LITERATURE CITED

1. Heenan, P. B. 1982: *Knightia excelsa* in Dunedin. *Roy. N.Z. Inst. Hort., Hort. Bull.* Spring: 30–31.
2. Johnson, L. A. S. and B. A. Briggs, 1975: On the Proteaceae—The evolution and classification of a southern family. *Bot. Jour. Linn. Soc.:* 83–182.
3. Metcalf, L. J. 1972: The Cultivation of New Zealand Trees and Shrubs. Reed, Wellington: 292p.
4. Thomas, M. B. 1974: Research on the nutrition of container-grown Proteaceae plants and other nursery stock. *Proc. Inter. Plant Prop. Soc.* 24: 313–335.
5. Thomas, M. B. 1980: Nutrition of container-grown trifoliate orange rootstocks (*Poncirus trifoliata*). *Royal N.Z. Inst. Hort. Ann. Jour.* 8: 89–98.
6. Thomas, M. B. 1982: Nutrition of container-grown *Callistemon citrinus* and *Hakea laurina*. *Scientia Hort.* 17: 159–167.
7. Thomas, M. B. and Matheson, S. A. 1981: The nutrition of container-grown macadamia trees. *Comm. Hort.* October: 32–33.

A SYSTEM FOR THE EVALUATION OF *ZANTEDESCHIA* (CALLA LILIES)

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The breeding and selection of summer flowering Zantedeschia hybrids has had a long history in New Zealand. Over the past 50 years amateur breeders have crossed and back-crossed selections originating from the following species: *Z. elliottiana; Z. rehmannii; Z. albomaculata; Z. tropicalis;* and *Z. pentlandii*. The result of this work has led to a wide spectrum of beautifully coloured hybrids suitable for cut flowers, potted plants or garden plants.

In recent years commercial nurseries have been able to exploit the tremendous potential of this crop through the rapid multiplication process of tissue culture. Previous to this technique, clones could only be multiplied by division which was very slow and often led to disease. With tissue culture propagation it is now possible to bulk up thousands of progeny from a single clone in a very short period of time. This process is, however, expensive and a clone must be thoroughly assessed before it is selected for bulking up.

Although companies involved in commercial rhizome production each have their own field plots for evaluation, a need has arisen to carry out comparative assessments of selections, from the various producers, at one common site. This need is being fulfilled at the Massey University Bedding Plant Trial Garden in Palmerston North, New Zealand.

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A collection of newly released cultivars has been established so trials can be conducted on a continuing basis. The evaluations provide accurate, unbiased information on cultivars submitted for assessment. To ensure impartiality, a three person assessment panel is used to collect the relevant data. The panel is comprised of Dr. D. Cohen, Plant Physiology Division, D.S.I.R., A. Jamieson, Ornamentals Advisory Officer, M.A.F., and T. E. Welsh. Tutor in Nursery Crops, Massey University.

EVALUATIONS

Timing. All entries are planted on the same day in early spring. Recordings are made at the time flowering starts and flowering finishes for each cultivar. This time period is expressed in weeks. Separate recordings are made on the life of individual blooms and are part for flower life (re-greening).

Habit. Average height and width of plants is measured when plants are at their peak flowering performance, usually 2 to 3 weeks after first flowers open. A descriptive rating is given to express the Branching Effect of each cultivar. A scale of 1 to 5 is used with 5 being the most heavily branched.

Description of Flowers. Size, shape, and colour are the parameters used to describe the flowers. Zantedeschia blooms are actually compound structures composed of a scape (expanded stem), a spathe (modified leaf), and a spadix (flower inflorescence).

Average *size* in centimetres is given for the scape from ground level and the length of the spathe is recorded. A measurement is also taken across the top of the spathe giving the longest and shortest diameters. This measurement is helpful in determining the shape of the bloom as observed from above.

Shape. Descriptive terms are used to visualize the top of the spathe. Using the ratio between the top measurements the following terminology is used:

Rounded = less than 0.5cm differential
Pointed = less than 1.0cm differential
Long Pointed = more than 2.0cm differential

Colour. Is difficult to express in exact terms, even using colour charts, because of the many pigments interacting within the spathe. While the yellows, creams and golds have a dominant base colour, the reds and deep purples have a dominant overlay colour. The beautiful pink, apricot, and bronze bi-colours assume a woodgrain effect as pigments change with age or growing conditions. To complicate matters, some cultivars have a light to deep purple blotch in the throat around the spadix. Also, most cultivars are green prior to opening and re-green as they become senescent. As many as four pigments can be expressed in varying shades within one bloom. Colour may also vary on different blooms from the same plant.

