

Cutting Propagation of *Chamelaucium* Cultivars

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INTRODUCTION

The genus *Chamelaucium* is endemic to Western Australia and consists of 12 species of small- to medium-sized shrubs. The foliage of most species is xerophytically adapted to a needle shape and it forms a soft green backdrop to the flowers. The genus is principally cultivated for its flowers which are 1 to 2 cm long, five-petalled, and waxy in texture. The main flowering period is winter and early spring. The waxy nature of the flowers has given rise to the common name "waxflowers" for this genus. This genus has a requirement for very sandy, well-drained soils in an open, sunny position.

The best known member of the genus is *C. uncinatum*, the Geraldton waxflower from the Geraldton district of Western Australia. It is popular as a shrub for cut flower use. It is widely used as a flowering garden shrub, but it is very short-lived if soil type and drainage are unsuitable. In addition, it is also popular as a flowering specimen for growing in tubs on patios, etc.

Chamelaucium uncinatum grows to a height of around 3 metres and forms a broad, spreading habit. Flower size is large and a number of colour forms have been selected for cultivation including: 'Alba', 'Fortune Cookie', 'University', 'Purple Pride', 'Burgundy Blush', 'Mullering Brook', 'CWA Pink', and 'Early Hard Pink'.

Chamelaucium floriferum is another highly ornamental waxflower species; it has a proliferation of small, white flowers and in the early years the shrub has a conical growth habit which is densely compact in habit. This growth habit lends itself well to use as a garden shrub or as a patio specimen; it is not so useful for cut flowers. In the natural habitat *C. uncinatum* and *C. floriferum* tend to hybridize freely and a number of *C. floriferum* × *C. uncinatum* hybrids are in cultivation. The most widely cultivated of these in Queensland is 'Lady Stephanie', a late flowering light pink form which is widely used by cut flower growers. Another *C. floriferum* × *C. uncinatum* hybrid with similarities to 'Lady Stephanie' is the 'Wanneroo Wax'.

Chamelaucium ciliatum is a more compact species growing to about 1 metre high. It has small heath-like foliage and the flowers have a bicolor effect of white with some red on the outer petals. This species also has given rise to many selections, and the form 'Stirling Range' is more compact and floriferous and makes a very attractive pot plant or garden shrub.

Chamelaucium megalopetalum is a genus with larger flowers. It appears to hybridise freely with other species in the wild and a number of selected megalopetalum hybrids with much larger flowers are now coming into cultivation. These are showing great potential for the cut flower trade.

THE UNIVERSITY PLANT NURSERY UNIT

The University of Queensland's Gatton College operates a plant nursery unit as a part of its field facilities unit for teaching. The philosophy of this unit is to carry out

teaching within a commercially successful operation. In order to achieve commercial success it has been necessary to select a number of species of plants and develop production systems which can ensure the production of high quality plants. The genus *Chamelaucium* is one of those commercial plant lines which the UQGC plant nursery has concentrated on for a number of years.

This particular genus is in wide demand from both the local Queensland cut flower industry and from the ornamental nursery industry. Surprisingly, few nurseries in the local area grow this genus; it is considered difficult and unreliable in its propagation and the maintenance of stock plants for cutting propagation in Queensland is quite difficult. There are a number of commercial waxflower plantations in close proximity to Gatton College and most cuttings used for our propagation programs are collected from vigorously growing plantation plants. This eliminates the need to establish mother stock beds in the nursery unit.

THE GERALDTON WAXFLOWER FLOWERING SEASON

The southern hemisphere flowering period for waxflowers extends from April to October (autumn to spring) so the main cutting propagation period for the crop occurs outside of this period. After harvesting is complete, regrowth shoots must be allowed to develop to a level of maturity suitable for adventitious root growth to occur. Very soft and succulent shoots are difficult to root as they tend to desiccate very rapidly after collection. Shoots which are allowed to develop to a semi-ripe condition prior to collection will perform much more successfully. Therefore, the propagation season for waxflowers at Gatton does not commence until mid-late November when growth of the early flowering types is suitable. These early flower types include *C. uncinatum* cultivars such as 'Early Pink', 'CWA Pink', and 'Early Hard Pink'

Propagation of the later flowering types such as 'Lady Stephanie' and *C. floriferum* does not commence until late January. The propagation program will then continue through until April when flower bud initiation terminates the season. Some of the later flowering cultivars can be propagated through to late May before flower bud initiation occurs.

PROPAGATION

Type of Cutting. Terminal stem cuttings 8 to 10 cm long are preferred and the growing points are left intact. Cuttings are collected from the stock plants and placed in polystyrene containers to prevent desiccation until they are brought in from the field.

