Stirlingia

Aileen Reid

Introduction

Stirlingia latifolia is a major bush-picked export crop. More than 2.9 million stems with a value of about $348,000 are picked each year. While the species is relatively abundant in its natural growing area, urban encroachment is steadily reducing the extent of its habitat. This, together with considerable seasonal variation in quality, and low marketable yields, is contributing to increasing interest in cultivating this crop.

Markets and marketing issues

Japan, the USA, Europe and Taiwan are the major markets. Demand is steady, but most exporters agree that quality is a major constraint. The quality of stirlingia harvested from the bush varies from year to year, and only one year in four yields good product. The proportion of marketable blooms from a given stand averages only 15%.

Traditionally, stirlingia has been sold when in fruit as a processed product, either in its natural colours or dip-dyed. However, it can also be sold in bud or in flower, either fresh, or dipped in dye or paint. Most fresh product is currently sold processed. The proportion of stems sold fresh and unprocessed could be expanded by the use of selections with different bud colours.

Production requirements

In its natural state, stirlingia occurs in Western Australia on well drained and nutrient-depleted sands extending from Kalbarri in the north to Albany in the south-east. A frost free site with no waterlogging is essential. Soil should be slightly acidic with a pH of 5.0–6.0. Avoid alkaline soils.

Stirlingia is a member of the family Proteaceae and so prefers low levels of phosphorus. Where land has previously been used for farming or other forms of horticulture, a soil test for residual phosphorus is necessary to ensure that toxic levels of this element are not present. No standards exist for *Stirlingia* but levels above 30 ppm (used for other proteaceous crops) could be expected to cause problems.

Soil should also be tested for the presence of Phytophthora and/or nematodes. If Phytophthora is present, consider another site. Satisfactory treatments can be applied for nematodes.

Varieties/selections

Stirlingia plants are usually supplied as tissue-cultured plantlets, although cuttings from cultivated plants do strike reasonably well. Only one standard form is currently available with potential to exploit other forms which have variation in bud colour (dark red through to orange and lemon, either as single or mixed colours) for the fresh market product.

Agronomy

Tissue-cultured plantlets are best planted in autumn. They then establish over winter and flower in the first spring. Spring plantings may also be satisfactory where well controlled irrigation systems, able to respond to sudden changes in weather, are installed. In sandy soils, once-a-day watering should be sufficient in spring and autumn, while irrigation two to three times a day may be necessary in hot weather, particularly in the first year. Low-tension tensiometers are proving quite reliable in sandy soils.

If fresh seed is available, good germination rates can be obtained by using the smoke treatment (as developed by Kings Park and Botanic Gardens) as an alternative method of propagation.

In the first year, plants tend to send up one flowering stem which is often unmarketable due to the thick stem which overpowers the inflorescence. In addition, because the plant consists only of one fan, and a large flowering stem, it is unbalanced and often falls over. Pruning before the first flowering has not proven useful in overcoming this problem. Trials at Medina Research Station indicate that pruning back to 25–50% of the foliage height after the first flowering provides a much better response. Almost every leaf axil will shoot, with the result that the following crop should easily achieve 5–8 stems per plant. Pruning back to ground level in the first year has proven fatal, possibly since the carbohydrate reserves of the young plant are too low to permit resprouting. Anecdotal evidence from other growers suggests that pruning back to ground level in subsequent years should not pose a problem.

A natural stand of *Stirlingia latifolia* at late bud

A bunch of stirlingia picked in the traditional fruiting stage

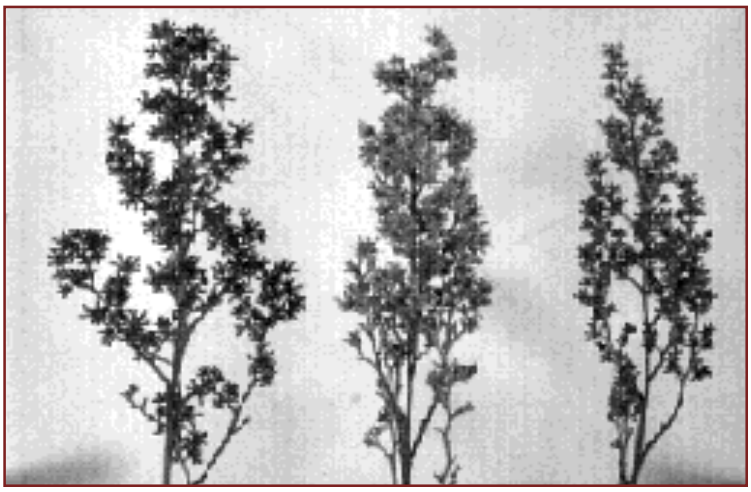
Before planting apply a base dressing of mixed trace elements and lime if necessary. Plants should ideally be fertilised with low rates of NPK fertiliser via the irrigation water (75 ppm nitrogen, 15 ppm phosphorus, 50 ppm potassium).

