the nursery industry are finding it hard to maintain their economic viability. This paper presents the current status of Sanyo-Noen Nursery's micropropagation of virus-free understocks of fruit trees.

Sanyo-Noen Nursery set up a micropropagation laboratory in 1984. Since then, it has concentrated on the micropropagation of virus-free stocks of fruit trees. The major product of our company is grafting understocks for sweet cherry and peach. The understock plants are 'Dandy Chair' and 'Meteor' introduced from New Zealand. Both are useful dwarfing understock cultivars in Japan because they show good summer heat tolerance. Each year, 10,000 to 20,000 plants of both cultivars are produced by meristem culture. At present, a steady pace of production and sales is planned. However, there are still serious production problems remaining.

One problem is the need for improvement in the rate of acclimatization. The solution to this problem is to improve the quality of the young plants while in vitro. If good root production occurs in culture, young plants will establish freely at the acclimatisation stage. We have improved the soil in the acclimatisation bed, but there are several more modifications needed in the mixture ratio of composts.

Apart from fruit trees, another 30 flowering plants and vegetables are under study for their rapid mass production in tissue culture.

A second research area is the breeding of elite grape cultivars. The main target is to produce a seedless triploid cultivar. Several trial crosses have been made of diploid and tetraploid cultivars.

In summary, our company, Sanyo-Noen Nursery, utilizes micropropagation to produce fruit trees. However, the usage of micropropagated stocks is still only a small proportion of the production of such plants in Japan. Japanese agriculture will change dramatically in the near future and along with these changes, fruit tree understock production using micropropagation techniques will play an important role and be of great benefit in the future.

Large-Scale Production of Yama-udo (*Aralia cordata*) Using Adventitious Embryo Culture

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Today, natural foods such as Japanese native herbal vegetables are fashionable. Accompanying this trend, the more aromatic yama-udo (*Aralia cordata*) is more popular than the common udo. Propagation is done by seed rather than division because it requires less labour. However, seed stocks are variable in sprouting, growth, and quality. Several aspects of tissue culture of yama-udo were examined in an attempt to produce uniform stocks.

The application of 2,4-D at 1 mg litre^{-1} was most effective for inducing adventitious embryos (induction frequency was 90%); BAP suppressed embryo formation.

Induction frequency was observed to be different between strains. Strain No.7 was the most prolific in embryo production. To save labour in isolating the small embryos, a simple protocol was established. This protocol involved mashing the

embryo-forming callus in Murashige and Skoog (MS) liquid medium, filtering through nylon mesh, and plating a thin layer on the agar medium. By this process, it was estimated that we can easily obtain more than 300,000 plantlets from one mother plant using its young leaves.

At present, inspection of in vitro micropropagated plants has shown uniform traits of sprouting time, stalk colour, internode length, and flowering time.

Figure 1. Young plantlets of yama-udo (*Aralia cordata*) regenerated from tiny embryos sown on the MS medium in vitro.

Changes in the Rooting Response of Two Miniature Roses During Micropropagation.

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The rooting ability of a number of difficult-to-root woody plant species has been markedly increased by repeated in vitro subculturing. This phenomenon is referred to as "rejuvenation by in vitro culture." In the present study, the relationship between the degree of rooting ability and "rejuvenation" is discussed with in vitro cultured miniature roses.

Rejuvenation efficiency was evaluated by percent rooting, number of roots, percentage of elongated lateral shoots, and flowering in vitro. Only the rooting results are presented.