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Export flower industry

A review of recorded statistics

A report for the Rural Industries Research and Development Corporation

by Sally Sutton

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Researcher Contact Details
Sally Sutton
Flower Export Council of Australia
PO Box NFC513
Melbourne Markets
542 Footscray Road
FOOTSCRAY VIC 3011

Phone:	03 9258 6150
Fax:	03 9258 6112
Email:	feca@netspace.net.au
Website:	http://www.feca.org.au

In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

RIRDC Contact Details
Rural Industries Research and Development Corporation
Level 1, AMA House
42 Macquarie Street
BARTON ACT 2600
PO Box 4776
KINGSTON ACT 2604

Phone:	02 6272 4539
Fax:	02 6272 5877
Email:	rirdc@rirdc.gov.au.
Website:	http://www.rirdc.gov.au

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Foreword

This project was commissioned to continue analysis and reporting of information about the Australian flower export industry. The project sought to determine patterns in industry outputs over the last few financial quarters, as well as advance the methodology used in gathering and presenting the data. The project was funded from industry revenue which is matched by funds provided by the Federal Government.

While the Australian flower export industry has been operating for some time, few macro level analyses have been undertaken. The current report advances the work undertaken by Brooks (2001) and responds to continued industry and policy level needs. For the first time, information on seasonal trends and exports to 42 export markets is presented. The report also includes a number of methodological suggestions for future studies. It is a timely report, coming at a point of increased recognition of the need to progress the measurement and analysis of many smaller Australian primary industries.

This report, a new addition to RIRDC's diverse range of over 800 research publications, forms part of our Wildflower and Native Plants R&D program, which aims to improve the profitability, productivity and sustainability of the Australian wildflower and native plant industry.

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Simon Hearn
Managing Director
Rural Industries Research and Development Corporation

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Abbreviations

ABS	Australian Bureau of Statistics
AHECC	Australian Harmonised Export Commodity Classification
FECA	Flower Export Council of Australia now renamed Australian Flower Export Council (AFEC)
MAFF	Japanese Public Relations Department of the Ministry of Agriculture Forestry, and Fisheries
RIRDC	Rural Industries Research and Development Corporation

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Executive Summary

This report presents information about the size and nature of the Australian flower export industry. The report gives information on the patterns and levels of flower exports across a range of important variables. Seasonal information on the categories of flower exports as well as their state of origin and destination market is presented. This report is the first publication listing seasonal variations in the Australian flower export industry.

The results bring out patterns in the flower export industry. Seasonal trends and the strength of particular flower categories and export markets are clear. Generally, there appears to be a low period in the March and June quarters. Fresh flowers occupy the great majority of the current market. Within the fresh flower category, Other Australian Species and Fresh Artificially Propagated Waxflowers are dominant. Japan, the USA and the Netherlands are the major export markets.

The results given in this report confirm market trends, seasonal patterns and product demands. These results can be used to generate and support marketing and production strategies. Reviewing data on the levels and types of exports makes it possible to ensure alternative products are targetted in low periods and that demand matches supply. Environmental strategies can be implemented given figures from fresh wild picked categories.

The results suggest that the dollar value and volume of flowers exported from Australia have been underestimated for a considerable period. This report indicates that current figures may underestimate the industry size by as much as 30%. It is important that accurate data for this export industry is obtained to encourage further investment, employment, and focused research and development.

Methodological uncertainties in the current analysis are exposed. Despite many clear trends, the findings reported are made complex by unclarity in current measurements, and the lack of any holistic means of crossvalidating the current data. Despite recent revisions to the classifications used for measurement, this study demonstrates that the categories need to be further refined. To this end, a list of specific suggestions is given. The report also develops a rationale for obtaining additional and different forms of data capable of providing more accurate and reliable measurement of the industry. In addition to the substantive results, therefore, methodological suggestions are made for increasing the efficiency and accuracy of future studies.

A number of recommendations are made:
1. Additional production and export figures on the value of the industry need to be gathered from a range of sources both inside and outside Australia. This information can then be used to establish the reliability and validity of ABS data, particularly the dollar value estimates.
2. An independent audit of exporters and possibly certain growers should be undertaken to crossvalidate production and export statistics.
3. Additional data on exports should be obtained from significant export markets, including Japan, the USA and the Netherlands. This can be used to crossvalidate current ABS estimates.
4. Marketing strategies for the dried flower industry need to be investigated. It is possible that dried flower exports could make a particular contribution during the low March and June periods.
5. AHECC relating to the current industry need to be refined. The redefinition is particularly necessary in the case of a few categories which have current dominance. New categories have been proposed in this report.
6. Interstate flower movements need to be collated, as this is valuable information.
7. From an industry perspective, it may be useful to examine seasonal complementarities of export countries and regions, particularly between the Asian and European markets.
8. Quantitative analysis of the Australian flower export market should be undertaken on an annual basis. These need to develop better means of diagnosing export patterns and developing explanatory models which can be used in developing production and marketing strategies.

1. Introduction

Focus

The generation of effective policy and commercial strategies and practices for Australian export industries is dependent on the provision and use of reliable and accurate production and export information. The acquisition, analysis and reporting of such information plays a valuable role which requires support and development. It is important that these efforts of research and dissemination focus on all industries contributing to the Australian export economy, rather than limit their attention to major sectors. Only a comprehensive picture of the export market has the capacity to provide information for understanding current developments and for guiding future growth.

This report responds to a continued need for detailed and accurate information about the Australian flower export industry. Following from Brooks (2001), the report provides information on the patterns and levels of flower exports across a range of important variables. Seasonal information on the categories of flowers exports as well as their state of origin and destination market is presented. In addition to highlighting implications arising from current analyses, the report reinforces the need for further data analysis, as well as the construction of more accurate and reliable categories for recording and reporting export information.

The current study seeks to fulfil both current and future industry needs. While Brooks (2001) provided longitudinal data on exports from 1993 to 2000, the current findings provide the first report of seasonal variations in the Australian flower export industry. The analysis of seasonal data provides important information for production and particularly marketing purposes. It helps to establish current industry strengths, weaknesses, threats and opportunities.

The current study extends the call from Brooks (2001) to refine the categories used for recording flower exports. The data currently available is recorded using the Australian Harmonised Export Commodity Classification (AHECC). AHECC categories are used to classify goods for export. As such, they are directed towards obtaining information specifically for tariff rather than industry purposes. AHECC numbers may represent individual commodities or group of commodities. Consequently, these groupings can be too general for obtaining fine grained data desired by particular industries. Despite recent revisions to the AHECC (ABS, 2002), this study demonstrates that the categories used to record significant data on Australian flower exports are still too crude and needs revision.

A number of constraints are placed on the current analysis through limitations in the data available. In order to maximise the worth and usefulness of reports such as this, it is necessary to increase the accuracy and reliability of the data on which the findings are based. To this end, the present study undertakes a series of preliminary analyses designed to interrogate the integrity of the current data and suggest methods for increasing the accuracy and reliability of future reports.

Aims

Three specific aims for the project were set:

1. The report presents the results summarising seasonal trends in flower export statistics from the September 2000 to the December 2001 quarters.
2. The report continues analysis of the efficiency of using ABS statistics, and in particular AHECC, for recording flower export information.
3. Examine the integrity of the current data and its impacts on the measurement of the flower export industry.

2. Methodology

This section details the methodology used for the data analyses. After summarising the data used for the study, it discusses the statistical analyses performed and approaches for interpreting the findings.

Data context

Data on Australian flower exports for six quarters from September 2000 to December 2001 was obtained from the ABS. A range of variables of interest were supplied in the data. Two outcome variables are given:

- export value, measured in thousands of dollars; and
- gross export weights, measured in tonnes.

