The production of table grapes in Western Australia

Jim Campbell-Clause
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The table grape industry in Western Australia is expanding to fill increasing export and domestic demand. Expansion of the industry has been based on Redglobe production in new areas ranging from Carnarvon in the north to Margaret River in the South. Expansion has been rapid with success due in part to adoption of research findings. Jim Campbell-Clause reviews the direction the industry must follow to continue to expand. It will need to adopt new varieties to fill market niches, use production methods that minimise inputs and off site effects and maximise yield and quality.

The industry
There are 250 commercial table grape vineyards in Western Australia producing nearly 4000 tonnes of marketable fruit. Exports of table grapes have increased from 100 tonnes in 1991-92 to about 400 tonnes in 1995-96. Exports are projected to increase to 1500 tonnes by the year 2000. The value of table grapes exported from Western Australia is about $1.3 million. This is projected to treble to $4 million by the year 2000. Over the same period the domestic market is expected to increase from $6 million to $10 million.

Western Australia has a wide climatic range and table grapes can be supplied year round. Carnarvon produces the earliest ripening table grapes starting the season in October, table grapes harvested in April in Margaret River can be stored to extend the marketing period. The highest prices commanded by the domestic market are in the early and late part of the marketing period. Demand on the export market is greatest and prices are highest from late December to mid February.

The market
Western Australia has the land, climate, water and technology to produce high yields of excellent quality fruit. We have a major advantage over our Southern Hemisphere competitors with regard to distance to the expanding markets in Asia (specifically Singapore, Malaysia and Indonesia)

We can supply produce when many of our Northern Hemisphere competitors cannot. Table grapes can be air freighted to Asia competitively.

Western Australia has supplied high quality table grapes to South-East Asian markets for more than 60 years and developed an excellent reputation in the market. A Quality Assurance scheme has been developed and adopted. The program allows grape growers, market agents and retailers to demonstrate to their customers an ability to produce and market safe, clean grapes to quality specifications. The program will enhance the high reputation of Western Australian table grapes.

Quality and production to market specifications are critical factors for international competitiveness. Consumers expect consistent quality. Retailers, therefore, require a guarantee of continuity of supply and quality products. Overseas buyers are increasingly concentrating on factors which will improve the competitiveness of products, including:

• guaranteed consistent quality products which meet market specifications, with an increasing emphasis on a 'clean and green' philosophy;
• marketing and promotional support;
• price competitiveness;
• continuity of supply and
• good choice of varieties.

The outlook for Western Australia’s export table grape production is excellent. Much of the opportunity will occur in the Asian region. Population growth, estimated at more than 60 per cent over the next 15 years, and high rates of economic growth providing continued increases in disposable income will promote an increase in grape consumption.

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Table grapes must be irrigated to produce viable crops. The source of water should be of adequate volume and reliability to supply the soil survey should include measurement of soil pH (acidity or alkalinity), salinity, and the level of some nutrients. If the results show a pH of less than 5.0 in calcium chloride (1:5 in 0.01M) liming is recommended. Avoid soils that pose a salinity hazard.

Investing in the Western Australian table grape industry
To maintain current market share, an additional 100 to 125 hectares of table grapes will need to be established in the next two years and 500 hectares by the year 2000.

To produce quality table grapes economically, site selection, water requirements, varieties, management techniques, costs and marketing options all need to be considered carefully before planting begins.

The preferred table grape production areas are, from Carnarvon in the North to Margaret River in the south, on the coastal plain or the foothills. Frost and water availability limit development further inland and tropical conditions limit development further north.

In the southern extremity, a climate change appears around Cowaramup, and suitable areas south of this taper towards the coast to a point around Hamelin Bay. Suitable varieties to plant and their time of ripening will change from the north to the south of the region.

Spring and summer temperature, incidence of wind, hail and rainfall are critical climatic factors for successful table grape production. Low spring temperatures resulting in frost can cause damage to green shoot growth. Frost after budburst can kill the whole shoot.

