

Production & Marketing Reports

A Business Profile of Australian Nurseries

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ADDITIONAL INDEX WORDS. floriculture, economics, greenhouse profitability

SUMMARY. A 1995 study of 22 Australian nurseries 1) developed a profile of production, management, and profitability; 2) compared their performance to relevant U.S. benchmarks; and 3) identified trends and potential areas of improvement in the management of Australian nursery enterprises. The study confirmed that Australian nurseries incur high labor costs (38.8% of sales) comparable to

United States nurseries, while costs of materials and supplies were lower than in the United States. Australian managers were concerned with marketing and recruiting and keeping labor rather than increasing capital investment to enhance production efficiency. Capital expenditures were funded from internal cash flow rather than external financing. Many of the nursery managers used relatively simple performance indicators, and most business objectives were stated in general terms. Concerns about the viability of the industry included oversupply, the growth in chain stores' business, factors eroding the demand for nursery products, and greater regulation.

Until a recent survey by the Australian Bureau of Statistics (ABS, 1995), the Australian nursery industry suffered from a lack of base statistical data (Industry Commission, 1993; Victorian Agriculture and Horticulture Industries Training Board, 1983). Exceptions are reviews of the cut-flower sector of the industry (Ferguson et al., 1987; Karingal Consultants, 1994; Kloosterboer et al., 1992; Sutton, 1978).

According to the 1995 report by the ABS nursery on cut flower, and cultivated turf statistics for 1993-94, 2,641 Australian nurseries sold greenstock. The total value of greenstock production sales, excluding cut flowers and cultivated turf, was \$AUS 465.9 million. This figure includes sales to retail nurseries, chain stores, municipalities, and landscapers. Retail nurseries account for 64% of Australian retail sales and chain stores account for the remaining 36%.

Materials and methods

We surveyed 22 Australian nurseries in 1995 to 1) develop a profile from production, management, and profitability perspectives; 2) compare the data to relevant U.S. benchmarks; and 3) identify trends and potential areas of improvement in the management of Australian nursery enterprises.

Data were obtained primarily from visits to nurseries that agreed to participate in the project, chosen based on nursery type and size. The survey represents small to medium-sized nurseries with annual sales of less than \$5 AUS million. Parts of the questionnaire were based on questions found in the Professional Plant Growers Association (PPGA) survey and the 1984 Pennsylvania Greenhouse Survey (Brumfield et al., 1993). All monetary data are expressed in U.S. dollars using a conversion rate of 0.74 Australian/U.S. dollar as of 31 Dec. 1995.

The term nursery in Australia refers to any producer of ornamental crops, including herbaceous and woody plants and cut flowers. In this study, the survey was limited to producers of potted crops. In the United States, this definition would include greenhouse and nursery crops. However, since no comparable data are available for nurseries producing woody plants, the U.S. data used for comparison comes from the PPGA 1994 Greenhouse Operating Report. Because of a milder climate in the production areas of Australia compared with most of the United States, many crops produced in greenhouses are grown outdoors in Australia. Comparisons were made using a percentage of sales rather than in dollars for each crop category.

Results and discussion

BUSINESS PROFILE. We asked nurseries to estimate the size of their outdoor with no cover, shade cloth cover, and greenhouse-covered growing areas (Table 1). Greenhouse production accounted for only 14% of the average growing area, while 76% of the production area was outdoors with no cover, and 10% was under shade cloth. The proportion of covered growing area was much higher for potted color (69%) and bedding plant (56%) groups. While data for this type of growing area were not available for U.S. firms, we assumed that most U.S. production reported by the PPGA takes place

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Table 1. Average growing area, average number of full-time equivalent employees, and sales per nursery, sales per square meter, and sales per full-time equivalent employee by type of nursery for nurseries in Australia.