The data included the following four explanatory variables:

- state or territory of origin;
- AHECC;
- country of export destination; and
- quarterly period.

A number of preliminary observations about these variables can be made. First, Brooks (2001) notes problems with the use of currency values to present export information. Specifically, it is unclear whether the dollar values represent market, gross, net or guess estimates. Given these observations, and based on study of the relationship between the dollar value and weight figures presented below, findings in this report are presented using gross weight rather than dollar figures. Second, weight information is based on the gross export weight rather than the number of stems exported. Although the AHECC manual (ABS, 2002) indicates that stem number information is recorded, this data was not available for current purposes. Third, because interstate movements of flowers are not recorded, the state of origin information needs to be treated with caution. Fourth, country classifications used more or less directly in the current analysis are shown in Table 1. As shown later, many countries contribute only small portions to the market. Only countries making substantial contributions are examined in detail throughout the report. Fifth, the AHECC descriptions and codes used in this report are shown in Table 2. Following Brooks (2001), these are divided into fresh and dried types.

Table 1: Countries used in the current report.

Argentina	France	Mexico	Sweden
Aust Antarctic Territory	Germany	Netherlands	Switzerland
Austria	Hong Kong	New Caledonia	Taiwan
Bahrain	India	New Zealand	Thailand
Belgium-Luxembourg	Indonesia	Papua New Guinea	Tunisia
Canada	Israel	Philippines	United Arab Emirates
China	Italy	Poland	United Kingdom
Colombia	Japan	Qatar	United States of America
Czech Republic	Republic of Korea	Saudi Arabia	Zimbabwe
Denmark	Kuwait	Singapore	
Ecuador	Malaysia	Spain	

Table 2: AHECC descriptions and codes.

Type	Category	AHECC
Fresh	Wild picked	0603.10.30
	Waxflowers	0603.10.41
	Kangaroo paw	0603.10.42
	Other Australian native species	0603.10.43
	Orchids	0603.10.50
	Exotic proteaceae	0603.10.52
	Other exotic species	0603.10.53
	Fresh foliage	0604.91.00
Dried	Wild picked	0603.90.11
	Australian native species	0603.90.70
	Mosses and lichens	0604.10.00
	Dried foliage	0604.99.00

Analyses

Descriptive and bivariate statistical analyses were performed using SPSS (SPSS, 1999). The majority of results are presented either as total weights or percentages of particular groups. The results for each variable are reported across the six seasons analysed. The data is presented as population data, which means that is not suitable to report sampling or measurement variance information with the results. Such variance naturally exists, however, and it is important to ascertain ways for it to be measured and reported.

3. Results

This section presents findings from the data analyses. An examination of the relationship between the dollar value and the weight figures is presented. Results from current analyses are then summarised across seasons by fresh or dried categories, AHECC, states of origin and destination countries.

Measuring the industry

Establishing a sound analysis of the size and distribution of the flower export industry is dependent upon specification of a suitable measurement unit. As mentioned above, Brooks (2001) has raised questions about the representational adequacy of dollar values listed on export forms. While the data analysed is supplied by the ABS as population data, this does not imply the absence of measurement and sampling variance. Rather, such variance naturally exists, and an important progression for the industry would be to ascertain ways in which this information could be recorded. That is, while the current data provides a means for suggesting a perspective on the flower export industry, it is not possible without further information to determine the level of reality of this perspective.

This section presents findings from a preliminary analysis of the adequacy of current dollar values as industry measurement units. The results of three analyses are presented. First, national level comparisons between weight and dollar measurements are reported. Second, the relationship between weight and currency measurements within countries are presented. Third, ABS data is compared with customs statistics obtained form the Japanese Public Relations Department of the Ministry of Agriculture Forestry, and Fisheries (MAFF, 2002).

Figure 1 shows a scatterplot with line of best fit showing the relationship between the kilogram and dollar measurements. Observations for all recorded transactions in the industry are given in the graph, regardless of country of export destination, state or territory of origin, AHECC or quarterly period. Both of the dollar and kilogram measurement distributions are very skewed, meaning that there is a great deal of very small valued observations but also a small number of very large observations. Because of this, it was necessary for the data to be transformed before examining the relationship between the variables. For the current analysis, a natural logarithmic transformation was performed. While such transformation clarifies examination of the relationship, it also changes the scale used in reporting the results. Establishing the actual value of the recorded unit, however, can be achieved by taking the natural logarithm of the value reported on the axes.

Figure 1 shows from an industry wide perspective that there is generally a strong relationship between the weight and value variables. There are, however, a large number of points above and below the line of best fit. Points below the line relate to exports which returned less value than expected for a particular weight. Conversely, points above the line were overvalued, and returned more dollar return than expected. While there is a strong relationship between currency and weight variables, there are also many points of inconsistency. It is important to note that this chart shows the type of relationship rather than the magnitude of units in the relationship. That is, it is possible that this relationship could be maintained even if dollar value figures were under reported.

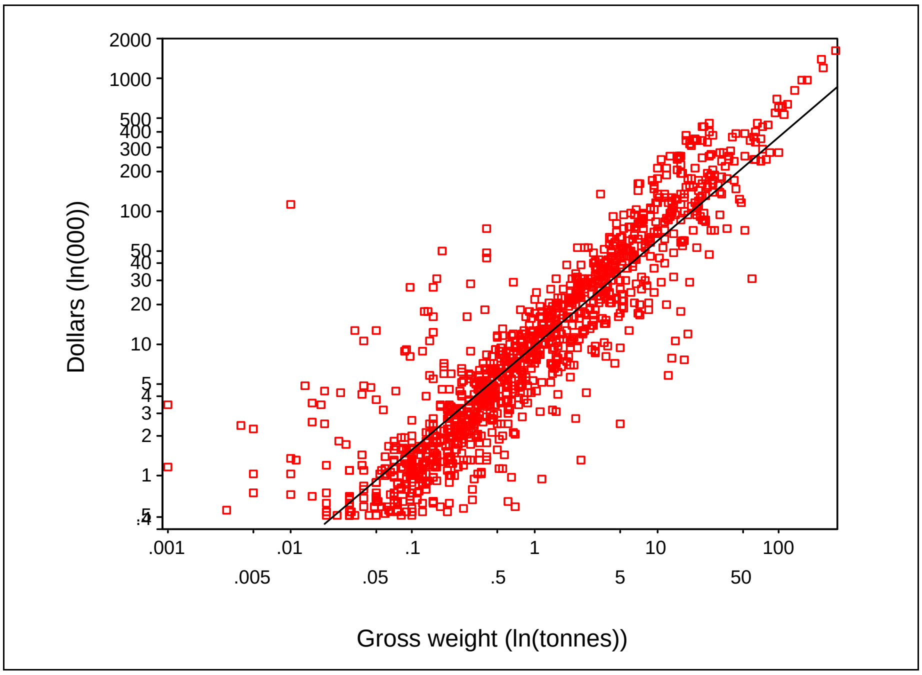

Figure 1: Industry relationship between dollar and kilogram measurements.

The correlations between currency and weight measurements can be calculated independently for each export market. The correlations can then be compared to form an impression of the generalisability of relationship between weight and value measurements. Figure 2 shows the distribution of correlations between weight and currency measurements calculated within countries having more than five observations. The results vary from a near perfect correlation of 1.00 to a low relationship of 0.50. This suggests that the relationship between these variables can be inconsistent within particular countries, and also that the level can vary markedly from one country to the next.