Summer temperatures influence grape ripening. In southern areas, with lower summer temperatures, the fruit ripens more slowly. In some seasons there is a risk that some varieties may not ripen. This emphasises the importance of varietal selection.

Wind can damage the structure of the vine, scar the fruit and cause physiological stress reducing potential yield. Salt laden winds can result in leaf burning and shoot tip damage. Select protected sites.

Table grapes will perform better where there is at least 50 centimetres of topsoil overlying a friable, well-drained subsoil with good water holding capacity. Soil with a loam to fine sandy loam texture is considered ideal because of its drainage, water holding capacity, nutrient retention and rooting conditions.

Soils prone to waterlogging should be avoided. The presence of gravel in the soil is not detrimental as these soils are usually well drained, however, nutrient requirements, particularly phosphorus, may be higher.

Soils associated with marri/jarrah or tuart forests are generally suitable for table grape production.

A full soil survey of the intended site should be completed before establishing a vineyard. The survey will identify problem sites and will define management units based on soil type. This will assist in irrigation design and variety and rootstock selection.

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Sufficient water to the vineyard. Where water supply is limited the vineyard area should be restricted.

Table grapes will annually require up to 9000 kilolitres per hectare in Carnarvon, 5000 kilolitres in the Harvey and Donnybrook areas and 3500 kilolitres at Margaret River.

The irrigation system should be installed and commissioned before planting. It should be designed as separate management units based on soil type. It must be able to supply enough water to the whole vineyard during peak water requirements. Drip irrigation is recommended for most situations. Micro jet type sprays and mini-sprinklers are suitable for light soil types and hot regions. They can lead to water wastage in early years and encourage weed growth, but in heat wave or frost conditions they can be used to moderate temperature.

Avoid saline irrigation water. As a general guide an electrical conductivity of irrigation water of less than 230 microsiemens per metre should present no problems with micro irrigation. Soluble iron and bacterial iron can cause blockages.

It is easier and cheaper to develop and operate a vineyard on flat ground. The area should be relatively flat or at least with an even grade (preferably less than 10 degrees) to reduce erosion risk and to facilitate the trellising and netting structures. In the southern districts vineyard slopes should face north or north-east to take maximum advantage of sunlight.

When establishing the vineyard purchase the best quality planting material available, preferably through the Western Australian Vine Improvement Association or from a reputable nursery. Material purchased should be free of disease and true to type.

It is advisable to grow table grapes on rootstock. These provide nematode resistance, improve vine vigour and yield and berry size. Rootstocks can be used to overcome soil conditions such as soil acidity, salinity, drought and soil pests. Most varieties growing on their own roots are susceptible to nematodes and weaken over time resulting in reduced yields and berry size. This is particularly so with Redglobe.

Good site preparation is essential for the long term success of the investment. Activities such as deep ripping should be done to break up the soil to depth to allow the vines' roots to fully explore the soil profile and to remove large rocks and old tree roots, which may harbour pests and disease.

Deep ripping should be done in late summer or autumn to a depth of 0.75-1.0 metre on all soil types. Weed control is required particularly if perennial grass is present. Weeds are difficult to control after planting. Mounding may be necessary in areas with a high winter watertable.

Table grape production is labour intensive and relies on skilled labour. There are many operations that must be done at critical times to produce high quality fruit. If any of these operations are delayed or not carried out, then viability will be affected. All table grape varieties differ in the cultural practices that are required to produce good yields and quality. Some of the management techniques are discussed below.

Management techniques

The training of developing vines into a uniform shape is a time consuming but critical operation in the development of a successful vineyard. The level of pruning should be adjusted according to the variety and the vigour of individual vines to achieve a desired balance between crop and foliage. Shoot thinning involves removal of unwanted shoots to open up the canopy and to avoid loss of bloom and berry scarring.