Therefore, a loose description is given for the overlay and base colours along with mention of the absence or presence of a purple blotch. Descriptive ratings are used to express the degree of "*Colour Change*" amongst open blooms within a block of the same cultivar. A 1 to 5 scale is used with 5 having the most dramatic degree of colour change. This rating should be regarded as a characteristic and not necessarily an attribute or fault.

Description of Foliage. The main parameters are leaf shape and colour pattern. No attempt was made to measure individual leaves as size is extremely variable. Shape can also be variable due to the physiological age of the growing point from which they emerge.

Leaf Shape. This is described by a diagram of numbered shapes ranging from lance, semi-spear, spear, semi-arrow, and arrow. Adult leaves arising from flowering growing points are used for leaf description.

Pattern. Leaves can be maculate (spotted) or immaculate (non spotted)—and variations between. This spotting pattern on the leaf blade is described by the following self-explanatory terminology: no pattern, slight pattern, medium pattern, and heavy pattern.

Quantitative Ratings. These are made to express the life of the bloom on the plant and the average number of blooms per plant.

Flower Life. As previously mentioned, blooms often re-green when they begin to close after pollen shed. This time period for senescence can vary from one to five weeks. To quantify this occurrence a rating scale of 1 to 5 is used. Sample blooms are tagged as blooms are fully open. They are checked daily. When no green on the outer spathe is apparent the tag receives one dot, at 25% two dots, at 50% three dots, at 75% four dots and at 100% the blooms are fully closed, receiving five dots. At this stage they are cut off the plant and recorded. A rating of 2 was given if complete greening occurred after three days and each point of the scale increases at 3-day intervals to a total of 15 days, which rates a 5.

Floriferousness. This attribute of a cultivar is also given as a quantitative rating. As blooms are completely closed and green they are cut off the plant and recorded. This dead heading takes place weekly. Cultivars averaging 0.5 blooms per plant received a 1, and up to 5 blooms per plant received a 5. Steps between 1 to 5 on the scale are based on average numbers per plant. This rating is affected by the correlation between rhizome size and flower number. Therefore, rhizome size is recorded with these results.

Comments. These are made on a result sheet to record any other observations. They may include pest or disease problems, certain flower abnormalities, or physiological characteristics.

CONCLUSION

The recording system used endeavours to determine a cul-

tivar's suitability as a cut flower crop, a potted crop, or as a garden plant. Those cultivars that are naturally compact and heavily branched should make good potted plants while characteristics such as stem length and flower life are important for cut flower crops. Cultivars which are very free flowering but have a short flower life could be well suited as garden plants.

These evaluations should assist breeders with their work as well as providing rhizome producers with the necessary information to pass on to their customers, all of which will help contribute to the success of *Zantedeschia*, "the flower with a future".

CAPILLARY BEDS—AN EARLY ASSESSMENT

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Capillary beds were installed at Omahanui Native Plants in December, 1985. Although 9 months is a relatively short period of time to offer an assessment, I feel that current interest in capillary beds is high and our experiences to date could be of relevance.

I intend to outline structure, cost, management techniques, and offer an overall assessment of this system 9 months on.

Basically, capillary beds are a watering system where water is made available at the base of the container-grown plant rather than by an overhead sprinkler system. Water availability is an extremely important factor affecting plant growth rates and general plant health. Overhead watering inevitably has variable distribution, resulting in some overly wet and other very dry areas in the nursery. There is also considerable water wastage with fall on standing out areas and pathways. In the capillary system water is available at all times through capillary action from the moist sand of the bed up through the drainage holes of the container into the mix, providing the plant with moisture at all times. The results of constant water supply are to be seen in healthier, faster growing plants.

The decision to build capillary beds at our nursery was made when one standing out area desperately needed resurfacing. After reading an article in Aglink and hearing about capillary beds at a