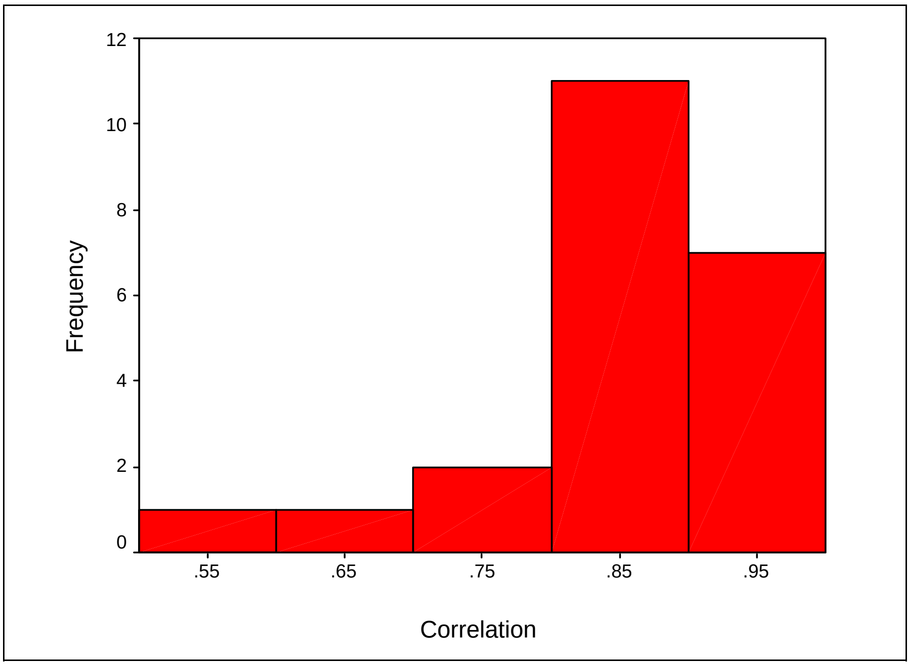

Figure 2: Distributions of within country weight and currency correlations.

A further means of analysing the veracity of dollar value information is by attempting to crossvalidate ABS information with that from another source. Japanese customs statistics by weight and value were obtained for this purpose (MAFF, 2002). Comparisons of weight and value between

Australian and Japanese customs estimates are shown in Figures 3 and 4. Both charts, in particular the weight figures, indicate that the ABS statistics undervalue the Australian flower export industry. Figure 4 in particular indicates discrepancy in the measurement of the industry's output. If the Japanese weight figures were more reliable, then the results presented in this report may have considerable negative bias. That is, in many instances, Figure 4 suggests that Australian customs statistics may be leading to undervaluation of the industry by nearly a third.

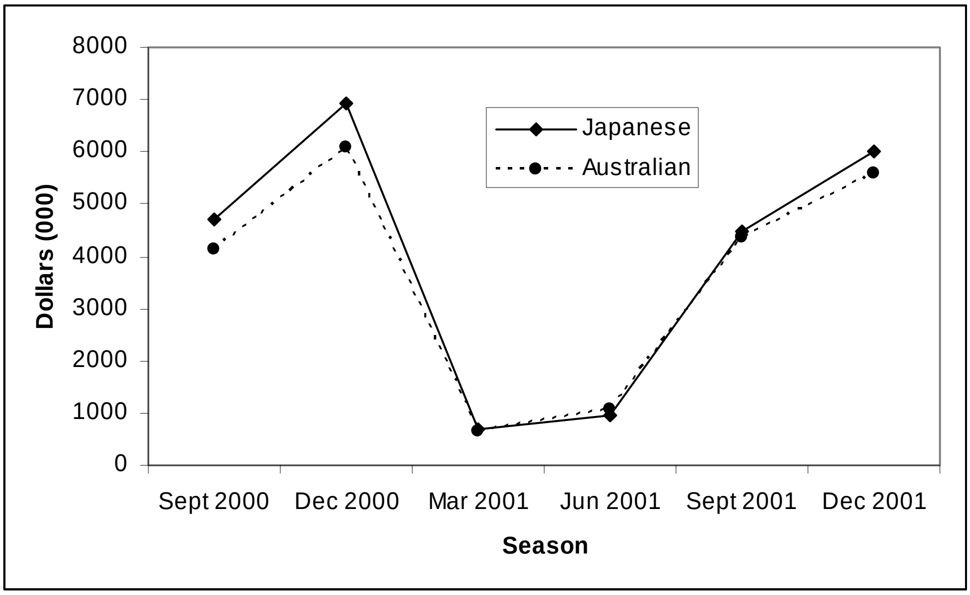

Figure 3: Comparison of Japanese and Australian value estimates.

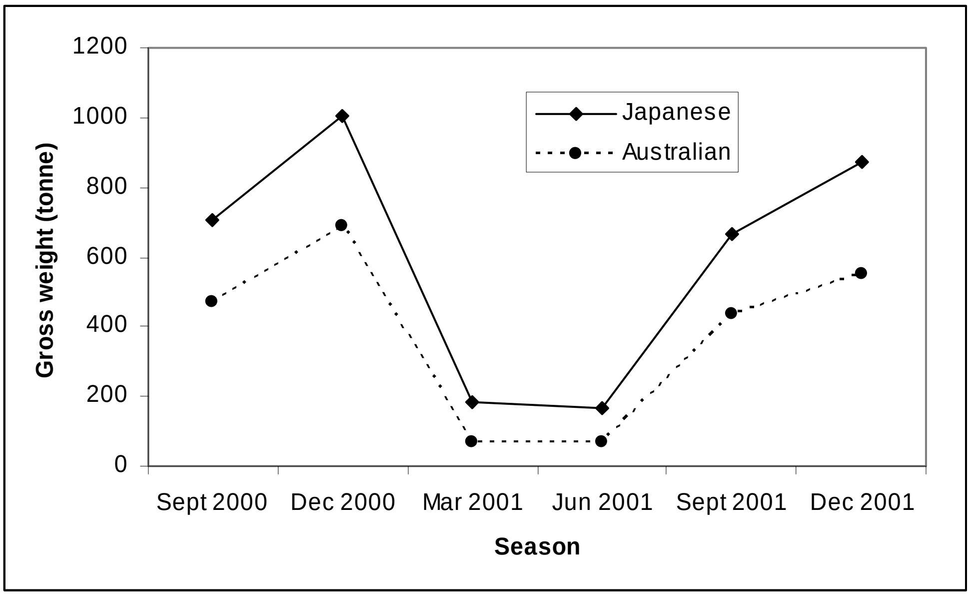

Figure 4: Comparison of Japanese and Australian weight estimates.

Despite these limitations with the current data, efforts to obtain and report valid and reliable value in addition to weight information should be increased rather than diminished. Future reports of measurements of value would enable the magnitude of the flower export industry to be estimated. They would facilitate interindustry comparison. Assessment of the value adding nature of particular exports could also be performed. It is important, therefore, to find ways of obtaining reliable estimates of value and means of crossvalidating and reinforcing the validity of these estimates. In addition to the ABS data, information could be obtained from external audits of exporters and alternative industry and governmental sources both inside and outside Australia.

Flower categories

Figure 5 shows the weight of total, fresh and dry flowers exported. The total line shows a clear cyclical trend, with peaks in the September and December quarters and lows in the March and June quarters. The gross weight of total exports reduces to a third during the low seasons. Most of the pattern in total export variation is accounted for by fresh exports. This confirms the results obtained by Brooks (2001). Table 3 shows the percentage balance of fresh and dried exports across seasons. Fresh exports total to 87% of exports across the period analysed. This percentage decreases during the March and June quarters, however it still exceeds dried exports. Figure 5 and Table 3 show that dried flowers contribute between only one tenth or fifth of the total export quantity. Exports of dried flowers remain stable over the periods assessed. The variance in export quantities is due to fluctuations in the fresh flower market. The figures for dried flowers reinforce the concerns expressed by Brooks (2001) about this sector of the industry.