Crop thinning involves reducing the crop load to a level the vine can carry to achieve optimum yield and quality. It can be carried out by removing bunches before or after flowering or by berry thinning, the timing depending upon the variety.

Treatments to improve fruit set include cincturing, topping or tipping shoots or the use of plant growth regulators. The treatment will depend on the variety.

Gibberellic acid sprays are required for most seedless grape varieties to attain satisfactory bunch shape and berry size. Foliage manipulation is required for some varieties to improve fruit colouration and quality, reduce disease, improve spray coverage and bunch accessibility. This involves leaf removal and tucking in of shoots.
Just over 200 growers have planted the variety since its release in 1989. It makes up 40 per cent of all table grapes sold in Perth and 98 per cent of all grapes exported from Western Australia. The colour and berry size make it popular on export markets where it achieves high prices.

**Flame Seedless** is a red seedless, early variety with crisp round berries. It has a distinct flavour and is popular in South East Asian and domestic markets, particularly if large berries of high quality are produced. It requires exacting management techniques.

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**Varieties**

Over thirty varieties of table grapes are currently grown commercially. Five of the most important are discussed below:
to produce good size and quality. It is prone to splitting if wet or humid conditions occur near harvest.

**Sultana** is the most widely grown and popular table grape in the world. It is a white, mid season seedless cultivar with large, crisp oval berries when treated with gibberellic acid sprays. It requires exacting management techniques to produce good size and quality. It produces consistent yields of large, elongated, seedless berries.

Low fruitfulness and berry splitting often result in uneconomic yields south of the Swan Valley.

**Perlette** is an early ripening white seedless variety with a slight muscat flavour. It is only suitable for low rainfall areas.

**Italia** is a mid season, white seeded variety with a muscat flavour which produces high yields of conical shaped bunches.

**Kyoho and Black Olympia** are Japanese bred grape varieties. They are large, black, mid season, seeded varieties that are difficult to grow but high quality fruit is expected to command high prices in the Asian markets.

Black Olympia has been grown in the Swan Valley and has been evaluated at Swan Viticultural Research Station and Wokalup Research Station and as a result it has been established that moderate yields can be achieved in Western Australia with good fruit quality. Recent test plantings in Margaret River and in Manjimup have produced promising results.

Following these results a research program has been started to define management techniques and climatic regions suitable for the production of export quality Kyoho and Black Olympia.

If moderate yields of good quality fruit can be achieved in Western Australia then a viable new industry could be established. A further impetus behind this work...
is to use these varieties to open an export market into Japan for Western Australian grapes.

Preliminary results with Black Olympia and Kyoho have indicated that cincturing, shoot tipping, and bunch tailing before berry shatter has produced good fruit set and berry size. At Wokalup and at Margaret River these treatments have resulted in an average yield of 12.5 kilograms per vine with an 80 per cent export packout.

Fruit from these trial plantings have been test marketed on the domestic and export markets. Outturn reports for fruit test marketed in Hong Kong has been very encouraging. Good arrival condition, in a standard 10 kilogram export carton, good flavour and high returns were reported.

**Crimson Seedless** is a variety bred by the United States Department of Agriculture. It is a late season, attractive, bright red seedless grape with crisp berries and good flavour. It is characterised by medium conical bunches. The berries are medium sized and oval. Crimson Seedless responds to gibberellic acid and cincturing. Crimson Seedless is less susceptible to rain damage.

This variety was released to industry in September 1996. It is believed to have outstanding potential. Reports from California indicate that it is a difficult variety to grow. Different management practices to overcome low fruitfulness, to improve colour development and berry size will be assessed by Agriculture Western Australia on growers' properties.

**Table grape vineyard prior to pruning, with recommended wind protection, trellising and soil management**

**With careful planning, good site selection, adoption of best establishment and management practices, and with selection of suitable varieties, investments in the table grape industry should provide investors and the State with high returns**

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