Product: riceflower, sago bush, wild rice, mountain daisy, tick bush

Botanical name: Ozothamnus diosmifolius (formerly Helichrysum diosmifolium)
Rice flower is used as a filler in mixed bunches and dried arrangements and is popular on both the domestic and export markets. It is a spring-flowering, perennial, Australian native shrub which has been grown in plantations since the 1980s.

The common name is derived from the shape of the small individual flower heads, called capitula. At bud stage, each capitulum looks like a grain of rice. The flower colour comes from the papery bracts of the capitulum and ranges from white to dark pink. The capitula are arranged in clusters called corymbs, and a number of corymbs make up the flower head on the harvested stem. Because of the complexity of the flower structure, these botanical terms are used here to ensure that reference is made to the correct part of the flower head.

Leaf form and colour are variable. Leaves of different varieties range from fine to broad, and from bright to greyish green. The performance of individual varieties is often site specific.

The introduction of new varieties and production sites has extended the production season to almost 6 months. Breeding and selection have reduced many of the early problems, including susceptibility to leaf blackening and grow-past. New cultivars have larger flower heads, cleaner colours and a longer harvest season.

If plants are dry, irrigation a few days before harvesting may improve postharvest freshness. Leaf blackening can result if the product is exposed to high (>25 °C) or very low temperatures (exact temperature not known) after harvest, and mostly develops during transport. Packing rice flower too tightly can cause overheating, leading to leaf blackening and an unmarketable shipment. Blackening can also be caused by rough handling or physical pressure (which ruptures the oil glands in the stems and leaves). This may include squeezing bunches too tightly when tying them or forcing too many stems into a bucket. Fine-leaved forms tend to be less susceptible to blackening.

Riceflower may suffer from grow-past or grow-through, where the shoots at the stem tip grow through the flower head. Some inferior selections are spoilt by immature capitula that develop around the edges of the main flower head.

Plant losses can be very high, reducing the economic life of the crop to 3 years or less. This may be due to root congestion, root knot nematode or various root diseases, such as Phytophthora. Stem borer insects can also be a major problem. The woody stems are brittle and prone to splitting.

The oils in the stems and foliage of riceflower cause skin and respiratory allergies in some people. Allergies are more likely from exposure to broad-leaved forms.

Incorrectly harvested riceflower can completely destroy market interest. At least 50% of the capitula must be at full size but still closed. Too early and the stems can wilt; too late and the head can shatter, or fall apart. The harvest ‘window’ may last for only 5–7 days but can be up to 3–4 weeks, depending on the variety and location. Overmature rice flower should never be marketed.

For a simple wilt test, take a sprig of riceflower and hold it in the shade out of water for 2 hours. If it wilts, the product is not yet ready to pick.

<table>
<thead>
<tr>
<th>Flowering season:</th>
<th>mid July to mid December</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical vase life:</td>
<td>7–14 days</td>
</tr>
<tr>
<td>Export can reduce vase life, especially if the transport conditions are not cold, the product dries out, or transport takes too long.</td>
<td></td>
</tr>
<tr>
<td>Other products to which this specification can be generally applied:</td>
<td>dried, preserved or dyed riceflower products; Cassinia.</td>
</tr>
</tbody>
</table>

Pink forms of riceflower are also grown.
Product: riceflower

STAGES OF OPENING

The stages shown apply to the product at market entry. Pay attention to the weather, time of year, and mode and duration of transport, because the flowers will continue to open during transport. You must consult with your target market to ensure that the flowers arrive at the desired stage.

Stage 1 Very immature: unacceptable to markets (immature product is prone to wilting)

Stage 2 Immature: no bract separation or floret extension

COMMON DEFECTS

Common defects to avoid at market entry:
- Wilting due to early harvest
- Flower shatter due to late harvest
- Leaf drop
- Crooked stems
- Leaf blackening (bruising)
- Poor leaf colour (yellowish) or dried-out leaves
- Grow-through (shoots growing past the flower head)
- Wilting shoots below the flower head
- Disease, insects or insect damage
- Bud defects due to poor or uneven development
- Frost damage

Overmature – do not market
Wilting product (immature) – do not market
Underdeveloped buds spoil the flower head – discard

Aphids and sooty mould – manage insect pests before harvest
Gall wasp – manage insect pests before harvest
Rust – discard; manage with preharvest fungicide applications
Stage 4 Ready to market:
the most advanced corymb on the stem has fully expanded, and 50% of the small buds (capitula) at its centre have reached full size and are plump (tulip stage; each bud is about the size of a match head); <5% of buds (capitula) in the centre of the most advanced corymb show bract separation and floret extension.