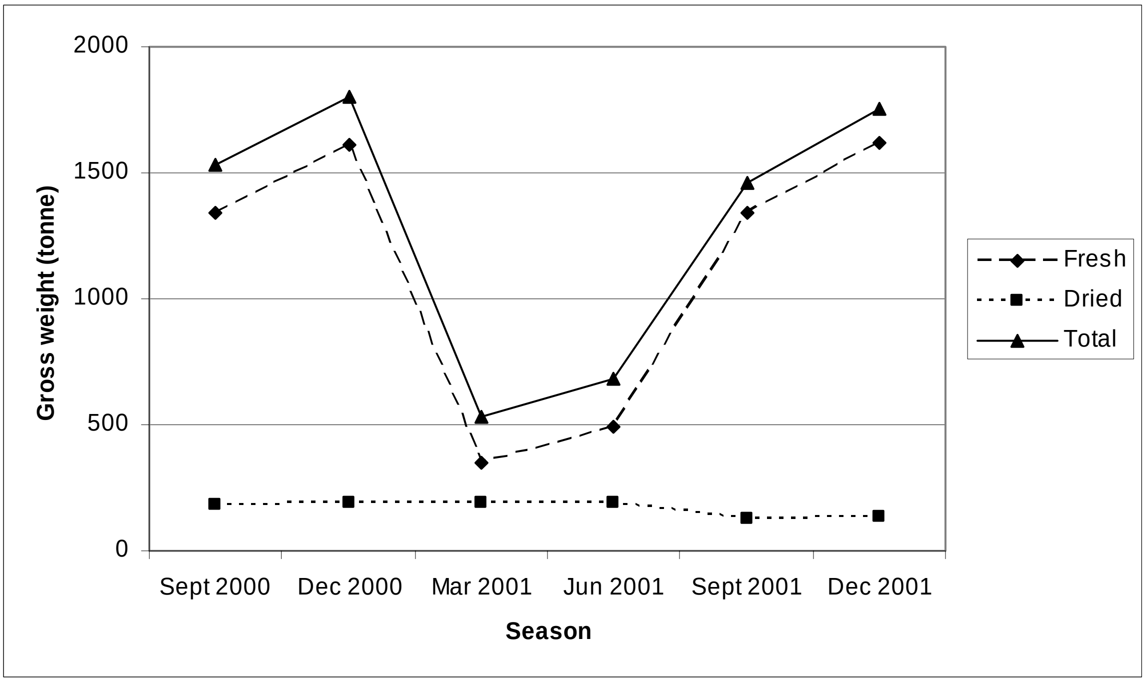

Figure 5: Fresh, dried and total export weights.

Table 3: Percentage fresh and dried of total exports.

Type	Sept 2000	Dec 2000	Mar 2001	Jun 2001	Sept 2001	Dec 2001	Total
Fresh	88	89	65	72	92	92	87
Dried	12	11	35	28	8	8	13

Figure 6 shows the total weights of fresh flowers exported by AHECC. It is clear that Waxflowers and Other Australian Species account for most exports during the high seasons, although the contribution of Exotic Proteaceae has increased in the 2001 September and December quarters. Despite the dominance of the Other Australian Species category, there is no information on its composition. Thus, although the category includes Thryptomene, Actinotus, Boronia, Banksia and Ceratopetalum, it is not possible to discriminate between the relative contributions of these varieties to the export market. These results further support the recommendations made by Brooks (2001). In particular, the AHECC need to be altered to better reflect the industry. Some existing categories need to be deleted, while others need to be created. Further, the labelling and definitions of categories need to be revised to establish a parsimonious system.

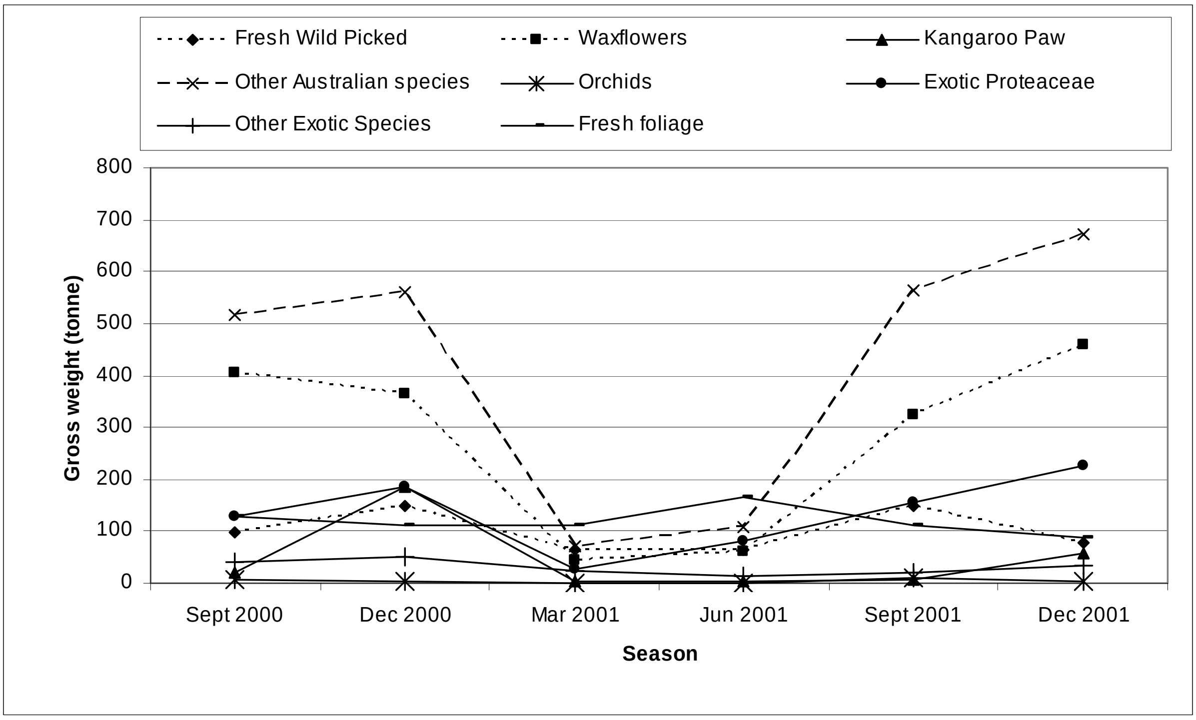

Figure 6: AHECC fresh flower total weights.

Table 4 shows the percentage contribution of each fresh flower category by season, as a percentage of fresh exports and as a percentage of total flower exports. Waxflowers and Other Australian Species respectively account for 25% and 37% of the fresh flower market, and 21% and 32% of the total market. Together, these undifferentiated categories account for over half of the flower export market. Exotic Proteaceae, Fresh Foliage and Fresh Wild Picked flowers contribute most out of the remainder of the categories, and rise to play a dominant role in exports during the low March and June periods.

Table 4: Percentage balance of fresh categories.

Fresh category	Sept 2000	Dec 2000	Mar 2001	Jun 2001	Sept 2001	Dec 2001	% of fresh	% of total
Fresh wild picked	7	9	19	13	11	5	9	8
Waxflowers	30	23	13	12	24	28	25	21
Kangaroo Paw	2	11	1	1	0	4	4	4
Other Australian species	38	35	21	22	42	42	37	32
Orchids	1	0	0	0	1	0	0	0
Exotic Proteaceae	9	12	8	16	12	14	12	10
Other Exotic Species	3	3	7	3	2	2	3	2
Fresh foliage	10	7	32	33	8	5	11	9

Trends in dried flower AHECC categories across the six quarters are shown in Figure 7. Dried wild picked flowers account for over two thirds of the flowers exported. While there is little variation in dried flower exports, a rise in Dried Foliage during the low seasons sustains the total dried levels.

