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Development of Redglobe table grapes for export

By Ian Cameron, Senior Technical Officer, Midland

Exports were once a major outlet for the Western Australian table grape industry.

Over the past 20 years, however, exports have fallen from 500 to 100 tonnes per year, despite an increase in the area planted to table grapes and an increase in overseas demand for our product.

By 1993, less than 3 per cent of the table grapes produced in the State were exported.

The introduction of Redglobe, a new table grape variety from California, is expected to increase the export of table grapes from Western Australia to 1000 t by 1997, when the variety will represent 90 per cent of all table grapes exported (see Figure 1).

Redglobe production will be a $5 million industry by 1997 if growth continues at its current rate and the management techniques being developed are fully adopted.

Redglobe – the queen of table grapes.
Redglobe was first introduced into Western Australia in January 1985 and released to industry in October 1988. The variety is protected by United States patent laws and its availability throughout Australia is controlled by the Australian Vine Improvement Association. The Department of Agriculture is one of three distribution agents for Redglobe in Western Australia.

Since 1988, 180 commercial grape growers have planted more than 60 ha of Redglobe in Western Australia. Significant plantings have been made at Bindoon, the Swan Valley, Mandurah, Harvey, Donnybrook and in the Vasse-Margaret River districts, with trial plantings at Carnarvon.

About Redglobe

Redglobe is a red, seeded, mid-season variety with exceptionally large berries. The colour and berry size has made it popular throughout the Pacific rim areas, with strong demand in Indonesia, Hong Kong, Singapore and Malaysia.

The variety has commanded record prices on south-east Asian markets since it first appeared in 1984. The major producers in the world are California (sold September to December) and Chile (sold mid March to late April). Production in California has increased from 16,000 t in 1989 to 27,000 t in 1991 and further increases are expected. Western Australia's production will be from early December to early April.

More than 16,000 vines were planted in the Swan Valley in the year of release. The Valley remained the major production centre for Redglobe until 1992–93 when plantings outside it began to dominate (see Figure 2). Plantings in Harvey and Vasse are expected to rapidly increase in coming years owing to the outstanding quality of the fruit produced in these regions.

Research

Western Australia was the first State in Australia to receive Redglobe. As the variety had only been released to industry in California in 1981, little was known about the management techniques necessary to produce the quality fruit that was making such an impact on south-east Asian markets.
vigour vines, vines should be planted 3.3 m x 2.4 m (1263 vines per hectare) or 3.3 m x 2.0 m (1515 vines per hectare).

Crop load, berry size and yield
This trial, started in 1988, involves two blocks of Redglobe vines grafted to Schwarzmann rootstock. One block was planted at Wokalup Research Station and another at Swan Research Station, Upper Swan. After four harvests, the following conclusions can be drawn.

- The viability of a Redglobe vineyard is controlled by the uniformity and size of the berries. The aim should be to produce berries with diameters greater than 26 mm and weights greater than 12 g.
- Berry size is not influenced by crop load when vines carry between 15 and 27 bunches per vine.
- The optimum crop load for a vine is dictated by the vigour and age of the vine. Low vigour vines (less than 3 kg of prunings) at Swan Research Station produced relatively small berries and gross yields of less than 19 kg per vine.

High vigour vines at Wokalup produced maximum yields of export quality fruit with 21 bunches in the second cropping year, 24 bunches in the third and 27 bunches in the fourth cropping year. These cropping levels produced 31.5, 34.5 and 37.5 t/ha export quality fruit in the second, third and fourth cropping years.

The Department of Agriculture initiated a series of experiments to determine which areas were best suited to the variety and what were the management techniques for producing Redglobe in each of these areas. Most of these trials have yet to be completed, however, progress to date has enabled a management system to be developed for each area.

**Planting distance, yield and fruit quality**
This study started in 1987 and evaluated 48 planting distances. Rows were planted from 3.0-3.5 m apart and vines 1.6-3.1 m apart. After five harvests, the optimum row width appears to be 3.3 m and the optimum distance between vines ranges from 2.0-2.4 m. On deep fertile soils which produce high

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Environment, time of maturity, berry size and yield

By 1990, some vineyards in the State were producing high yields of perfect fruit and other vineyards were producing low yields of relatively small fruit. To determine what caused the difference in berry size, growers throughout the State were invited to join a Redglobe Club.

The aim of the Club was to increase the export of Redglobe and to monitor berry growth throughout the season to determine critical periods or management practices that influence final berry size. Twenty-two growers participated in 1991–92 and 25 in 1992–93.

Results to date indicate:

The growth pattern of Redglobe berries is similar in all environments provided the vines are vigorous and have adequate nutrition. It takes 100–110 days from flowering to harvest in all districts from Carnarvon in the north to Karridale in the south.

The range of climatic conditions available throughout Western Australia enables Redglobe to be harvested over a four-month period from early December in Carnarvon to early April at Margaret River. Little Redglobe is produced from mid December to mid February.

For best results, bunch numbers should not exceed 27 per vine, and all bunches are trimmed to carry 90–110 berries.

Vines which produce high yields with berries greater than 26 mm diameter all exhibit the following characteristics.