Nursery type	Potted color	Bedding plants	General lines	Other lines	All nurseries
Average growing area in square meters (%)					
Outdoor	2,376 (30)	5,538 (42)	18,192 (68)	89,111 (95)	22,686 (76)
Greenhouse	5,170 (66)	5,750 (44)	3,463 (13)	4,458 (5)	4,325 (14)
Shade house	250 (3)	1,775 (14)	5,203 (19)	300 (0)	3,011 (10)
Total area ²	7,796 (100)	13,063 (100)	26,858 (100)	93,869 (100)	30,022 (100)
Average number of full-time equivalent employees (SD)					
All types	19.4 (6.4)	19.7 (2.7)	18.5 (14.0)	25.1 (19.1)	19.9 (12.5)
Average sales per nursery in U.S. dollars² (SD)					
All types	933,788 (297,749)	896,325 (66,207)	991,418 (876,025)	857,956 (397,430)	940,854 (624,681)
Average sales/m² in U.S. dollars (standard deviation)					
All types	131 (34)	84 (39)	33 (16)	12 (4)	60 (50)
Average sales per employee in U.S. dollars (SD)					
All types	48,611 (4,385)	46,670 (8,807)	48,578 (18,924)	45,247 (16,458)	47,703 (14,925)

²Sum of individual items does not always arrive at this total due to rounding errors.

²Sales figures are expressed in U.S. dollars using a conversion rate of 0.74 Australian/U.S. dollars as of 31 Dec. 1995.

in greenhouses. The employee data (Table 1) were adjusted to include family labor. Part-time and casual employees have been converted to full-time equivalents based on average hours worked.

The average sales per full-time equivalent employee for all nurseries was \$47,703 (Table 1). Sales per employee ranged between \$43,850 and \$55,368 for the potted color group and \$39,005 and \$61,603 for the bedding plant group. The variation in sales per employee was much wider for the general container group although this variation seems to be explained by nursery size. The typical net sales per employee for U.S. firms was \$55,089 (Table 2). The U.S. data varied significantly by nursery size and type. Australian and U.S. nurseries showed extensive variation in levels of space productivity, i.e., sales per square meter.

On average, 22% of business capital for Australian nurseries was borrowed. The maximum level of external financing for any Australian firm was 50%. This level of external financing appears low when compared to U.S. data (PPGA, 1994), which showed debt levels ranging from 42.2% for

small nurseries (sales less than \$300,000) to 56% for the large nurseries (sales more than \$1.5 million). The Australian nurseries surveyed tended to develop their greenhouse facilities as their cash flows allowed.

We asked the nurseries to identify their most important market channels and to estimate the percentage of business directed towards these channels (Fig. 1). Retail nurseries and garden centers, on average, accounted for 52% of sales and chain stores for 30%. Other channels including florists, landscapers, production nurseries, cooperatives, promotion and display organizations, and markets made up 18% of business.

In the United States, wholesale sales to retailers accounted for 62.7% of sales (Fig. 2). United States data were not delineated by retail nurseries/garden centers and chain stores. United States nurseries retailed 25.8% of their plants directly from their greenhouses; Australian nurseries did no direct retailing from their production facilities. Sales to other growers accounted for 11.5% of sales for U.S. growers. These sales are included in the 18% sold through other channels in Australia.

Australian nurseries produced a large diversity of lines, sometimes up to 300 different crops. Australian nursery owners told us that their market for container production is limited to the relatively small domestic market, and growing a diversity of lines was a way of minimizing the losses if a particular line proved to be unpopular and unprofitable. While managers appreciated that a greater product diversity meant a lost opportunity for achieving greater production efficiencies and lower costs, they were concerned with the risks of "putting all of one's eggs into one basket."

Because of the large number of different products and sizes produced at each nursery, automation is very difficult. Nurseries appear to be trying different approaches to reduce labor costs by automating. The adoption rate of computerized accounting systems (which can be adapted to any nursery) was higher than for production techniques that often do not lend themselves to such diverse product mixes. For example, 17% of the nurseries used computerized accounting systems while only one used movable benches. Many nurseries grew most of

Table 2. United States nurseries—average net sales per full-time equivalent employee and total sales per square meter by product type in U.S. dollars.²

Parameter	Flowering potted plants	Bedding plants	Diversified	All
Average net sales per employee	73,562	49,194	64,173	55,089
Total sales per square meter	128	64	165	89

²Source: PPGA, 1994. The PPGA used the median or midpoint.

