

## RESULTS

The explants required continuous subcultures to adapt to the environment. The higher cytokinin levels reduced leaf size, except with *L. grandifolia* which proved obstinate to these treatments and as a result fewer plants could be contained in the standard size container. It was necessary to remove the apical shoot to promote axillary budding at the base and then to lower the cytokinin level to allow branching and promote rooting.

The most favourable medium for shoot multiplication was MS with 10 mg litre<sup>-1</sup> BAP reduced to 3 mg litre<sup>-1</sup> BAP prior to root initiation. Rooting was achieved with 1 mg litre<sup>-1</sup> IBA and more particularly for *L. grandifolia* 1 mg litre<sup>-1</sup> NAA.

Flowering occurred in the second year after deflasking.

## DISCUSSION

The vigour of these micropropagated plants overcame the susceptibility of cutting-grown plants and seedlings to fungal infection and root disturbance. In addition, this technique allowed for the selected forms to be multiplied quickly for release to the retail market.

## LITERATURE CITED

- Economou, A.S. and M.J. Spanoudaki.** 1985. The in vitro propagation of gardenia. HortScience 20(2):213.
- Murashige, T. and P. Skoog.** 1962. Revised media for rapid growth and bio assays with tobacco tissue culture. Physiologia Pl. 15:473-97.

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# Propagation of *Corynocarpus laevigatus* and Cultivars

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## INTRODUCTION

The family Corynocarpaceae is a small genus of a few species native to New Zealand, the New Hebrides, and the New Caledonia region of the south-west Pacific.

*Corynocarpus laevigatus*, the New Zealand species, is a medium-sized tree, maturing at 10 to 15 m tall. It grows in lowland and coastal forests throughout the North Island and in coastal forests as far south as Jacksons Bay on the South Island's west coast, Banks Peninsula in the east, and the Chatham and Kermadec Islands.

*Corynocarpus laevigatus*, known as karaka by the Maori people and called the New Zealand laurel by early European settlers, has handsome obovate to oblong, rich-green glossy foliage, with entire margins. Small five-parted greenish-white flowers, arranged in terminal panicles, develop into 3- to 4-cm fleshy drupes, bright orange when ripe, with a nut-like seed. This was an important food source for the Maori people, who planted the karaka near their habitations. The fruits are extremely toxic and a great deal of preparation was required to prepare the kernels for eating. First they were baked in an earthen oven for several hours, then soaked

in fresh running water in flax baskets for several days—all flesh being removed before the clean kernels were dried and stored for later use.

The handsome karaka is under-rated as an ornamental plant. Although it is somewhat frost tender and must be regarded as only half-hardy, it will thrive in places as far south as Christchurch, as long as some shelter is given when young. In favoured mild climates, like those of the coastal North Island, karaka cultivars are useful in a wide range of outdoor garden situations. It is useful for coastal hedges, being tolerant of salt winds and light sandy soils. The cultivars as specimen plants are excellent in large pots or tubs for courtyard, terrace, or patio, where lush glossy leaves are desirable in the landscape.

Being largely a coastal species, the karaka has developed characteristics enabling the foliage to tolerate wind, salty air, and relatively harsh conditions. These attributes can be most useful in indoor horticultural situations. The glossy, leathery foliage tolerates drier, lower light conditions, and the fleshy fibrous roots withstand a wide range of soil conditions, as long as drainage is adequate and parching is avoided. This makes *C. laevigatus* a versatile, small, shrubby tree, useful for container growing for amenity horticulture, for city buildings, indoor shopping malls, covered atriums, foyers of hotels, and the like, where lush, glossy foliage conveys a cool clean atmosphere. The Auckland International Airport Authority have recently featured the karaka in its concourse gardens, the glistening foliage enlightening these indoor gardens superbly.