Pest and disease control

Stirlingia naturally grows in nutrient-poor, well-drained sands. Growers should therefore be aware that excess fertiliser salts or poor drainage may cause a high risk of root damage and subsequent root rot. Routine treatments with phosphorous acid (Fosject®) as a foliar spray are recommended for the prevention of Phytophthora and Pythium root rots but are no match for poor soil conditions in controlling these diseases.

About the author

Aileen Reid (BHortSc(Hons) (NZ)) is a development officer in Agriculture Western Australia and has worked with growers on a wide range of exotic and native nursery and cut-flower crops. For address see *Key contacts*.



Colour variation in stirlingia at the bud stage. This is also a marketable product.

Key statistics

Stems of stirlingia picked from the bush from 1992 to 1996.

Year	Number of stems
1992	1,681,960
1993	2,999,310
1994	3,019,459
1995	2,385,625
1996	2,500,000 est.

Alternaria leaf spot has been observed on cultivated plants at the times of the year when rain occurs. Control is difficult but sprays of Rovral® or Mancozeb® should help. At flowering time, Botrytis can cause flower and fruit abortion. Use a rotation of chemicals such as Rovral®, Mancozeb® and Octave® to prevent the build-up of resistance.

Young shoot growth may be susceptible to aphids and thrips. Use synthetic pyrethroids such as Mavrik® to control these pests.

Harvest, handling and postharvest treatments

The criteria for determining stem quality (Table 1) in *S. latifolia* have some specific requirements in terms of bobble positioning. It is important for the shape of the inflorescence to be clearly delineated. Thus, the bobble at the very tip of the inflorescence must be present and also those around the perimeter of the inflorescence. Since these bobbles are exposed, they are especially prone to desiccation by winds and frost damage and regularly fall off in the wild. In cultivation, this problem should largely be solved with the use of windbreaks.

There do not appear to be any major postharvest problems with fresh stirlingia. The use of a biocide such as chlorine or 8-hydroxy-quinoline sulphate in the holding buckets may be beneficial.

It is more usual for the exporter to process the product. This way, dyeing is done to fill specific orders. Dyeing is usually by immersion rather than uptake. Product which is to be dried or dyed does not need to be placed into water, but simply packed for transport to the exporter.

Economics of production and processing

This plant lends itself to high-density plantings which are necessary to for an economic return. One scheme is to use 6-row beds with rows 0.5 m apart within the bed, plants 0.5 m apart within a row and 3 m between beds. Such plantings contain just over 22,500 plants/ha . Assuming a maximum yield of 15 stem/plant, the return will be $40,000/ha at $0.12 per stem. Allowing for a fairly heavy spraying program, after operating costs, this reduces to about $8300/ha. It may be possible to harvest mechanically but this has not been tested.

Examples of poor seed set in stirlingia. These blooms are unmarketable.

Table 1. Criteria for *Stirlingia latifolia* stem quality.

1.	The stem must be picked when the 'bobbles' are silvery, ie. fully mature. If the stems are picked too early, dye is not taken up and the ovaries are still visible as black dots in the centre of the bobble.
2.	'Bobbles' must be present on all key terminal positions, ie. the presence of these determines the inflorescence shape.
3.	There must be a good number of 'bobbles' and they must be distributed evenly so they are visible individually.
4.	Branch angles should not be too wide.
5.	Stem length should be greater than 60 cm and in proportion to the length of the inflorescence.
6.	'Bobbles' must be full, ie at least 6 fruits should be present, otherwise the clusters are too small or lopsided.

Key messages

- Stirlingia from the bush is in diminishing supply.
- High densities are needed for economic returns.
- Expand markets using different colour forms.

The major cause of rejection of inflorescences by pickers or exporters in bush-picked material is deficiencies in cluster numbers or their positioning. At least 60 cm stem length is required. Growers should also take care to harvest the stems at the required degree of maturity (see Table 1).

Exporters pay a premium of about $1.00 per bunch if the product is already processed.

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Key references

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