of filling Miyazaki with flowers—under his guidance, many flowers were planted in Miyazaki City. Mr. Iwakiri was 92 years old when he died in 1985.

Seeing the beautiful environment of Miyazaki, we cannot help remembering the vision of Mr Iwakiri.

Environmental Control in Plug Production

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INTRODUCTION

The commercial use of seedling plugs (called plugs hereafter) has recently increased rapidly worldwide in horticulture. They have many benefits, such as easier transplanting, faster growth, and greater uniformity compared with conventional nursery plants. However, the scheduling of plug production is still a common problem because of the difficulty in controlling plug growth in glasshouses. The precise control of environmental factors is needed to produce high quality plugs with rapid turnover. Short and thick stems (i.e. short height) is essential for quality plugs. This article summarizes the responses of plugs to environmental factors from an environmental control point of view.

ENVIRONMENT INSIDE THE PLUG STAND

In general, the environment inside the plug stand in a glasshouse is characterised as follows: high relative humidity (RH), high daytime air temperature, and low nighttime air temperature when compared with the temperatures outside the plug stand, low light intensity at the lower part of the stand, and lower CO_2 concentration under a higher light intensity. These characteristics often cause poor and/or uneven growth of the plugs.

RESPONSES OF PLUGS TO ENVIRONMENTAL FACTORS

When the temperature varies from the optimum temperature recommended, the growth and quality of the plugs is adversely affected. The leaf temperature of the plugs will affect the growth and quality more directly than the surrounding air temperature, and will be 2 to 3C higher than the air temperature around the plugs in sunlight. The height of many ornamental plants increases with the increase in the difference in air temperature between day and night, known as "DIF" (Heins et al., 1988). Plants become taller with greater positive DIF value, i.e. when day temperature is higher than night temperature, and shorter with greater negative DIF value, i.e. when day temperature is lower than night temperature.

Low relative humidity will often induce water stress in plugs and thus inhibit photosynthesis, because the transpiration rate of the leaves would be higher than the water absorption rate of the roots. On the other hand, higher relative humidity in general makes plug stems longer. The relative humidity is often observed to be 10% to 20% higher under the canopy of plug stands than above it.

The photosynthetic rates of plugs are dependent on a photon flux in a spectral range between 400 and 700 nm. Light quality (blue: 400 to 460 nm, red: 620 to 680 nm, far-red: 700 to 800 nm) affects the morphogenesis of plugs. Plug height decreases with increasing photon ratios of red to far-red regions and of blue to red regions.

Increases in the net photosynthetic rate and thus the growth rate of plugs are expected by increasing the atmospheric CO_2 concentration. Therefore, CO_2 enrichment in glasshouses will be effective in accelerating turnover in plug production.

CONCLUSION

The growth and morphology of plugs are strongly influenced by their environment. Environmental control is becoming essential to improve the quality of plugs and to reduce the production cost of plugs through rapid turnover. The methodology and techniques for plug production should be developed by means of environmental control.

LITERATURE CITED

Heins, R., J. Erwin, R. Berghage, M. Karlsson, J. Biernbaum, and **W. Carlson.** 1988. Use of temperature to control plant height. Greenhouse Grower 6: 32-34.

Cultivar Differences in Shoot Proliferation and Rooting of Japanese Plum (*Prunus salicina* Lindl.)

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Cultivar differences in shoot proliferation and rooting of *Prunus salicina* were investigated. The number of shoots on woody plant medium (WP) containing 2 μM BA was greater in cultivars Ooishi-nakate and Santa Rosa. While the cultivars, Ooishi-wase, King, Cocheco, Sordum, Manchurian, and Methley showed low proliferation rates. Maximum shoot length was found in 'Cocheco'. 'Sordum' had the poorest shoot elongation.

Rooting ability was higher in cultivars Ooishi-wase, King, Cocheco, Santa Rosa, Manchurian, and Methley, but that of Ooishi-nakate and Sordum were low. In most cultivars tested, IBA was more effective for rooting than NAA.

INTRODUCTION

Japanese plum (*Prunus salicina* Lindl.) originated in China. It was brought to the United States about 100 years ago, and was hybridized with *P. cerasifera, P. simomi, P. americana*, and other species to produce important cultivars. Therefore, Japanese plum cultivars have a diverse and complex genetic background. Although micropropagation methods have been successfully applied to many fruit trees in the genus, very few studies have been reported for *P. salicina* (Rosani et al., 1980; Uematsu and Akihama, 1987).