Conditioning. The only move necessary after the final growth stage is to a cooler environment for conditioning or hardening off prior to transplanting. Controlling this area is not critical if short-term storage is planned. Cooling is an important consideration and this can be achieved simply by using cold greenhouses, with roll-up sides to maximise air flow and correct shading or screening to allow maximum light levels. Long-term storage of plugs is possible but this requires specialised environmental control.

The conditioning stage is important and should result in a plug that has reached ideal root ball development and foliage that is hard enough to withstand the stresses of transplanting, yet have the vigour to quickly re-establish and grow with minimal setback.

SESSION 4: SPECIALIST PROPAGATION TECHNIQUES

Horticultural Research at the Royal Botanic Gardens

Rob Cross
Royal Botanic Gardens, Birdwood Avenue, South Yarra, VIC 3141

INTRODUCTION

The Royal Botanic Gardens Melbourne has recently established a formal horticultural research program. The main areas of research are *Phytophthora*, prospecting Proteaceae for the horticultural industry, and the photoautotrophic micropropagation of *Banksia* for the horticultural industry and *Caladenia* for conservation.

PHYTOPHTHORA

The control of *Phytophthora* in cultivated areas is essential to prevent restrictions on the range of plant taxa that can be grown. The Royal Botanic Gardens is currently undertaking a collaborative project with the School of Botany at the University of Melbourne to test the possibility of using antagonistic microorganisms to eliminate *P. cinnamomi* from infected soils. The trial has been running since Sept. 1995, and will continue until May 1997.

PROSPECTING PROTEACEAE

The generic diversity in the Proteaceae of north-eastern Queensland, and New Caledonia, is being looked at for their potential as landscape plants or as new floricultural crops. Research on the optimal propagation methods for taxa showing horticultural potential will follow.

PHOTOAUTOTROPHIC MICROPROPAGATION

Photoautotrophic micropropagation trials are currently being set up for two areas of work;

1) The micropropagation of *Banksia* with the aim of having an asexual propagation technique that will enable superior selections to be made for the cutflower or nursery industries.

2) The micropropagation of endangered terrestrial orchids, in particular *Caladenia* spp., with the aim of producing plants for ex situ conservation collections and for reintroducing into natural habitats.

Research by Kirdmanee et al., (1995) using *Eucalyptus camaldulensis* suggests that the survival of plantlets ex vitro will be improved using this method.

Photoautotrophic micropropagation differs from standard micropropagation by maximising the potential of the explants/plantlets to photosynthesise and metabolise normally. It is an attempt to provide the conditions that allow for normal development of the plant. That is:

- Light is increased in the incubators using metal halide lights;
- Carbon dioxide in the atmosphere is increased so that it is not limiting for photosynthesis;
- Sucrose, which is implicated in the inhibition of the RubPcase enzyme, is not incorporated into the medium.

Horticultural research is now an important part of the Royal Botanic Gardens research program.

LITERATURE CITED

Kirdmanee, C., Y. Kitaya, and **T. Kozai.** 1995. Effects of CO_2 enrichment and supporting material in vitro on photoautotrophic growth of *Eucalyptus* plantlets in vitro and ex vitro: anatomical comparisons. Acta Hort. 393.

Micropropagation of *Evolvulus pilosus*

T. Yamamoto, T. Kiyohara, N. Ikeda, and K. Toki
Minami-Kyushu University, Takanabe, Miyazaki, 884, Japan.

INTRODUCTION

In Japan *Evolvulus pilosus* Nutt. 'Blue Daze' also known as "American Blue" has been popular as a potted ornamental for several years. Although the plant is easily propagated by softwood cuttings, micropropagation is expected to be the better technique for obtaining a large number of the elite clones of this plant. This paper describes the regeneration of the plant through organogenesis using three types of explants; nodal segments, shoot internodes, and leaf cuttings.

MATERIALS AND METHODS

Nodal segments (3 mm in length), shoot internodes (10 mm in length), and leaf cuttings were taken from a donor plant grown in a greenhouse. After sterilisation with 1% sodium hypochlorite solution, these explants were rinsed three times in sterile water and then placed on Murashige and Skoog (M&S) media supplemented with cytokinins. All media were adjusted to a pH between 5.7 and 5.8, and solidified with 0.2% Gelrite. In some experiments, nodal segments and shoot internodes taken from plantlets in vitro were used as explants. Shoots formed by the explants were transferred to a rooting medium supplemented with NAA. Cultures were kept at 25C with a 16-h photoperiod.