Floriculture industry benefits from southern African floral biodiversity

E. Reinten[a] and B.-E. van Wyk

Department of Botany and Plant Biotechnology, University of Johannesburg, South Africa.

Abstract

The flora of southern Africa is widely recognised as an international hotspot of botanical diversity. The unique fynbos floral kingdom alone consists of 8,600 species, while an estimated 22,800 species from 220 flowering plant families of the southern Africa flora represent 10% of the worlds' plants. The contribution of the southern Africa indigenous flora to the international floriculture trade is mostly associated with *Freesias, Gerbera, Gladioli, Nerine, Protea, Leucospermum, Leucadendron, Zanthedeschia, Agapanthus, Lachenalia, Ericas, Strelitzias* and *Ornithogalum*. On the Flora Holland auctions in 2009/2012/2015, sale rankings for gerbera and freesia were 4/5/5 and 6/8/9 respectively, in cut flower turnover, while *Kalanchoe* ranked second for indoor plants. Pelargonium ranked 4/5 (2012/2015) and *Osteospermum* ranked 6/9 (2012/2015) for garden plants. The potential impact of southern African indigenous plants on world horticulture is enormous. The southern African floral biodiversity provides the availability of plant material for the international floricultural trade.

Keywords: cut flower industry, fynbos floral kingdom, horticulture, indoor plants

INTRODUCTION

Southern Africa flora is well known for its biodiversity and availability of a large genepool for past and potential development into floricultural crops. The unique fynbos floral kingdom or Cape Floristic Region (CFR) is the smallest of the six recognised world floral kingdoms (90.8×10^3 km), but the largest in biodiversity, with 9,383 species (Manning and Goldblatt, 2012), within 997 genera of which 15.4% are endemic. The fynbos growing environment is largely a Mediterranean type climate and offers international cultivation opportunities (Huysamer et al., 2016; Reinten et al., 2011). For instance, members of the *Proteaceae* family are cultivated in similar climates such as Australia, Azores, California, Canary Islands, Chile, Hawaii, Israel, New Zealand and Portugal (Reinten et al., 2018). This indicates part of South Africa's unique biodiversity contribution to the world floriculture industry.

An estimated 23,000 flowering plants in southern Africa represent more than 10% of the worlds' plants. There are 220 flowering plant families with 22,800 species represented, with many of them endemic. The largest families are the *Asteraceae*, *Mesembryanthemaceae*, *Fabaceae*, *Iridaceae* and *Poaceae*. The biodiversity is complemented by gymnosperms with 68 species in 6 families, the mosses with 903 species in 97 families and ferns with 321 species in 34 families (Koekemoer et al., 2014; Leistner, 2005). For the floriculture industry some of these are either being used directly in floriculture or in selection and breeding programmes worldwide, while others have potential to contribute to the floriculture industry.

A review of the potential of South African indigenous plants (Reinten et al., 2011) described the history and development of southern African plants in the international cut flower trade, together with information on the local research and development of indigenous plants. Lists of southern African plant species of commercial interest were compiled with guidelines highlighted by Maree and Van Wyk (2010).

[a]E-mail: emmyr@netactive.co.za

The climate change in southern Africa is resulting in periods of severe drought and indigenous plants are thought to be more adaptive to these changes and recommended for horticultural activities. In a South African study by Middleton (2015a, b), the choice for indigenous plants was influenced by aesthetic appearance such as shape, size, decent leafing and attractive flowering properties, the availability on the market and by the consumers' personal preference. Vase life for cut flowers and information when buying the flowers seemed to become more important with consumers. An interesting phenomena in South Africa is that ornamental plants attract the highest number of plant breeders' rights applications despite inadequate turnover to allow for breeding programs and research (Netnou-Nkoana, 2016).

