Towards Improved Quality in Cut *Boronia*

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INTRODUCTION

The commercial cultivation of cut *Boronia,* which is largely confined in New Zealand to *Boronia heterophylla* (red boronia), is a relatively recent development in Australasia and Central America. Exports from New Zealand have been received favourably in several markets, particularly in Japan. However, production and postharvest information for cut stems is limited for *B. heterophylla* and practically nonexistent for other members of the genus.

The number of species readily available in New Zealand is not large but it does allow comparative evaluation of their suitability for cutting. The evaluation of these species was carried out according to modified standard criteria. (Salinger, 1985). These criteria were vase life, cutting season, form, growth rate, colour, physical character and pest/disease problems. The fragrance of *Boronia,* which can affect marketability and varies in strength and nature between species, was included as an evaluation criterion. Fragrance testing was carried out under controlled conditions as used for the testing of food and wine, the testers drawing upon their experience in these areas. Once a species shows potential as a cut flower, it is worthwhile examining other production and postharvest factors that can affect stem quality. Shading effects on production of *B. heterophylla* were examined as were postharvest treatments.

A GENUS OF CUT FLOWERING FOLIAGES

Nine *Boronia* spp. (excluding *B. heterophylla*) were evaluated for two spring harvest seasons. A clone known as 'Carousel' proved highly suitable over both seasons. *Boronia pinnata* showed great potential in the first season, but stem extension was not entirely satisfactory in the second season. This was also the case for *B. muelleri* 'Sunset Serenade' which was initially suitable but was less so in the second season. These two species were well accepted on the local New Zealand market. *Boronia megastigma* 'Lutea' was another species that had initial promise but the second harvest highlighted deficiencies.

Conversely the suitability of *B. crassipes* and *B. denticulata* was questionable in the first cutting season but improved in the second season. The increased maturity of the plants probably led to improved stem extension, correcting the first season deficiency. *Boronia fraseri* 'Southern Star' showed potential but was not entirely satisfactory and *B. crenulata* and *B. pilosa* 'Double' were completely unsuitable.

In conclusion, *B. denticulata, B. crassipes* and the clone 'Carousel' suggest good suitability with *B. pinnata* and *B. muelleri* 'Sunset Serenade' having some potential as cut lines, under New Zealand conditions.

THE INTERACTION BETWEEN LIGHT INTENSITY AND QUALITY

The significant effects of light intensity on plant growth and flowering are well documented (Conover and Poole, 1973; Craig and Walker, 1963; Armitage et al., 1987). Light reduction through the use of artificial shade promotes stem elongation and improves quality in some cut lines, e.g. *Chrysanthemum* [=Dendrathema] (Wilfrit et al., 1976).

Five shade levels, ranging from unshaded to 80% shade, were applied to a field planting of *B. heterophylla* using commercially available cloths. The trial aimed to represent a long term commercial planting with plant spacing of 50 cm in offset double rows. Results indicated that light reduction had no significant influence on stem extension under these conditions. The measurement of specific leaf area suggested that heavy shade may alter leaf characteristics. The effect of reduced light on the number of flowers per stem was important. Stems with the greatest number of flowers were on the unshaded treatment. The heaviest shade level had inferior flowering. Stems exposed to maximum light were found to produce the best quality cut material. This observation suggests that double row plantings do not favour optimum quality stems as half the plant is shaded by its nearest neighbours. Flowering would probably be superior in single row plantings that allow high light penetration to the entire plant.

A problem that occurs in spring-flowering foliages is the size of the vegetative shoot above the first flower. Shading increases the length of this unwanted vegetative tip.

VASE LIFE

The vase life characteristics of *Boronia* spp. are not widely known. An investigation was carried out based on postharvest principles that are well established (Reid and Kofranek, 1980; Halevy and Mayak, 1981). All trials were carried out in a controlled environment room in recommended standard conditions. Senesence occurred when flower and/or foliage degradation was clearly evident. The Salinger criteria (Salinger, 1985) for evaluating vase life were used.

The vase life of *B. heterophylla* in distilled water was 6.8 days. This was similar to that of *B. denticulata* at 7.0 days. The biocides 8-hydroxyquinoline citrate (8HQC) and a quaternary ammonium compound (Physan-20®) were used as vase solutions and as pulses. A solution of 200 ppm 8HQC maintained stems of *B. heterophylla* for 10.3 days and pulsing for 4 hours with 800 ppm 8HQC gave a vase life of 8.5 days. Physan-20® at 200 ppm resulted in a vase life of 9.4 days. *Boronia denticulata* vase life was also extended by 200 ppm 8HQC and 200 ppm Physan-20 solutions to 11.2 days and 9.4 days respectively.

A range of pulsing periods from 2 to 12 hours were tested. Evidence suggested that an 800 ppm 8HQC pulse was most effective for a minimum of 8 hours. The use of biocides, such as 8HQC and Physan-20, as solutions or pulses enhances water uptake, maintaining turgor and extending vase life.

Pulses of 800 ppm and 400 ppm 8HQC with sucrose were tested with stems of *B. heterophylla*. Sucrose concentrations of 2 to 30 g/l were used. These combination pulses were no more effective in extending vase life than the same pulses of 8HQC without sucrose. This suggests that sucrose does not extend vase life although it may assist in flower opening.

Ethylene damage can be a problem in some cut flowers, e.g. carnations (Reid et al., 1980). Pulsing with silver thiosulphate (STS) gives a degree of protection against ethylene damage and has been used to prevent flower drop in *Chamaelaucium* (Lamont, 1985). Pulsing with STS had little beneficial effect on the vase life of *B heterophylla* suggesting an absence of sensitivity to ambient and/or endogenous ethylene.

In summary, biocide solutions and pulses were effective in extending vase life for *B. heterophylla* and *B. denticulata*. Pulses of sucrose and STS did not significantly extend vase life.

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