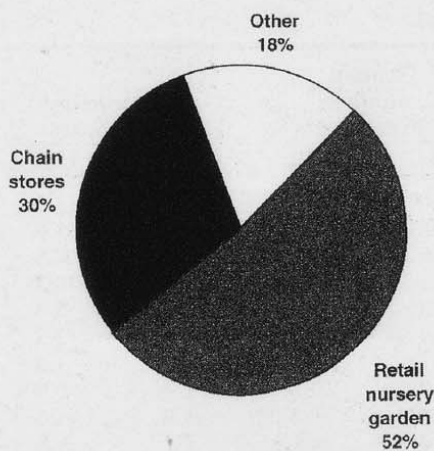


Fig. 1. Sales distribution of Australian nurseries/greenhouses.

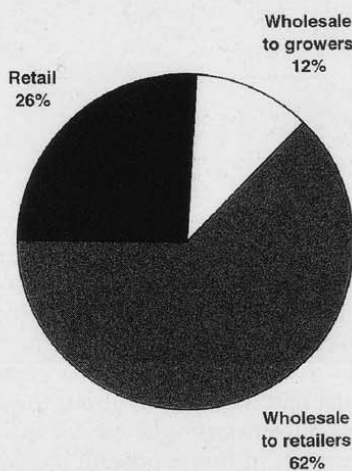


Fig. 2. Sales distribution of U.S. nurseries/greenhouses.

the plants on the ground rather than on benches.

The nurseries were asked to identify their major product advantages (Fig. 3). All factors except price were important with the most important being quality, variety, service, and reliability. Many nurseries carried unique products and brands as a way of maintaining a competitive edge.

Costs. Caution should be used in comparing U.S. and Australian data. Bedding plant firms and potted color firms are fairly similar in each country. In the United States, however, a firm is considered to be

diversified if it does not have >50% of its production in any one of the following categories: bedding plants, flowering potted plants, foliage plants, or cut flowers. United States diversified firms do not produce woody plants that take >1 year to produce, whereas general container firms in Australia included woody plants.

Total cost of production for comparable firms was less for Australian nurseries than for U.S. greenhouses. It is possible that several cost categories were not on the Australian questionnaire and thus managers did not report them, even in the "other" category. This omission did not occur from U.S. firms because data were based on income statements. It is also possible that the United States is a more mature, and thus more competitive, market with lower profit margins.

Labor-related expenses appear comparable between Australian and U.S. firms (Table 3). More accurate information about the treatment of the cost of family labor is needed to enable a better basis for comparison.

The largest annual expense for Australian nurseries is labor. This is the largest cost of U.S. nurseries producing flowering potted plants, but direct materials and supplies were a slightly higher cost than labor for other U.S. nurseries. One possible explanation for the higher costs of direct materials and supplies in U.S. firms may be that U.S. firms tend to buy most of their required cuttings and seedlings from other producers, while many Australian nurseries produce their own. Thus some of the costs of materials and supplies would be included in other categories such as labor, heat, irrigation, etc. Many managers who participated in the survey indicated that they

produce some of their own plant varieties to ensure that they have unique product lines.

It is not surprising that rent and depreciation on buildings and equipment are higher for U.S. nurseries than for Australian ones because most Australian production occurs outdoors or in low-cost greenhouses, rather than in greenhouses that require a larger capital investment. Except for diversified nurseries, the cost of general maintenance and repairs is also higher for U.S. nurseries than for Australian ones. For the same reasons (i.e., greater use of covered area) insurance is a higher cost for U.S. than Australian nurseries.

BUSINESS OBJECTIVES AND PERFORMANCE INDICATORS. Financial objectives of most of the nursery managers surveyed were expressed in general terms, and few nurseries had adopted quantitative targets or goals. Typical business objectives were to increase annual turnover and profit, operate a financially successful business, increase market share, increase profit per unit of sales, maintain or exceed budget, accumulate money in the bank, or simply to keep going. Two specific quantitative objectives included achieving a profit margin of 10% of revenue and a return on assets of 10%. Other objectives related to the development of buildings or facilities. One nursery planned to consolidate its existing activities in hopes of making them more viable.

Business performance indicators included monthly sales levels, performance against budget (monthly budgets or annual crop budgets), or performance against previous years' sales and expenses. Little reference was

Fig. 3. Product advantages identified by nursery managers in Australia.