Internationally, the demand of the floriculture market is based on availability, price and trends, but it is becoming increasingly more focused on sustainable and ethical production (Riisgaard, 2011; Getter et al., 2016). Preferences by countries can influence demand and cause variation in commercial activities. In 2013, the Netherlands exported 52% of international cut flowers from own production and imports, but in 2016 this dropped to 43%. The four rising flower producers being Colombia, Kenya, Ecuador and Ethiopia, have passed the share of the Netherlands and now account for 44% in global cut flower exports, up from 25% in 2005. (World Floriculture Map, 2016). This is based on production by commercial demand and not on flowers of origin or their own indigenous flora.

However, information regarding the origin of floricultural crops remains important as geographical indication (GI, 2009), a type of intellectual property right, being apart from plant breeders' rights, trademarks and commercial names, gains international momentum in the context of regulatory regimes. GI identifies a product as originating in the territory of a particular country, or region or locality in that country, and where a given quality, reputation or other characteristic of the product is essentially attributable to its geographical origin.

MATERIALS AND METHODS

A study to determine the origin of commercial floriculture products and the contribution role of floriculture plants from southern African origin, used lists of traded plants to compare the fresh cut, potted and garden plants sector. Data from flower auctions provided trends and quantities.

RESULTS AND DISCUSSION

The ornamental plant sector is very diverse and includes the production of floriculture crops such as cut and potted flowers and foliage as well as garden plants. The global floral production value is estimated at USD 55bn (World Floriculture Map, 2016), while the global value of the floral trade was estimated at USD 104.8bn (www.Statisticbrain.com, Feb. 2016). This is small compared to the food industry, but large and important enough to merit research in trends and opportunities. Cut flowers, cut foliage and flower bulbs are traded globally, mainly from south to north, more bulky live plants, such as potted plants and nursery products, are mainly traded regionally.

In the USA 80% of flowers sold are imported. Cut flower sales remain the highest during Valentine's Day, Easter, Mother's day and Christmas. The UK spends more than £2bn on cut flowers per year, but around 90% are imported. Now a new breed of growers are determined to grab more of that market, by persuading the public that local and seasonal are the ways to go (The Guardian, 2017).

Country preferences vary for cut flowers. In the United Kingdom carnations, roses and chrysanthemums are the best sellers, while in Germany it is roses, tulips and carnations. In France roses and gladioli are most preferred, whilst the Italians prefer roses, lilies and daisies and in the Netherlands' top sellers are mixed bouquets, roses and tulips. The Indian commercial floriculture preferences focus on roses, marigold, *Gerbera, Chrysanthemum, Gladiolus, Anthurium*, carnation, orchid, tuberose, *Lilium* and *Alstromeria* (Misra and Ghosh, 2016). This all indicates personal preferences, but also the worldwide use of flowers from southern Africa origin.

Products exported from the fynbos biome (South Africa) include *Bulbinella, Chasmanthe, Crocosmia, Gladiolus, Phylica, Plectranthus, Restio, Watsonia* and *Zanthdeschia* together with the best known *Protea, Leucadendron* and *Leucospermum*. Export of fynbos from South Africa is still mainly to the EU (Table 1).

Cape flora (fynbos) accounts for 90% of South Africa's cut flower exports (Table 2). The value of South Africa's cut flower industry is estimated at R1 billion per year, of which exports are close to R500 million (USD 35 million).

Apart from fynbos, South Africa has seven other terrestrial biomes namely Nama Karoo, succulent Karoo, forest, thicket, savanna, grassland and desert that also contribute products to the floral kingdom of South Africa, as well as supply products for commercial trade. From these biomes products include *Agapanthus, Amaryllis, Clivia, Cotyledon, Kniphofia, Eucomis, Gerbera, Leonotis* and *Strelitzia.*

The data from Royal Flora Holland Market (The Netherlands) being one of the largest exporters of cut flowers provides indications for the role of southern Africa origin of products. For the last few years (Table 3) *Gerbera, Freesia, Kalanchoe, Pelargonium* and *Osteospermum* remained in the top sellers group. The turnover for Royal Flora Holland in 2015 was 4.465 million € and in 2016 4.633 million € (USD 5.373 million), an increase of 4%.