The species is propagated from fresh seed, which germinates readily in moist light humus containing compost at temperatures from 12C to 17C. As the juvenile seedling has a vigorous tap root, a deep liner tube or root trainer should be used so as not to restrict early root development. Airy, lightly shaded conditions and temperatures between 12C and 25C, will ensure the seedlings thrive. A potting compost with 4 to 5 kg/m<sup>3</sup> of controlled-release fertiliser, such as Osmocote 15-4.8-10.8, will promote good sturdy growth.

### **CULTIVARS THAT DUNCAN AND DAVIES HAVE RAISED**

Cultivars that Duncan and Davies have raised over the years include the following:

***Corynocarpus laevigatus* 'Variegatus'**. Rich green foliage, broadly margined with golden-yellow; compact and slower growing than the species, eventually 2 to 3 m tall and excellent as a tub plant.

***Corynocarpus laevigatus* 'Alba Variegatus'**. Dark glossy-green foliage, narrowly margined with crisp, white, slightly irregular variegation; vigorous strong upright bushy habit, 5 to 6 m tall.

***Corynocarpus laevigatus* 'Picturata'**. This cultivar is a bud sport of 'Variegatus', with reverse variegation—central golden and yellow marbled variegation, with green margins; vigorous bushy habit, 4 to 5 m tall.

***Corynocarpus laevigatus* 'Moonlight'**. This cultivar is similar to 'Picturata', but with pale lemon-yellow to cream-marbled, central leaf colour, with green edges—not as flamboyant, and with a tendency to revert to plain green; 3 to 4 m tall.

***Corynocarpus laevigatus* 'Brightly'**. A new cultivar, which arose as a seedling from 'Picturata', with clean golden-yellow margined young foliage, which fades to a clear cream margin with maturity. It combines the best of 'Variegatus'

characteristics with those of 'Picturata' to produce a clean banded appearance and a vigorous, bushy, upright habit, to approximately 4 m.

**Table 1.** Rooting trials with *Corynocarpus laevigatus* cultivars.

Cultivar	Hormone	Rooting (%)	Month N.Z.	Weeks to root
Variegatus	IBA 1.0%	70	May	14
	IBA 0.8% + NAA 0.4%	70	June	12
	IBA 1.0% + NAA 0.6%	50	August	5
Alba Variegata	IBA 0.8%	95	June	8
	IBA 1.0%	80	May	15
	IBA 0.8% + NAA 0.4%	90	July	12
	IBA 0.8% + NAA 0.4%	96	May	8
	IBA 0.8%	50	May	8
Picturatus	IBA 0.8%	60	July	10
	IBA 0.8% + NAA 0.4%	40	July	10

+ = Combination Hormone IBA + NAA

## PROPAGATION

The cultivars are all easily propagated during late summer to early winter from semi-hardwood cuttings with moderate intermittent misting or poly tent methods. Providing humidity is not maintained at a high level, gentle bottom heat of 18C to 22C is useful for rapid callusing. Wide wounding—a sliver of bark 1.5 to 2 cm long removed to expose cambium to hormone stimulation—will assist in more rapid and better rooting. Table 1. shows rooting trial results for *C. laevigatus* cultivars.

Because *Corynocarpus* cultivars produced from cuttings often lack the vigour and vitality that young seedlings have, grafting onto seedling understock is used to produce stronger young plants.

The oblique side graft is used with the incision made at ground level in the seedling rootstock in the manner of *Cedrus* grafting. An oblique whip cut is made at the base of a 10-cm scion, with a short cut made at the back of the whip tail and the cambiums are matched closely and tied together. The union area is buried in a light, airy, moist—but not wet—propagating medium, held at 18C to 22C to facilitate rapid callus formation. Foliage of the scion may be trimmed in half to reduce transpiration. The grafts are held in a moderately humid tent, or with light intermittent misting to maintain moderate humidity. After 5 to 6 weeks, the understock can be headed back and the graft potted up. Young plants produced in this way exhibit the juvenile vigour of the seedling rootstock and grow at twice the rate of cutting-grown plants of the same cultivar. Although grafting may be initially more costly, a quicker crop turnaround can prove more cost effective.