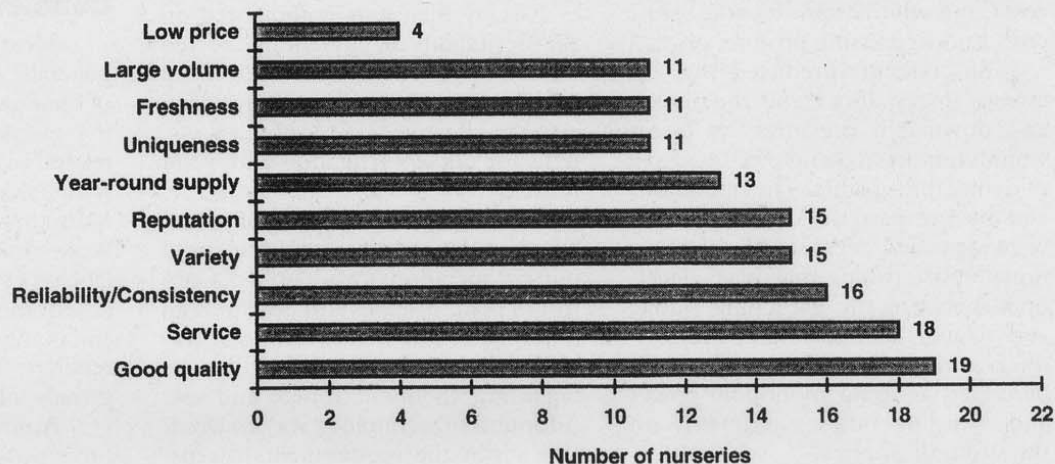


Table 3. Annual expenses as percent of sales for U. S. and Australian (Aus.) nurseries.²

Expense item	Potted color/ pot plant		Bedding plant		General container/ diversified		All nurseries/ greenhouses	
	Aus.	U.S.	Aus.	U.S.	Aus.	U.S.	Aus.	U.S.
Labor ^y	37.3	35.4	43.4	33.2	35.8	33.5	38.5	33.8
Heating	4.8	4.9	1.5	3.9	0.8	2.7	1.7	3.9
Irrigation	0.3	NA ^x	0.5	NA	0.9	NA	0.7	NA
Materials ^w	23.2	33.6	21.2	33.4	21.1	43.4	21.3	35.3
Rent and depreciation	3.1	7.2	3.7	5.3	4.3	4.4	3.7	5.5
General maintenance	1.9	3.0	1.5	2.8	2.4	1.5	2.2	2.5
Insurance	0.6	2.4	0.9	1.5	1.1	1.4	1.0	1.6
Office/administration	1.2	0.9	2.3	1.0	0.9	0.7	1.4	0.9
Other utilities	1.4	1.7	1.4	1.7	1.4	1.2	1.3	1.6
Rates	1.9	NA	0.3	NA	1.3	NA	1.1	NA
Auto/truck	1.3	1.5	2.1	2.0	3.1	1.3	2.5	1.7
Other freight	6.7	NA	1.0	NA	4.5	NA	3.9	NA
Interest	2.0	1.9	2.5	1.7	1.7	1.2	1.8	1.7
Advertising	0.9	0.7	0.5	1.1	1.3	1.2	1.0	1.0
Other items	4.2	3.9	3.4	5.0	4.1	6.5	3.8	5.1
Total expenses ^v	90.4	96.4	85.9	92.1	84.4	99.4	85.6	94.6
Profit (sales less expenses)	9.6	2.8	14.1	8.0	15.6	0.6	14.4	5.4

²Australian figures are averages from Brumfield and McSweeney, 1996. U.S. figures are typical / median figures from PPGA.

^yLabor expenses included wages, salaries, and benefits such as payroll tax, unemployment, insurance and worker's compensation.

^xNA = not applicable.

^wDirect materials and supplies include pots and containers, plant materials, and seeds, soil/growing media.

^vSum of individual item does not arrive at this total due to rounding errors.

made to monitoring business performance using productivity indicators.

INDUSTRY CONCERNS. We asked survey participants to list any particular problems or threats to sectors of the industry. Many managers were concerned about an increasing number of growers entering the market. Growers felt this would result in an oversupply of plants to the market and consequently a downward pressure on prices. Managers also expressed concerns about excessive price cutting and the potential for a price war mentality. One manager indicated that the industry was still perceived as a cottage business with relatively easy entry that lacked a level of professionalism. Many of these new entrants are not aware of costs, and sell their products at below cost, thus depressing product prices.