All cutting material is routinely dipped in a 2% solution of sodium hypochlorite to eradicate any fungi or bacteria which may be present on the leaves. This also helps to reduce leaf tissue temperature and maintains the cuttings in a moist condition until they are trimmed. Cuttings are trimmed using sharp secateurs and the needle leaves are stripped from the basal 2 cm of stem. This enables easier sticking of the cuttings and provides better root development.

The Propagation Medium. The propagation medium used as standard consists of 1 sphagnum peat (New Zealand origin) : 1 perlite : 1 vermiculite (by volume). This is a very high quality medium with little risk of pathogen problems and this eliminates the need to pasteurise the medium. The air-filled porosity of this mix is

in excess of 40% and it performs well with most stem cutting propagation.

The Propagation Container. Cuttings are direct stuck into Jiffy strips (Jiffy 515) which are imported into Australia from Denmark. The Jiffy Strips are placed in wire trays for unitisation and this produces a unit of 176 containers. Jiffy Strips are used for most of our cutting propagation as we feel that they encourage the development of a more fibrous and branched root system and they reduce the problems associated with handling of small rooted cuttings.

Thorough soaking of the Jiffy Strips is essential prior to filling with propagation media, otherwise the peat walls of the container may not be adequately wetted. This can lead to problems with root penetration as the root system on the cutting develops. It is also important in the routine management of Jiffy Strips to water regularly to prevent drying of the container walls. If they are allowed to dry out during root development the roots may be inhibited in their outward growth through the walls of the container.

The Propagation Environment. Waxflower cuttings are propagated in a fibreglass-covered greenhouse using a high-pressure fogging system for humidity control. The greenhouse is heavily shaded through the summer propagation period to provide approximately 80% shade. The fogging system is set to maintain a minimum 85% humidity in the greenhouse atmosphere. A warm-water bench heating system is installed and a root zone temperature of 25°C is maintained for most of the year. Through the main summer period the ambient greenhouse temperature is considered adequate for propagation and the heating system is not used during December, January, and February.

The fogging system provides a means of accurate humidity management but it does not apply sufficient water to maintain moisture levels in the propagation medium and hand watering is carried out as necessary to ensure that the medium and the Jiffy Strips do not dry out.

Auxin Treatments. The most successful auxin treatment for *Chamelaucium* cultivars at Gatton College has been IBA dissolved in liquid at 2000 ppm. The commercial product used (Rootex L) has ethanol as the solvent and it has been suggested that the ethanol may cause burning of the stem tissue at the base of the cuttings. Earlier this year trials were undertaken to compare IBA dissolved in ethanol and IBA dissolved in potassium hydroxide across a range of *Chamelaucium* cultivars. The IBA with ethanol gave consistently higher strike rates across all cultivars.

Rooting success rates vary with cultivar and time of year. Examples of the strike rates achieved at Gatton College during the 1992 production season were:

'Chinchilla Pink'	92%
'Fortune Cookie'	88%
'Lady Stephanie'	71%
'Purple Pride'	94%
'Wanneroo Wax'	82%

The New South Wales Department of Agriculture undertook a waxflower breeding program during the late 1980s and the rights to a number of the cultivars

developed in this program have been sold to industry. Gatton College has been propagating a number of these cultivars on behalf of the company which holds the rights and the propagation strike rate for a number of cultivars has been high. It is likely that these cultivars will become available to industry after plant variety rights have been granted.

Propagation Time Scale. Root development is normally well advanced in most waxflower cultivars after 4 to 5 weeks and all cuttings are normally weaned at the 6-week stage. The rooted plants in the Jiffy strips may then be handled in a number of different ways:

- 1) The rooted cuttings may be sold in the Jiffy containers to flower growers for field planting. It appears that small, vigorously growing plants straight from propagation will establish in the field better and with fewer root problems than larger container grown plants.

- 2) The cuttings in the Jiffy containers are potted into square liner pots (50 × 50 × 125 cm) called native tubes to grow on to a larger size prior to planting in the field. Root development in these liner pots can be very vigorous and if the plants are not planted out at the optimum time, serious root malformations may occur. Over the last 12 months trials with copper compounds for root growth control have been undertaken at Gatton and we feel that this treatment will be highly beneficial for waxflower plants grown in these liner pots.

- 3) The rooted cuttings may be potted on into 140- or 200-mm pots for the retail nursery trade and grown on in the nursery unit until flowering is well advanced before delivery to the retail outlets.

CONCLUSIONS

The production of waxflower plants in the Gatton College plant nursery has been undertaken for a number of years. During that time a number of problem areas such as auxin treatments, propagation media and environment, propagation containers, and root growth have been investigated to enable the plants to be produced more efficiently. A large number of trade customers, including flower growers, wholesale nurseries, and retail garden centres, are supplied with plants. Commercial production of this type allows our students to be closely associated with the commercial realities of the nursery industry and allows the College to maintain very close links with the local nursery industry.