Table 1. Main South African fynbos export regions for 2015/2016 export season (PPECB) when 3,244,277 kg (estimated 20,076,014 cut stems) were exported.

	Regions	%
1	EU & Russia	43
2	Middle East	30
3	UK	22
4	Far East	3
5	Canada	2
6	Africa	<1

Table 2. Recent South African export statistics for fynbos, including *Protea*, *Leucadendron* (Lcd), *Leucospermum* (Lsp) and Greens (PPECB).

	Protea stems exported	Lcd stems exports	Lsp stems exports	Greens exported
2014/2015	2,071,246	5,150,939	9,290,439	13,906,340
2015/2016	1,953,817	5,622,977	9,381,624	12,056,597
2016/2017	2,792,073	5,383,350	9,587,381	13,177,667
2016/2017 vs. 2015/2016	43%	-4%	2%	9%

Table 3. Ranking of southern Africa origin plants sold on the Royal Flora Holland Market during 1999, 2009, 2012, 2015 and 2016 (Royal Flora Holland Annual Reports).

	1999	2009	2012	2015	2016
Cut flowers					
Gerbera	5	4	5	5	5
Freesia	6	6	8	9	8
Zanthedeschia	25		15	16	
Indoor plants					
Kalanchoe			2	2	2
Pelargonium			4	5	4
Garden plants					
Osteospermum			6	9	10

Potted plants and nursery products compared to cut flowers are bought through a wider range of retail channels. However, there is one major trend impacting both categories namely the rise of online sales. The market share of online sales of cut flowers in the total cut flower sales ranges from 4% in Russia to 10% in the UK. Online potted indoor plant sales already account for 7% in Germany, 8% in Russia, France and the Netherlands and 12% in the UK. It seems that garden centres are challenged as they are the ones losing the largest market share (World Floriculture Map, 2016).

Several floriculture crops from southern Africa origin are in the ornamental public domain, but there is still scope for new developments. An example is the development of the long-lasting cut flower and graceful container plant, ornamental *Sandersonia (*Morgan et al., 2002), also known as Christmas bells or Chinese lantern lily. Although the floriculture marketing systems worldwide are undergoing changes by using direct sales and direct transport methods from production areas, and with an increased footprint knowledge on sustainable cultivation methods (Riisgaard, 2011), the flower products remain the same with roses taking the number one share. Rose sales at the Royal Flora Holland auctions in 2016 had a turnover of 746 million € (USD 865 million), more than double the amount for chrysanthemum sales.

The challenge for the indigenous flora of the southern African origin is to be developed into products with known cultivation information, requiring minimum chemical input and catching the buyers' attention, thus creating demand. Apart from the marketing developments to introduce new products to consumers, there is also a large scope for horticulturists to develop new propagation and growing protocols, for plant breeders to develop new cultivars as well as plant pathologists to provide healthy material and protection measures against pests and disease, especially when the new products are cultivated in areas outside their general distribution areas. The biodiversity of the flora provides the opportunity to increase the market share and opportunities to horticulturists for new developments.

CONCLUSIONS

The southern African indigenous flora contribution to the international floriculture trade remains mostly associated with *Agapanthus, Freesias* (ranked 9), *Gerbera (*ranked 5), *Gladioli, Lachenalia, Leucospermum, Leucadendron, Nerine, Ornithogalum, Protea, Strelitzia* and *Zanthedeschia.* Indoor plants *Kalanchoe* (ranked 2) and *Pelargonium* (ranked 4) together with garden plant *Osteospermum* (ranked 10) indicates the important contribution of southern Africa plants.

The world is becoming smaller with new marketing and transport technology, but GI becomes more relevant and it is good to know the origin and history of floriculture products used in daily life.

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