– Short communication

Plant Tissue Cult. **13**(1) : 81-84, 2003 (June)

PTC

In vitro Propagation of Plum (*Zyziphus jujuba* Lam.)

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Key words : In vitro, Shoot tip, Propagation, *Zyziphus jujuba*

Shoot tips of seedlings raised *in vitro* from sterilized seeds of *Zyziphus jujuba* Lam. were used as primary explants. A combination of 0.5 mg/l BA and 0.2 mg/l NAA in MS medium resulted highest number of multiple shoots. Maximum elongation of shoots was also obtained in the same combination. A concentration of 1.0 mg/l IBA in half strength of MS proved to be the best for rooting. *In vitro* regenerated plantlets were successfully transferred to soil under natural environment.

Plum (Vernacular name: Kul or Boroi) belongs to the family Rhamnaceae and is common in the tropical and subtropical regions. It has been described as a "gift of mother - nature symbolizing the productive capacity of the seemingly infertile ecosystem" (Kaaria 1998). An apt description of its value is that plum produces the three vital "f" that desert dwellers require fruit, fodder and fuel (Vashistha 1997). Plum trees are one of the hosts for the lac insects *Kerria lacca,* which are found on the bark and makes an orange-red resinous substance called lac. The purified resins make a shellac used to produce sealing wax and varnish. The leaves of plum are used as nutritious fodder for sheep and goat. The leaves are also gathered as food for silkworm (Gupta 1993).

This work was undertaken to develop a protocol for *in vitro* multiplication of plum with shoot tip explant as an initial plant material.

Sterilized seeds of plum (*Zyziphus jujuba* Lam.) were germinated *in vitro* on MS (Murashige and Skoog 1962) medium with 3% sucrose without growth regulators. Shoot tips of in vitro raised plum were cultured on MS supplemented with different concentration of BA and Kn singly or in combination with NAA. The medium was adjusted to pH 5.8 and solidified by 3.6 g/l phytagel. The medium was autoclaved at 121_C and at 1.2 kg/cm^2 pressure for 20 min. For

subsequent subcultures BA and Kn in the concentration ranging from 0.5 to 2.0 mg/l singly and also in combination with a constant concentration of 0.2 mg/l NAA were added to the basal medium for induction of multiple shoots.

For root induction, MS medium at half strength with 0.2 - 2.0 mg/l either IBA, IAA or NAA was used. After inoculation, all cultures were grown under a photoperiod of 16 h light from white fluorescent tubes at a temperature of 26 ± 2_C. The data were recorded after eight weeks of culture.

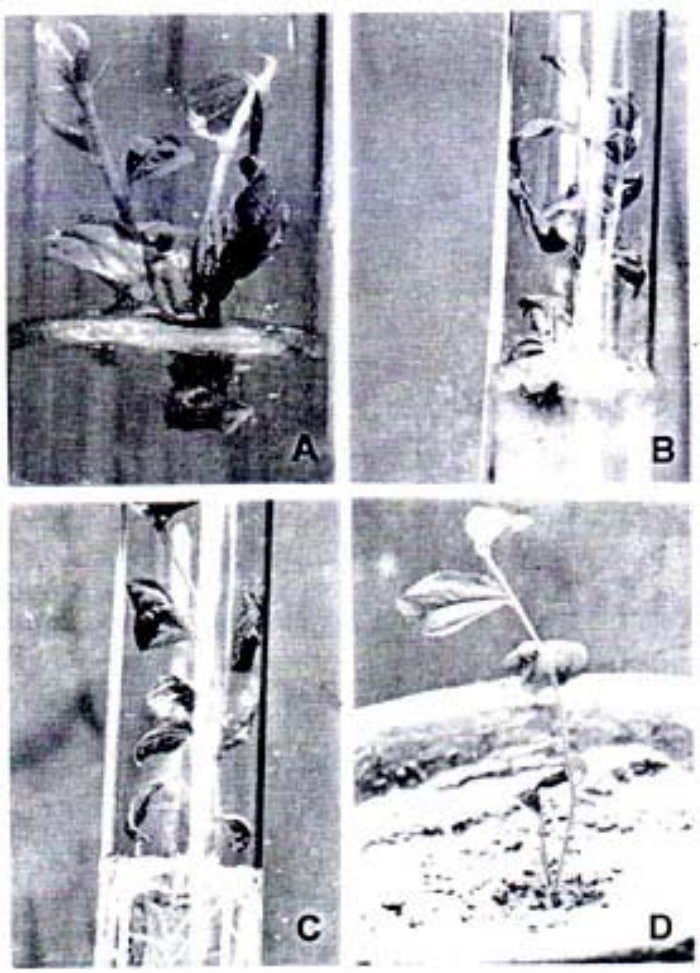

Fig. 1A-D : *In vitro* regeneration of plantlets of *Zyziphus jujuba* Lam. A. Multiple shoot formation in MS + 0.5 mg/lBA and 0.2 mg/l NAA. B. Elongation of shoots in MS + 0.5mg/l IBA and 0.2 mg/l NAA. C. Rooting of shoots in half strength of MS + 1.0 mg/l IBA. D. Potted planlet after eight weeks of transfer under natural environment.

After four weeks of culture, shoot tip explants showed different responses in production and development of multiple shoots when cultured on MS with different concentrations of BA and Kn singly or in combination along with 0.2mg/l NAA. Shoot tips provide superior explants compared to adventitious buds in the vegetative propagation because of the reduced risk of genetic instability (Hossain et al. 1993). Among the various hormonal concentrations and combinations used in the present study, 0.5 mg/l BA and 0.2 mg/l NAA were found to be best to yield the highest number of multiple shoots (Fig. A). The highest number of multiple shoots per explant recorded were six. The maximum length of shoots was also obtained in this combination (Fig. B). The combined effect of BA and NAA towards multiple shoot induction was also reported by different authors (Sarker et al. 1997; Azad et al. 1999; Hossain et al. 2001).

Among the three auxins (IBA, IAA and NAA) tested for root induction, 1.0 mg/l IBA was found more effective in root production compared to others (Fig. C). Inclusion of either NAA or IAA (0.5 - 2.0 mg/l) in the medium induced low rate of rooting. Similar results were also obtained by Das et al. (1996) in *Acacia catechu* Willd. Rooted plantlets were planted in polythene bags filled with 1 : 1 non-sterile garden soil and compost and successfully acclimatized in natural condition through a gradual increase of the sunlight period. When hardened, these were transferred to soil (Fig. D). Eighty per cent of the plant-lets produced from *in vitro* cultures survived in *ex vitro* condition.

The findings of the present investigation present a reproducible plant regeneration system through direct organogenesis from shoot tip explant in *Zyziphus jujuba*.

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