D-39 Some studies on development of a rapid *in vitro* propagation system for pears (*Pyrus pyrifolia*).

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This study investigates the development of *in vitro* methods for rapid multiplication of locally grown pear varieties.

The objectives were to find suitable media and explants for culture initiations and the best growth regulator combination in the medium to maximise the *in vitro* shoot multiplication and preparation of axenic cultures of pears.

Three experiments were conducted. In the first, Japanese variety J_3, from Rahangala was tested on 3 media MS, Lepoivre and Woody in relation to the success of shoot tip initiation as well as their growth. The media tested were MS, Lepoivre, and Woody with 1.0 mg/l BAP, 0.5 mg/l IBA and 1.0 mg/l GA_3 as growth regulators. In the second experiment, shoot tips taken from young tender buds and those from mature parts of J_2 and J_3 varieties were tested on MS medium with the same growth regulator combinations. In a third experiment, best growth regulator combination was tested in MS media to maximise the *in vitro* shoot multiplication. Here, batches of pear shoots originally cultured in hormone-free MS media were sub-cultured to media with different growth regulator combinations. One batch had no growth regulators. All other treatments had 0.5 mg/l IBA and 1.0 mg/l GA_3 but the amount of BAP in the medium varied as 0, 0.5, 1.0, 2.0, 2.5 and 5.0 mg/l.

It was found that the initiation of growth of shoot tips of J_3 was successful in all 3 media tested: rates of successful initiations being 60% in MS, 59% in Lepoivre and 43% in Woody. Thus MS and Lepoivre media were significantly better than Woody for the initiation success. The growth regulator combination tested BAP (1.0 mg/l), IBA (0.5 mg/l) and GA_3 (1.0 mg/l) was sufficient for the growth of pear shoot tips. The height of the main stem and the number of leaves produced were significantly better in MS and Lepoivre than in Woody medium but no significant differences in them between MS and Lepoivre. For both J_2 and J_3 varieties of pears successful *in vitro* initiations occurred only with shoot tips of young tender tissue and not with those of mature parts. Here the success rates were 53.6% for J_2 and 58.6% for J_3 using tender tissues, while there was no success at all with older tissues of both varieties. This indicates the importance of the physiological condition of the donor explants for culture initiation. The highest number of new shoot production per mother shoot was 3.1 (multiplication rate of 4.2) per month in the growth regulator combination of 1.0 mg/l BAP, 0.5 mg/l IBA and 1.0 mg/l GA_3 in MS media.