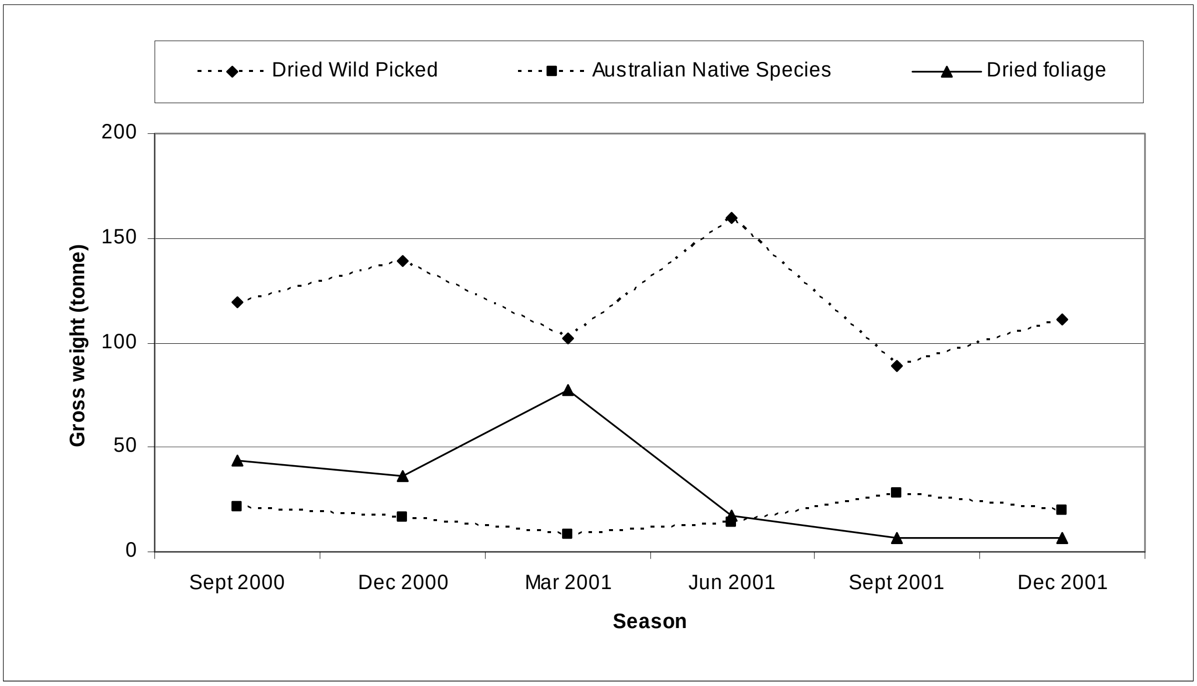

Figure 7: AHECC dry flower total weights.

With the above results in mind, a series of category changes aimed at increasing the accuracy of records has been proposed. A list of the current and proposed categories is shown in shown in Table 5. The proposed changes relate only to fresh flower categories, and do not affect current category descriptions. These changes were developed through consultation with exporters and growers.

Table 5: Current and proposed categories.

Type	Current category	Proposed category	Action	AHECC
Fresh	Other Australian native species	Other Australian Natives	Retain	0603.10.43
	Exotic proteaceae	Protea	Retain	0603.10.52
	Other exotic species	Other Exotic species	Retain	0603.10.53
	Wild picked	Wild picked	Retain	0603.10.30
	Fresh foliage	Fresh foliages	Retain	0604.91.00
	Kangaroo paw	Kangaroo Paw	Retain	0603.10.42
	Waxflowers	Waxflower	Retain	0603.10.41
		Banksia	Add	
		Thryptomene	Add	
		Ozothamnos	Add	
		Ceratopetalum	Add	
		Other protea species	Add	
		Leucadendron	Add	
		Leucospermum	Add	
	Orchids		Delete	0603.10.50
Dried	Wild picked	Wild picked	Retain	0603.90.11
	Australian native species	Australian native species	Retain	0603.90.70
	Mosses and lichens	Mosses and lichens	Retain	0604.10.00
	Dried foliage	Dried foliage	Retain	0604.99.00

States of origin

Total flower exports by state of origin are shown in Figure 8. The cyclical seasonal variation is evident in all major flower producing states. Despite the variations, the ordinal relations between the states is roughly maintained with Western Australia, Victoria and New South Wales being the top exporters. The figures confirm patterns presented by Brooks (2001). These findings need to be interpreted with caution. It is possible that they better reflect the state of departure from Australia rather than the state of production. Domestic transport prior to international distribution may lead to underestimation of figures in the smaller states and inflation of figures in the larger states. It is possible, therefore, that rather than reflect the state of origin, the figures should be interpreted as also representing the state of departure to other markets. It is in these states, therefore, that increased efforts in recording export data should be made.

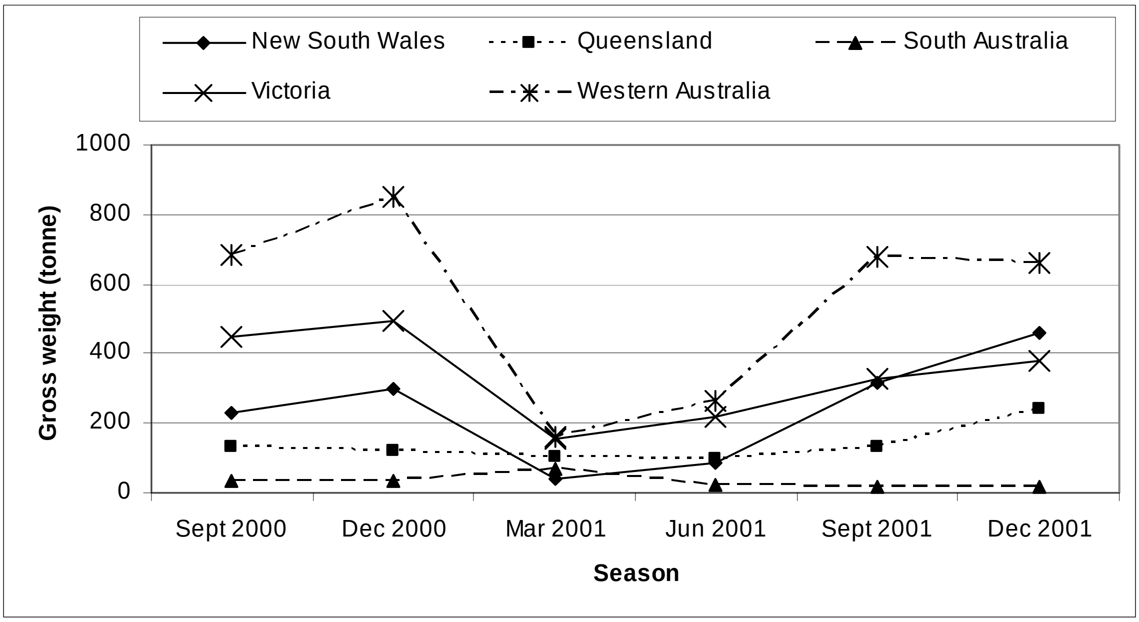

Figure 8: Total export weights of states of origin.