Stage 5 Overmature:
>10% of buds (capitula) at the centre of the most advanced corymb on the stem show bract separation and florets emerging (‘cracking’).
### Flowers

**Appearance**
Clear distinct white or non-fading pink. The full size reached by each capitulum (the small rice-grain-like flower head) and the number of corymbs making up the flower head vary with selection or cultivar. The number of capitula in the flower head can range from 100 to 700.

**When to harvest**
When the most advanced corymb on the flower head has fully expanded and 50% of the capitula at its centre have reached full size (each capitulum is about the size of a match head) and are plump (also called 'tulip' stage). When the flower head has reached maximum size (typically 5–10 cm in diameter).
Corymbs large and full of buds (avoid stems with sparse capitula, poor distribution of capitula or corymbs).
Do not pick after 5% of the capitula have cracked at the top (individual florets emerging from parted bracts).
Harvesting before this stage may result in stems wilting (this varies with variety and seasonal temperature).
Overmature capitula will shatter, or fall apart.

**Damage**
No grow-past of vegetative shoots.
No collapse of pedicels (the thin stems below capitula and corymbs).
No wilting.
No damaged or broken flowers.
Avoid selections where the inside of the capitulum is a muddy brown (which becomes visible after it cracks).

**Contamination**
Product free of grit and soil, weeds or weed seeds, living or dead insects, and signs of live insects or spiders, such as webbing.

**Pests and diseases**
Discard any poor-quality product with insects or fungal infections. Check individual stems for insects, because once riceflower is bunched, they are very difficult to find.

### Leaves

**Appearance**
Clean, fresh green; high-density foliage; no leaf blackening.

**Damage**
Minimum evidence of pests, disease or other blemish.
No visible chemical residue.

### Stems

**Appearance**
Rigid and strong enough to support blooms. Bend <15°. Derived from current season’s growth. Neatly cut straight across.

**Harvest**
Remove leaves and side branches from the lower 10–15 cm or 1/3 of the stem.

### Recommended Handling at Harvest
Handle with care and ‘loosely’ to avoid bruising, which can lead to blackening. During harvest, minimise drying out and exposure to heat, which can cause leaf blackening – pick when it is cool.
Move cut stems promptly to a cool, shaded packing area and make sure the product does not wilt.
Cool as quickly as possible to remove field heat – store at 2–4 °C within 2 hours of harvest; forced-air cooling is highly recommended within 2–4 hours of harvest.

### Grading and Bunching

**Processing**
Reject any contaminated stems.
Sort stems according to maturity, length and thickness. Handle gently.
Prepare bunches to buyer requirements.
Recut stems.
Tie bunches loosely.
Carry out postharvest disinfestation (dipping or fumigation) if required.
Add sleeves if they are required.
Pack into cartons or hold in buckets of postharvest solution and return to cool room.

**Stem length**
According to market demand.

**Bunching**
The number of stems per bunch varies, and is determined by their size, stem diameter, and market and buyer requirements.
There is no prescribed stem diameter in relation to the length of the stem. However, presentation is important, so for example if 5 stems make a thin-looking bunch, then increase bunch size in lots of 5: go to 10 or even 15 stems per bunch. Stay consistent for the grade and make all bunches the same.
For the domestic market, aim for consistent bunches weighing 400–450 g for 70 cm stems (this means stem numbers can vary between bunches).
For Japan, price and stem length are directly proportional. The market prefers long stems, at least 60 cm.
For US market, 50–60 cm, or as customer requests.
Place one tie at the base of short stems.
If possible, line up the flower heads so they are even across the top of the bunch (this depends on variety, as the arrangement of the clusters of flower heads differs between varieties).
Stems should be approximately the same diameter within a bunch, with the cut ends aligned.

### Stems per bunch

<table>
<thead>
<tr>
<th>Stem length (cm)</th>
<th>Av. no. of stems per export bunch (300–450 g depending on buyer requirements)</th>
<th>Av. no. of stems per domestic bunch (400–450 g depending on buyer requirements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100+</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>90</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>80</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>70</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>60</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>&lt;60 cm</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Sleeves**
Advice on whether or not to sleeve is variable, because some people believe sleeves may result in product overheating and cause leaf blackening, especially on the export market.
**Temperature and humidity**

Effective cooling soon after harvest is important to retaining quality and maximising vase life. There are two options:

- **Cool, process, cool – for example, remove field heat by cooling flowers immediately on entry into shed to 10 °C in buckets of solution, process flowers (bunch, grade), and then cool to 2–4 °C by either forced-air cooling (if boxed) or holding overnight in a cool room in postharvest solution.**
- **Quick processing and then cooling – for example, process within 2–4 hours of cutting, pack, and then cool to 2–4 °C, preferably using forced-air cooling immediately after packing.** Alternatively, hold processed flowers overnight in a cool room in buckets of postharvest solution.

Forced-air cooling of packed flowers is ideal for large volumes of product.

