. Effect of phytohormones on inducing shoot multiplication and proliferation.

The explants were cultured on VW or 1/4 strength MS media with different phytohormone combinations of BA 0.50, 1.00, 2.00, 3.00, 4.00 and 5.00mg/L plus NAA 0.05, 0.10, 0.20, 0.30, 0.40, and 0.50mg/L and shoot induction began ten days later. The medium with BA 5.00mg/L plus NAA 0.50mg/L showed good results. Shoots were recultured every 20-30 days, but the translucent shoots were induced when a medium with BA concentrations up to 4mg/L plus NAA up to 0.4mg/L was used. In that case, shoot proliferation was quick and the base of the callus turned black. Medium with BA 2.00-4.00mg/L plus NAA 0.20-0.40mg/L could get 3-4 times the multiplication rate, and the shoots had a quick growth (shoots up to 2.00cm in 20 days) with no translucent shoots produced. When the multiplication culture used a medium with BA 0.50-1.00mg/L plus NAA 0.05-0.10mg/L, only one or two shoots could be induced, and the shoot growth was much slower.

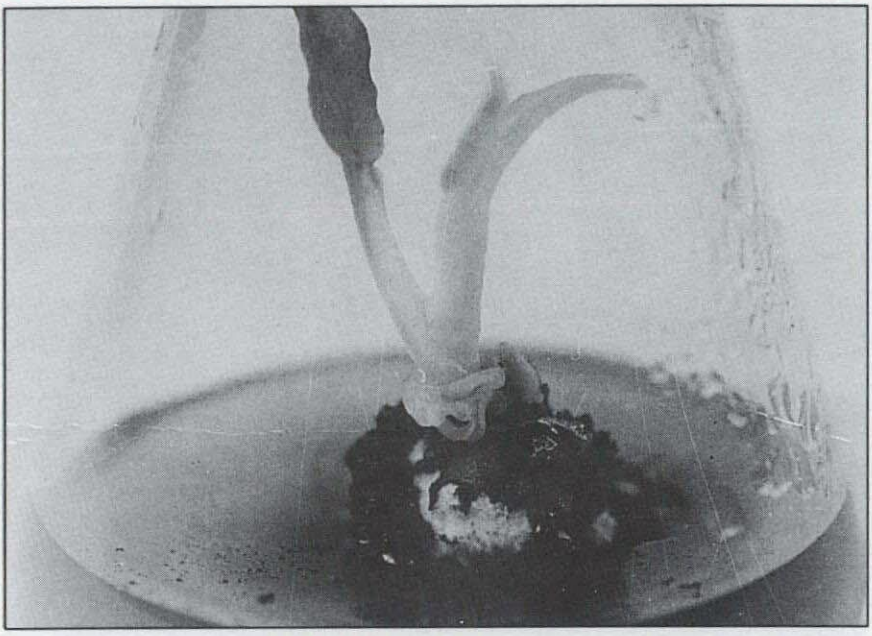
3. Medium pH.

Medium pH levels of 5.0, 5.4, 5.8, 6.2 and 7.0 were used for the culturing experiment. A medium pH of 5.0-5.8 was best; with a pH above 5.8, shoot leaflet color changed to yellow and the brown secretion was increased compared with other pH levels.

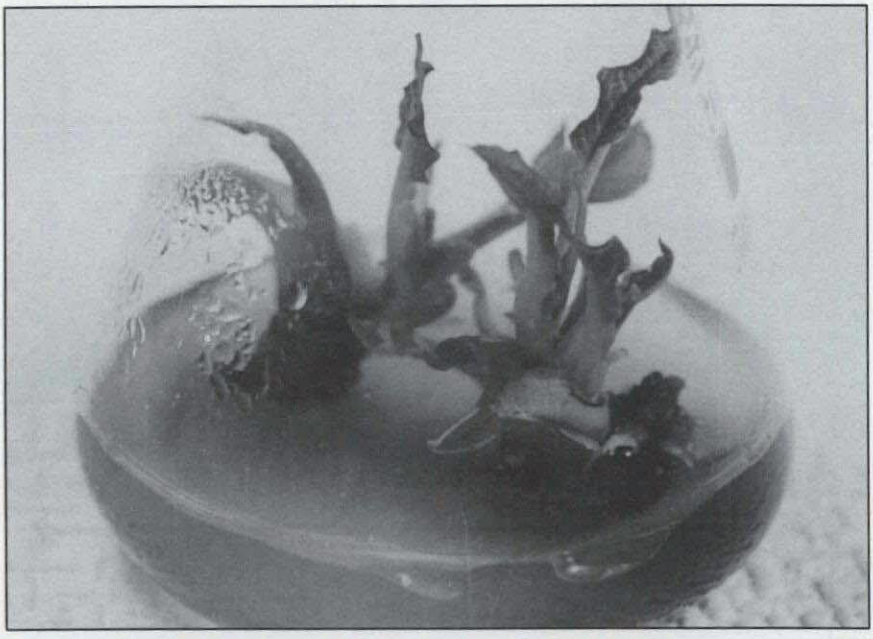


Magnolia acuminata *x* M. denudata '*Golden Sun*'

Magnolia cylindrica '*Bjuv*'



*Above: VW medium with BA 1.00mg/L plus NAA 0.10mg/L.*
*Below: VW medium with BA 3.00mg/L plus NAA 0.30mg/L.*



4. Culture Temperature:

A culture temperature of 20°C, 25°C, and 30°C was set inside the culture room. When temperature was above 30°C, it had the same result as the higher pH levels. The optimum culture temperature for the red form of *M. delavayi* was 20-25°C.

5. Light and Light Intensity:

Light of 10 hours, 12 hours, 14 hours, and 16 hours was given for the culturing test. If day length up to 12 hours/day was set, the shoots had a rapid multiplication with sturdy growth. Light intensity up to 2,000LX was suitable for shoot growth based on our test of light intensity levels of 1000, 1500, 2000, and 3000LX.

At present the induction of roots on the red form of *Magnolia delavayi* is being studied. We hope and believe that a successful micropropagation routine will be made for this rare ornamental shrub in the near future.

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