Figure 9 shows pattern and level differences between the states of origin in terms of the percentage of market share. While Western Australia has the most exports across the year, this state also has the largest decline during the low season. Although Victoria is the second highest exporter, there is very little cyclical variation and the state routinely supplies around 30% of the market. Data from the 2001 September and December quarters suggests a decline in the Victorian output. Conversely, exports from New South Wales are increasing in the last two periods analysed. Both Queensland and South Australia show increases during the low March and June quarters, with Queensland being the only state besides New South Wales showing growth towards 2002. While Western Australia, New South Wales and Victoria are the main exporting states, therefore, there is some complementarity among the states.

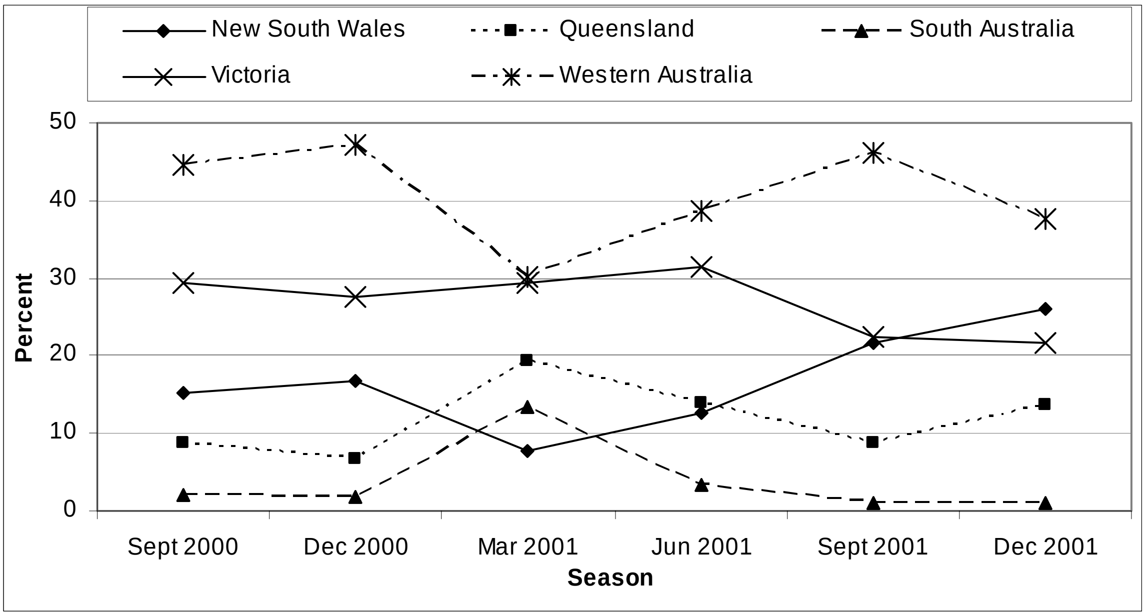

Figure 9: Percentage balance of states of origin.

Countries of destination

The seasonal and total weights in tonnes of flowers exported to all countries registered in the current analysis are shown in Table 6. The countries are ranked alphabetically. Several observations can be made. The weights vary from 3595.24 tonnes in Japan, to 0.02 tonnes in Ecuador. The are seasonal patterns in exports to certain countries like Denmark and Mexico. Exports to some markets such as Zimbabwe seem to have stopped after certain periods. Certain countries seem only to have attracted exports at particular moments. Overall, there are two countries importing over 1000 tonnes, three countries importing less than 1000 but over 300 tonnes, three countries importing less than 300 but more than 100 tonnes, three countries importing less than 100 but more than 50 tonnes, six countries importing less than 50 but more than 20 tonnes, four countries importing between 10 and 20 tonnes, twelve countries receiving between one and 10 tonnes and 10 countries receiving less than one tonne.

Table 6: Total export weights in tonnes by export market.

Market	Sept 2000	Dec 2000	Mar 2001	Jun 2001	Sept 2001	Dec 2001	Total
Argentina			0.30				0.30
Antarctic Territory					0.22		0.22
Austria	3.13	5.29	2.05	3.98	1.36	8.88	24.70
Bahrain					0.21		0.21
Belgium-Luxembourg	4.50			21.25	4.50	4.50	34.75
Canada	69.04	66.26	5.46	25.91	71.73	65.92	304.31
China	1.83	6.28	0.06	0.30	1.33	14.99	24.80
Colombia		0.02		0.05			0.07
Czech Republic						0.22	0.22
Denmark	0.29	0.52			0.29	1.25	2.35
Ecuador				0.02			0.02
France	0.94	1.79	0.76	1.55	1.01	2.21	8.25
Germany	47.91	50.16	74.02	99.62	47.74	41.71	361.16
Hong Kong	12.02	13.19	11.75	11.30	21.10	24.58	93.94
India	0.11	0.63	0.34	0.09	0.22	0.44	1.83
Indonesia	0.10	15.52	0.99		0.35	0.16	17.12
Israel	0.12		0.18	0.05			0.35
Italy	23.02	11.70	9.00	52.59		10.29	106.60
Japan	708.76	1003.04	181.30	165.08	666.22	870.85	3595.24
Republic of Korea	6.35	7.54	1.71	2.34	6.44	7.52	31.89
Kuwait			0.20	0.30	0.40	0.35	1.25
Malaysia	0.40	0.44	0.53	0.94		4.46	6.77
Mexico		0.04				0.04	0.08
Netherlands	122.65	213.86	134.17	140.63	116.05	223.87	951.22
New Caledonia	0.16	0.50	0.19			0.36	1.21
New Zealand	10.68	4.59	1.49	4.45	8.62	2.87	32.69
PNG	0.06		0.04	0.03			0.12
Philippines	0.30	0.46	0.40	0.08	0.74	0.47	2.44
Poland					0.11		0.11
Qatar					2.80		2.80
Saudi Arabia	1.03	1.46	0.77	0.09	1.75	9.31	14.42
Singapore	14.33	19.98	10.22	4.88	11.26	15.59	76.26
Spain		6.50	2.00			2.50	11.00
Sweden					0.18	1.15	1.33
Switzerland	20.75	37.83	17.99	15.14	16.98	26.18	134.86
Taiwan	27.64	16.44	12.53	8.33	27.63	37.35	129.92
Thailand	0.85	1.92	0.13	0.05	0.34	0.65	3.93
Tunisia		1.30					1.30
UAE	0.19	1.15	1.87	0.40	1.53	7.97	13.12
United Kingdom	28.05	7.93	3.77	5.48	10.87	8.21	64.30
USA	422.94	299.44	60.20	120.26	442.15	361.62	1706.62
Zimbabwe	0.40	3.60	0.85				4.85

Figure 10 shows the regional variation of the export flower market. The Asian, North American and European regions together account for 99% of Australia’s flower export market. Conversely, Oceania, Central and South America, and Africa and the Middle East account for only 1% of the market. There are seasonal variations in the export patterns. While the North American market is relatively stabile, there is a seasonal complementarity between the Asian and European markets. Specifically, European exports rise during the March and June low periods while Asian exports simultaneously decline. This pattern provides useful information for marketing and export programs.