**Longer-term storage**

If necessary, hold in cool room at 2–4 °C for a maximum of 5 days, ideally in cartons after forced-air cooling, or bunches can be held in postharvest solution. For longer storage seek professional advice and test in the market before committing product.

**Packaging**

Pack bunches of the same size (stem number, weight and thickness) together. Put bunches of similar length together, and ensure all bunches meet this specification.

Pack boxes according to customer requirements. Aim to standardise the number of stems per box for each stem length shipped.

For export, do not pack mixed varieties in the one box, unless requested.

Pack bunches firmly but springy in boxes so the product will not move and be damaged. Do not pack too tightly or leaf blackening may result. Pack head to tail, or use export hooks or stem breaks to ensure the tops of the bunches can't move in transit, or the flower heads will be damaged or crushed.

Avoid plastic liners, as riceflower is prone to overheating in transit. Use boxes with holes to allow forced-air cooling, or fumigation if necessary. In transit, or the flower heads will be damaged or crushed.

For export, do not pack mixed varieties in the one box, unless requested.

Put bunches of similar length together, and ensure all bunches meet this specification.

**Common Postharvest Problems**

Refer to *Postharvest Manual* for general advice.

**Fungal decay in storage due to botrytis (grey mould)**

Use preharvest fungicide sprays during wet weather to reduce the risk of botrytis. It is important to manage botrytis before and after harvest to minimise risk of the whole flower head collapsing (botrytis is suspected to cause collapse of the pedicels, which dry out and turn black).

Use preharvest insecticide sprays to reduce the pest population at harvest.

Dip flowers that are to be packaged and held for any significant length of time (export product) in a registered fungicide or insecticide solution with added wetting agent for not less than 1 minute, then dry naturally for 2 hours to ensure thorough disinfection.

Liquid dipping benefits riceflower by rehydrating after processing.

**Leaf blackening**

Minimise the risk of leaf blackening by handling product carefully, cooling promptly after harvest and not exposing cut stems to very high temperatures (>25 °C) or very low temperatures.

Check product for leaf blackening before bunching and before sending to market.

Minimise delays in transport, which allow flowers to heat up.

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**Ethylene sensitivity and anti-ethylene treatment**

Riceflower is slightly susceptible to ethylene, especially that produced by the product itself. Ethylene causes leaf blackening and leaf drop in some selections. Experienced growers do not currently use anti-ethylene treatments. Test your varieties to see whether anti-ethylene treatments are effective (for more details, refer to the *Postharvest Manual*), and if necessary do your own trials to optimise the procedure.

**Messages for consumers**

- Keep vase filled with the correct solution of cut-flower food. Check daily, as flowers can use a lot of water. If cut-flower food is not used, change the water at least every second day. Always use clean vases and clean water.
- Do not display in areas that are exposed to full sun, draughts, high temperatures or vehicle exhausts, and preferably do not display near fruit and vegetables. Use refrigerated displays if possible.

**Messages for retailers**

- Recut stems and place into fresh water containing a registered biocide.
- Cool product before marketing or sending on and keep it cool (2–4 °C).
- Maintain good hygiene and keep containers clean.

**Messages for importers and wholesalers**

- Recut stems and place into fresh water containing cut-flower food or a reputable commercial postharvest solution.
- Use clean buckets and containers for displays.
- Do not display flowers in areas that are exposed to full sun, draughts, high temperatures or vehicle exhausts, and preferably do not display near fruit and vegetables. Use refrigerated displays if possible.
- Tell the customer how to care for the flowers and emphasise the need for cut-flower food in solutions. Give the customer a sachet of cut-flower food to take home.

**Messages for suppliers**

- Keep vase filled with the correct solution of cut-flower food. Check daily, as flowers can use a lot of water. If cut-flower food is not used, change the water at least every second day. Always use clean vases and clean water.
- Do not display in areas that are exposed to full sun, draughts or high temperatures. Keep as cool as possible without freezing.

**PACKAGING**

Pack bunches of the same size (stem number, weight and thickness) together. Put bunches of similar length together, and ensure all bunches meet this specification.

Pack boxes according to customer requirements. Aim to standardise the number of stems per box for each stem length shipped.

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Pack bunches firmly but springy in boxes so the product will not move and be damaged. Do not pack too tightly or leaf blackening may result. Pack head to tail, or use export hooks or stem breaks to ensure the tops of the bunches don’t move in transit, or the flower heads will be damaged or crushed.

Use boxes with holes to allow forced-air cooling, or fumigation if necessary. Avoid plastic liners, as riceflower is prone to overheating in transit.

Cool flowers to 2–4 °C before transport.

**LABELLING AND DOCUMENTATION**

Label boxes and buckets as recommended in *Postharvest Manual* or as required by customer.

Ensure box contents are exactly the same as specified in the documentation and on the end of the box.

**TRANSPORT**

Refrigerated vehicle at 2–4 °C.