Respondents predicted that increased uncertainty about the market and downward pressures on prices would come from changes in the source of demand for plants. The operations and buying patterns of chain stores were identified as threats to the traditional relationships that have developed between the gardening public and retailer, and secondly, the producer and retailer. Chain stores were perceived as using monopoly power and awarding business primarily on the strength of price.

Managers felt that the industry reflected the general business cycles and trends in the economy, and they were concerned about demographic changes and consumer behavior. Some managers predicted that homes would occupy smaller land plots in the future. The adoption of a user-pays policy for home water use could also alter nursery spending patterns. One manager believed that the industry, as a whole, was unaware of the importance of educating and promoting home gardening to both today's and tomorrow's gardeners. Several managers in Victoria highlighted the increase in "competition for the discretionary dollar" with the recent development of gambling facilities in that state.

Many managers commented on the inevitability of regulations directed toward controlling nursery runoff and water recycling, and they were interested in effective and economical systems for nursery irrigation and water reuse.

A range of problems or issues affecting the ongoing management of nursery operations was identified. Control of plant diseases and pests was an ongoing problem made more complex through changes in regulations regarding chemical storage and use. Adoption of technology was unavoidable given the requirements of cus-

tomers. For example, a general expectation was that bar-coding plants would become a universal requirement for all nurseries. The gradual shift by the industry to outside sources for potting media raised questions about the systems nurseries should use for quality control of in-house potting media.

Many managers expressed concerns about obtaining and keeping good employees. The concern was less about the cost of labor than the quality of the labor supply. Most were not overly concerned about labor-saving automation. The managers who were most satisfied with their work forces had developed their own systems of staff training and development.

Conclusion

Most Australian managers were generally optimistic about the future of their own business and the future of the industry. Their major concerns related to management and marketing rather than to production problems. Many managers branded their products, some added bar codes, and all labeled every plant that left the nursery. Some provided in-store displays and point-of-purchase materials to the retailers. The quality of the survey groups' plant material was very high.

Australian nurseries had cost structures similar to those in the United

States. Australian nurseries had higher labor costs (38.3% of sales) but lower direct material costs than in the United States. The lower material costs could have been due to Australian nurseries tending to propagate in-house plant material, whereas U.S. nurseries tend to outsource propagation material. The U.S. nurseries had a higher investment in capital. One of the reasons is the greater tendency by U.S. producers toward greenhouse production. The U.S. and Australian nurseries showed similar variability in employee and space productivity.

Future analysis of individual Australian nurseries and overall industry performance for Australian nurseries would benefit from consistent recording of nursery data. The industry would benefit from having standard expense classifications and a stated definition of nursery growing area.

Managers should consider reducing the number of different products, but still provide enough diversification to reduce risk while allowing for more automation to reduce costs.

The largest expense category for Australian nurseries was the cost of labor. Although the main concerns relating to labor were about recruitment and training, given the high cost of labor, the industry needs to continually address the issues of automation and other practical ideas for reducing labor input. The Australian Horticultural Research and Development Corporation report (Rakajewski and Gaydon, 1995) addresses this topic.

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Crop Rotation Reduces the Cost of Colorado Potato Beetle Control in Potatoes

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ADDITIONAL INDEX WORDS. integrated pest management, IPM, economics, *Leptinotarsa decemlineata*, *Solanum tuberosum*

SUMMARY. The effect of crop rotation was investigated on the efficacy and the economics of various insecticide strategies for Colorado potato beetle (CPB) control in potatoes (*Solanum tuberosum* L.) in 1995-96. These included broad-spectrum insecticides and biorational (environmentally friendly, naturally occurring) combinations that targeted specific CPB life stages. CPB pressure was greater in the nonrotated than the rotated plots. Although all materials gave better CPB control than the check, significantly more spray applications were required to reduce CPB numbers below treatment thresholds in the nonrotated plots than the rotated plots in both years. Overall yields and economic returns were significantly greater in the rotated plots in 1995. Efficacy of insecticide strategies varied, with little defoliation and few CPB larvae found in the imidacloprid treatment in 1995 and 1996. All insecticide strategies except endosulfan resulted in significantly higher estimated returns to management than the untreated check;

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