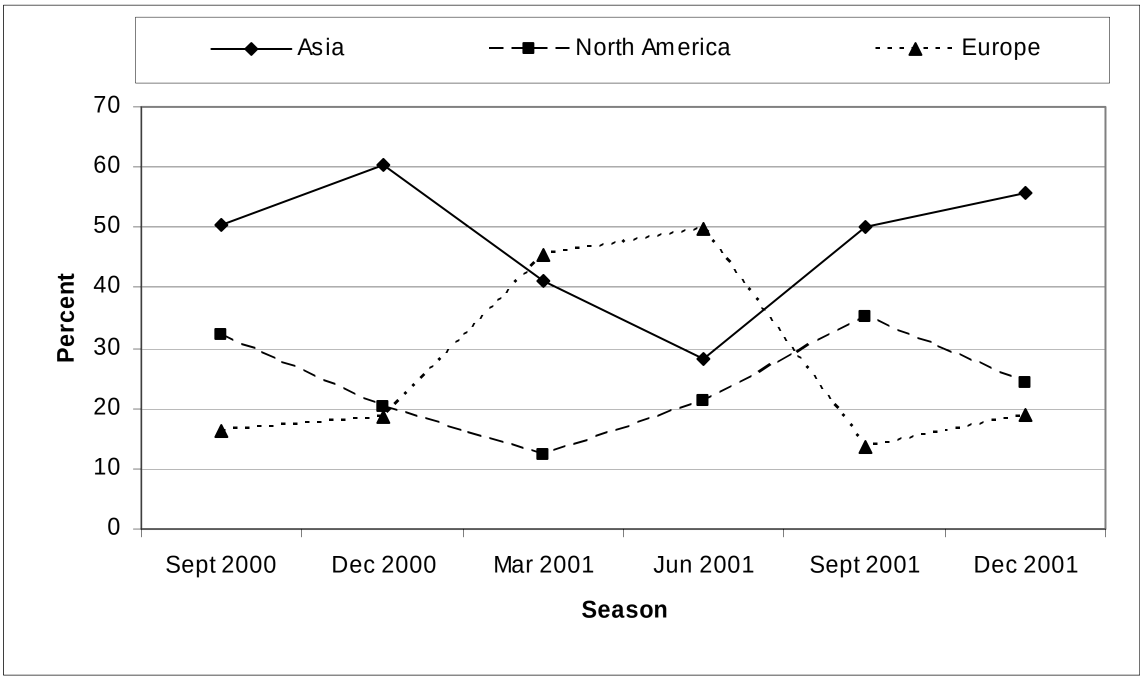

Figure 10: Percentage balance of export regions.

Total weights exported to the top five countries are shown in Figure 11. Japan is by far the biggest export market, followed by the USA and the Netherlands. These three countries account respectively for a total of 46%, 22% and 12% of exports across the periods analysed. The German and Canadian markets, contributing only 5% and 4% respectively, have been relatively stable across the periods.

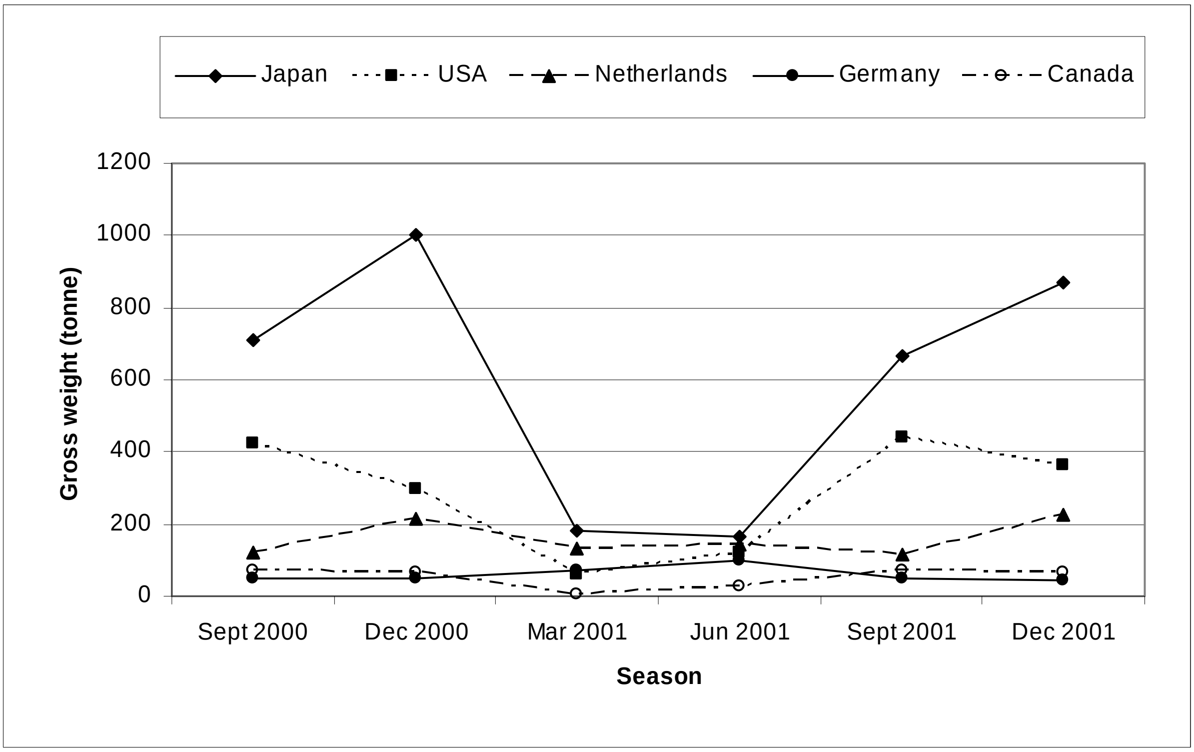

Figure 11: Total export weights to top five countries.

The Japanese market is dominant within the Asian region. In the six periods under consideration, exports to Japan accounted for the following percentages of the total exports to Asia: 91%, 92%, 82%, 85%, 90% and 89%. The significant percentage distribution of exports among the other countries in Asia are shown in Figure 12. Hong Kong, Taiwan and Singapore account for the next highest export destinations.

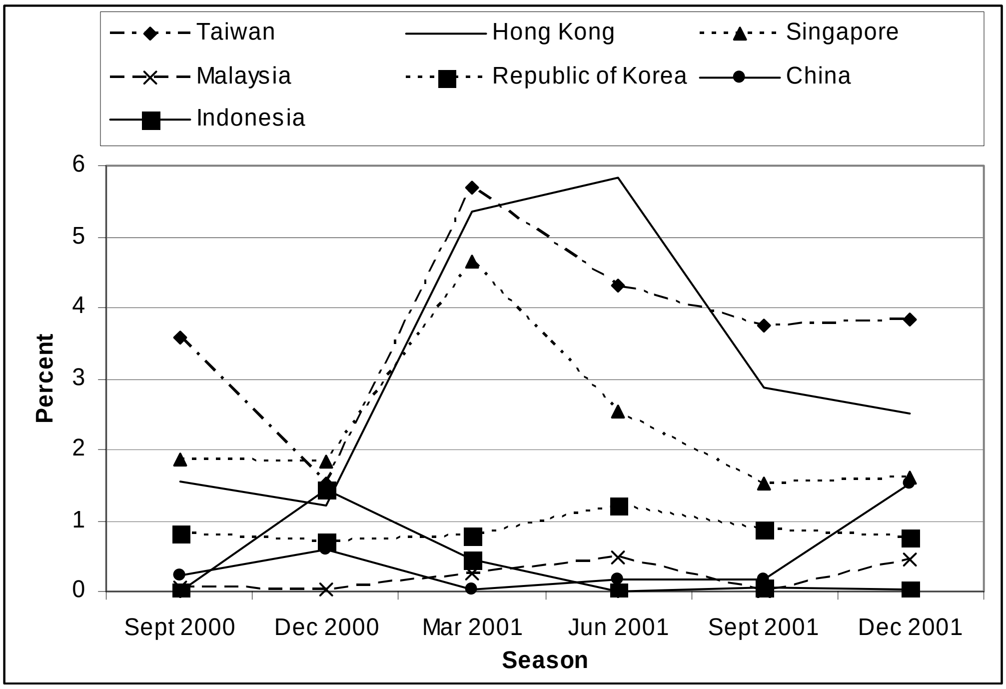

Figure 12: Percent distribution of exports between countries of Asia.