- Pruning weights range between 6.0 and 8.0 kg.
- Shoot growth does not stop until after the berries change colour.
- Leaves remain a dark green until autumn, when they turn yellow and fall.
- Nitrate levels in the leaf petioles range between 1600 and 2400 parts per million at flowering. Phosphorus, potassium, calcium, magnesium and copper levels are at levels adequate by international standards.
- Berry growth does not slow between 15 and 17.5 mm diameter even if heat waves occur during this period.
- Berries do not start to colour until the diameter exceeds 20 mm.
- Bunch numbers do not exceed 27 per vine and all bunches are trimmed to carry 90–110 berries.
- Vines receive optimum irrigation and fungicide treatments.

Postharvest handling and fruit quality

Redglobe grapes grown in Western Australia in 1990 and 1991 and submitted for export inspection often had problems of berry splitting, skin breakdown and sulphur dioxide bleaching. Cool storage trials conducted in the Swan Valley helped to define many of the cool storage requirements of Redglobe.

Redglobe berries will split in cool storage if moisture forms on the surface of the berry during the cooling or warming up phase. Berry splitting was greatest in poorly coloured fruit and least in dark coloured berries. The prob-
Redglobe grapes are ultra sensitive to sunburn damage. Here, the author is checking sun spots as a measure of canopy density for the prevention of sunburn damage.

Ilem could be totally overcome by picking well coloured fruit, rapidly cooling the grapes to below 5°C before the cartons were closed, and maintaining the cold chain from vineyard through to overseas buyer.

Sulphur dioxide is essential to control rots, which develop during cool storage. Redglobe is particularly sensitive to high levels of sulphur dioxide. Trials have established that Redglobe should receive half the dosage of sulphur dioxide given to other varieties. Storage life should not exceed 28 days. Light coloured fruit tended to be more susceptible to bleaching than dark fruit.

Irrigation, wind and nutrition
Studies at Upper Swan are determining the effects of irrigation and wind on the performance of Redglobe vines grown under high and low levels of nutrition. Soil moisture levels which encourage shoot growth and maximise berry size are being determined.

Cause of berry rot disease
Redglobe grapes in the Swan Valley were severely affected by a berry rot before the 1992 and 1993 harvest. Similar Redglobe vines in other parts of the State were not affected. Studies in 1992–93 indicate a possible cause and further investigations are planned.

Extension
Commercial production of Redglobe table grapes will only be viable if vines are planted in the right areas, on the right soils and grown with the right management techniques.

Half the growers are new to the industry and are going through a rapid learning curve.

Failures have been kept to a minimum by the establishment of TAFE courses and grower discussion groups in the Harvey, Donnybrook and Margaret River regions. Ninety-five per cent of all Redglobe growers south of Perth regularly attend these discussion groups.

The future
Production of Redglobe in Australia is expected to increase rapidly over the next five years, but the variety has specific requirements and is generally difficult to grow.
Berries that have lost their bloom from over-handling are not wanted on export markets.

Suitable areas
After five years evaluation, the most successful areas for the production of premium quality Redglobe is on tuart sands near Mandurah and on alluvial soils along the Darling Range Scarp from Harvey to Wokalup.

High yields of excellent quality grapes have also been achieved on selected sites at Vasse, Donnybrook, the Swan Valley and Bindoon. The success of these particular sites appears to be linked to vine nutrition and may be influenced by wind protection.

Carnarvon has outstanding potential for the production of 'out of season' Redglobe, however, the long term viability has yet to be determined.

Plantings of Redglobe are not recommended south or east of Donnybrook, where the fruit ripens late March to mid April. The combination of cool nights and rain during the harvest period can result in severe crop losses from berry splitting. Areas susceptible to spring frosts should also be excluded.

Redglobe should only be planted on deep, fertile soils in areas protected from wind and where adequate, good quality irrigation water is available.

The cost of developing a Redglobe vineyard outside the Swan Valley varies between $35,000 and $50,000 per hectare. Costs in the Swan Valley are less as bird protection is not needed.

Comparison of berry size in export table grapes

<table>
<thead>
<tr>
<th>Variety</th>
<th>Characteristics</th>
<th>Berry size g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame Seedless</td>
<td>Red seedless</td>
<td>3.0 to 5.0</td>
</tr>
<tr>
<td>Sultana</td>
<td>White seedless</td>
<td>2.5 to 6.0</td>
</tr>
<tr>
<td>Italia</td>
<td>White seeded</td>
<td>4.5 to 6.5</td>
</tr>
<tr>
<td>Cardinal</td>
<td>Red seeded</td>
<td>5.5 to 7.5</td>
</tr>
<tr>
<td>Redglobe</td>
<td>Red seeded</td>
<td>10.0 to 13.5</td>
</tr>
</tbody>
</table>

Success in Western Australia is linked to high yields of outstanding quality fruit sold on export markets. These markets require uniform bunches of about 1000–1500 g where at least 75 per cent of the berries exceed 26 mm in diameter.

Prices are expected to drop as production increases, however, demand has been extremely strong throughout Asia when the uniform, large berry size is maintained. Redglobe berries are more than 50 per cent larger than any other table grape variety (see Table) and sell themselves on appearance alone.

Production techniques have been developed in Western Australia which are producing the highest yields of export quality Redglobe in the world. If these techniques are adopted, plantings of 2–4 ha would be a viable unit, particularly if a central packing house were to be established in each production area.

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