

Phormiums: Production in 2005[©]

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INTRODUCTION

Multiplication rates are one of the key factors affecting volume production of *Phormium* cultivars around the world. Tissue culture techniques can now be harnessed to give volume production with certain cultivars in the lab. Significant improvements have been made in this field over the last 4 years in New Zealand. With the plants established and running well in tissue culture, the first obstacle to the commercial growers is acclimatising the material from the lab into the nursery environment. This paper focuses on our experience at Lyndale Nurseries with *Phormium* production in 2005.

TISSUE CULTURE

Medium. With all crops, knowing and understanding your medium is the first essential step. With phormiums, the key is to have an open medium with an air-filled porosity (AFP) of 17%–20%.

We use two media for deflasking phormiums (Fig. 1):

- 1) 9 pumice (3–5 mm) : 1 peat (v/v).
- 2) Compressed sphagnum moss cell — a new product from New Zealand.

Both media are used in a 128 cell trays (cell dimension 25 × 25 × 45 mm), these trays allow for good airflow between plants and allow for minimum root disturbance at the time of transplanting.



Figure 1. Media: Left to right (top row): pumice (3–5mm), peat, 90% pumice : 10% peat, (bottom row) compressed sphagnum, and expanded sphagnum.



Figure 2. *Phormium* 'Merlot' 6-month-old plugs ready for transplanting.

Deflasking. Plants arrive from the lab in flasks of 30 plants. The plants are graded on arrival by height and set straight from the flasks into 128-cell trays. Best results are achieved when plants are between 40–50 mm in height at the time of deflasking.

Care is taken throughout the deflasking stage to maintain a clean hygienic environment.

Plants are transported from the deflasking room to the production house by a covered trolley to prevent desiccation of the young leaves. With all micropropagated crops no waxy cuticle is present on the leaf for the first 2–4 days following deflasking.

Plants are deflasked using natural season in New Zealand September–March (spring– autumn) under mist with a calorie counter with a bottom heat 21 °C and air temperature ranging 20–25 °C.

The young plants are ready for transplanting 4–6 months from initial deflasking—this is dependant on the cultivar being grown (Fig. 2).

Advances in Tissue Culture of Variegated Forms. Talk often comes round to the future possibilities of tissue culture of the often-flamboyant variegated selections. To date tissue culture activities on these selections has been unsuccessful.

Phormium 'Red Dragon' is a new vigorous red variegated sport that was initiated into tissue culture in 2003 (Fig. 3). This cultivar has strong red variegated leaf margins and a dark central area to the leaf.

Figure 4 shows the range of variegation expressed in the resulting plants following tissue culture production of the 'Red Dragon' cultivar (Fig. 4). Ninety-five percent of the resulting plants have lost all red colouration. Five percent of the



Figure 3. *Phormium* 'Red Dragon'.

resulting plants expressed some degree of colouration. Less than 1% shows the original characteristics of the variety.

Future Possibilities. The key to successful *in vitro* propagation of *Phormium* at present is the selection of cultivars with solid foliage colours and unique foliage forms.

CULTIVAR REVIEW

Currently Produced in Tissue Culture.

***Phormium* 'Black Rage'.** 'Black Rage' is a fashionable slate-grey-foliaged plant. It is an architectural upright growing cultivar drooping at the tips and a beautiful blue bloom on the flower stem and underside of the foliage. Strong orange-coloured flowers (flower spike 1.2 m). A key feature of this selection is the promiscuous flowering and attractive spiralling seedpods. A great cultivar for mass planting; size is 0.8 × 0.8 m.

***Phormium* 'Merlot'.** 'Merlot' is an excellent architectural foliage plant (Fig. 5). Strong upright broad leaves, deep plum-purple in colour. Leaf underside is silver with leaf edges and midrib highlight in jet black. An excellent feature plant; hardy; 1.8 × 1.8 m; flower spike 2.4 m.

***Phormium* 'Twisted Sister'.** 'Twisted Sister' is a sport of *P. tenax*. The foliage and plant form of this selection is a whole new break for the genus. This funky little

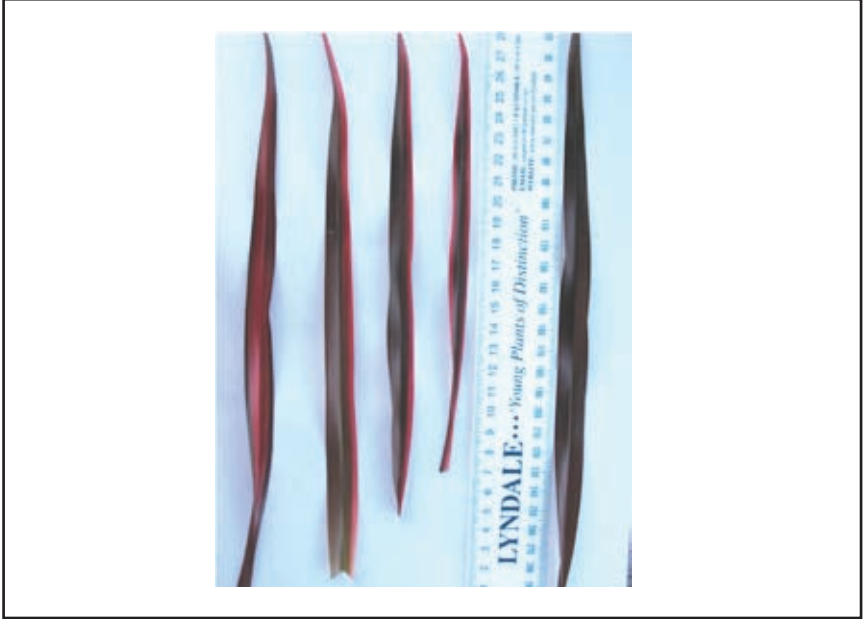


Figure 4. Range of variegation expressed in the resulting tissue culture plants derived from *Phormium* 'Red Dragon'.



Figure 5. *Phormium* 'Merlot'.



Figure 6. *Phormium* 'Twisted Sister'.

plant has extremely stiff olive green, twisted, and spiralling foliage, as if heated like hot molten metal, and then let cool. The foliage has an attractive grey-silver underside and bright orange leaf margins and midrib to complete the picture. All this makes 'Twisted Sister' the perfect architectural foliage plant for modern terrace and patio plantings; hardy; 0.4 × 0.4 m (Fig. 6).

Cultivars for Future Multiplication in Tissue Culture.

***Phormium* 'Garden Hero'**. One of the smallest selections, this new selection has very fine lime green foliage and a tight clump-forming habit. 'Garden Hero' is ideal for pots and plants on the deck or patio or for mass planting at the front of the garden border, hardy, 0.6 × 0.6 m.

***Phormium* 'Goliath'**. 'Goliath' is the largest selection from New Zealand, with huge upright architectural foliage drooping at the tips. The foliage is 250–300 mm in diameter, silver green in colour with beautiful silver-blue on the underside of the foliage. A great landscape cultivar of the future, for mass planting, 3 × 2 m, flower spike 3.5 m.