Summary

Table 7 presents a summary picture of the Australian flower export market. The top five destination markets are presented in rank order on the left side. Flower categories which occupy above 10% of exports to these markets are listed in decreasing order in the middle. The top states of origin of these exports are listed in the right side.

Table 7: Summary of Australian flower exports.

Market	Category	Origin
Japan (46%)	Other Australian species (37%) Fresh Artificially Propagated Waxflowers (20%) Exotic Proteaceae (14%)	Western Australia (52%) New South Wales (16%) Victoria (14%) Queensland (13%)
USA (22%)	Other Australian species (38%) Fresh Artificially Propagated Waxflowers (35%) Fresh Wild Picked (11%) Exotic Proteaceae (8%)	Victoria (52%) New South Wales (27%) Western Australia (21%)
Netherlands (12%)	Fresh foliage (Wild Picked or Artificially Propagated) (37%) Fresh Artificially Propagated Waxflowers (17%) Other Australian species (16%) Dried Wild Picked (14%)	Western Australia (33%) Victoria (31%) New South Wales (19%) Queensland (16%)
Germany (5%)	Dried Wild Picked (58%) Fresh foliage (Wild Picked or Artificially Propagated) (28%)	Western Australia (68%) Western Australia (26%)
Canada (4%)	Other Australian species (38%) Fresh Artificially Propagated Waxflowers (26%) Fresh Wild Picked (25%)	New South Wales (44%) Western Australia (44%) Victoria (12%)

Figure 13 uses seasonal data for the last eight financial years until 2001 to show the overall growth of the industry in terms of the weight of flowers exported. The growth rate of the industry increased dramatically during the 1997-1998 year, despite minor fluctuations before and after this point. Results for the last year indicate that the industry remains in a strong growth period.

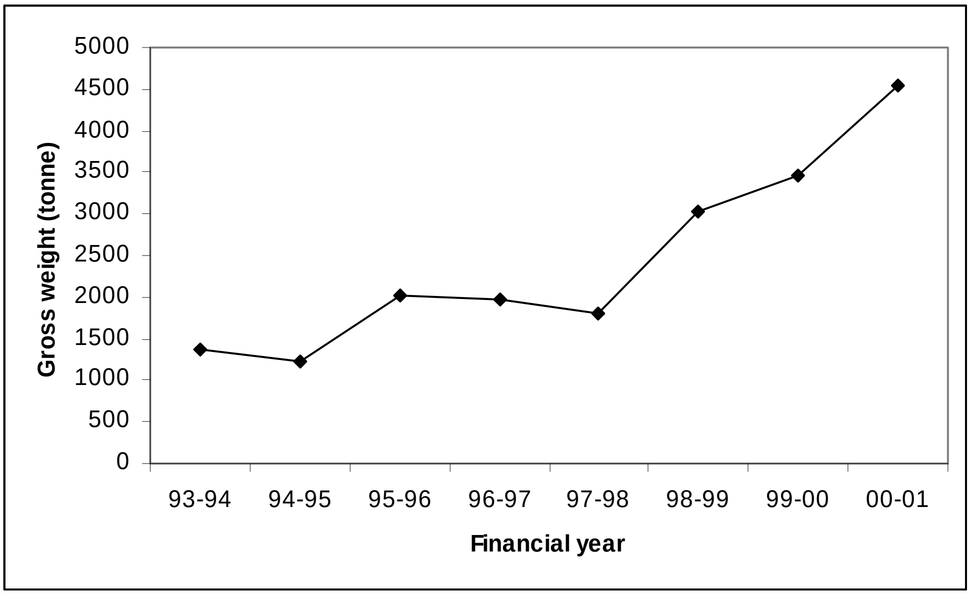

Figure 13: Total output of Australian flower exports.

4. Discussion

A number of quantitative and methodological findings have been presented in this report. This section summarises these findings and prepares a context for the recommendations which follow.

There is a general need to further identify and refine the units used for measuring industry outputs. While there is an approximate correspondence between value and weight measurements, there is also a need to further tighten units for measurement. The relationship between value and weight units is not exact and there are enough deviations to suggest that neither may present a reliable picture of the size of the industry. Comparisons with data from Japanese export market indicated that the data gathered in Australia may underestimate the industry by up to a third. It is possible that the reliability and validity of the data could be improved by obtaining data for cross validation from a range of industry and government sources, both without and outside Australia.

Analysis of export levels by flower type suggested that fresh flowers dominate the market at present. While the low levels of dried flower exports correspond with the findings of Brooks (2001), these findings obscure the past and perhaps the potential of this sector of the industry. Dried flowers have been a vibrant part of the industry in the past, and a similar future role cannot be ruled out. This particularly applies to the development of customs classifications for measuring flower exports. Given past levels, results presented on the dried flower exports in this report do not necessarily convert into future projections.

Analyses of fresh flower categories indicated that large sections of the market were occupied by Other Australia Species and Waxflowers. Suggestions were made as to how these dominant categories could be divided to increase the specificity of future analyses. There are clear cyclical trends in the fresh flower market, however, and other species rise to a position of relative prominence during the low March and June quarters. Dried Wild Picked flowers dominate about three quarters of the dried flower market. Splitting this category may also increase the accuracy of future studies.

Despite persistent difficulties and ambiguities in recording state of origin information, the results in this report confirmed patterns obtained by Brooks (2001). Western Australia is the dominant producer, followed by Victoria, New South Wales, Queensland and South Australia. It was suggested that efforts should be made to increase the accuracy of this information so that the data could be made more useful.

Analyses of country of destination information played a major role in this report. First, a complete list of seasonal and total exports across all 42 registered countries was presented. This showed a comprehensive yet complex picture of export levels and patterns. Second, a regional analysis was undertaken. This showed that Asia was the dominant market for Australian flowers, although exports to Europe increased during the March and June low quarters. Exports to North America are more seasonally stable than to the other regions, although they do approximate the cycles in the Asian market. The Japanese market dominates the Asian market, and is also the largest export destination overall. The USA, the Netherlands, Germany and Canada are the next highest export markets. When analysing export markets, it is particularly important to keep the possible negative bias of the data in mind.

By summarising the findings it is possible to see that although the flower export industry is composed in large part by exports from Western Australia and Victoria of Other Australian Species and Fresh Artificially Propagated Waxflowers to Japan, the USA and the Netherlands, the industry is complex, multifaceted and underexamined. Given the rapid growth of the industry over the last five years, it is time to explore the strengths, weaknesses, opportunities and threats for the industry, and harness its strategic direction for the future.

5. Recommendations

A number of recommendations are made:

1. Additional production and export figures on the value of the industry need to be gathered from a range of sources both inside and outside Australia. This information can then be used to establish the reliability and validity of ABS data, particularly the dollar value estimates.
2. An independent audit of exporters and possibly certain growers should be undertaken to crossvalidate production and export statistics.
3. Additional data on exports should be obtained from significant export markets, including Japan, the USA and the Netherlands. This can be used to crossvalidate current ABS estimates.
4. Marketing strategies for the dried flower industry need to be investigated. It is possible that dried flower exports could make a particular contribution during the low March and June periods.
5. AHECC relating to the current industry need to be refined. The redefinition is particularly necessary in the case of a few categories which have current dominance. New categories have been proposed in this report.
6. Interstate flower movements need to be collated, as this is valuable information.
7. From an industry perspective, it may be useful to examine seasonal complementarities of export countries and regions, particularly between the Asian and European markets.
8. Quantitative analysis of the Australian flower export market should be undertaken on an annual basis. These need to develop better means of diagnosing export patterns and developing explanatory models which can be used in developing production and marketing strategies.

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