

Iberian Ornamentals Industry: Diversified and Innovative

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Ornamental horticulture is probably the agricultural sub-sector most driven by innovation due to a highly competitive market and the constant demand for novelty. The sector has demonstrated the ability to generate profits from investments in research and development. Spain and Portugal offer favourable climatic conditions for ornamental production and the sector has experienced rapid expansion and innovative developments in recent decades. However, the ornamental sector in Iberia is expected to face common challenges. Technological innovation is the key for productivity and competitiveness and the basis for future progress and expansion will depend on a close cooperation between industry and research.

Figure 1. The regional communities in which the ornamental sector is most developed in Spain.



SPAIN

Flowers started to be grown by small holders in Barcelona by the mid 19th century and in the early 1900s production moved outside the city to the neighbouring district of Maresme. The cultivated area of cut flowers kept increasing until the early 1960s and spread along the Mediterranean coast (Valencia, Murcia, Andalucía). In the 1970s, production expanded to the northwest of the peninsula and by the early 1980s it started on the northwest coast of Cádiz, where the cut flower production expanded very rapidly and by 1989 there were about 1,200 ha in production (mostly carnation). Almost the entire production was being exported and sold through the Dutch flower auctions.

This rapid expansion of the cultivated area, absence of planning, and revaluation of the Spanish currency, the peseta, led to the crisis of 1989. Cut flower production disappeared in many regions and was drastically reduced in others. However, growers diversified crops and roses, *Dendranthema*, chrysanthemum, lily, gladiolus and cut greens began to be cultivated. The size of the farms increased and market channels were optimized by eliminating intermediaries and by the activity of large exporters. The high labor inputs required by ornamental crops, together with the increase of salaries had a negative impact on the sector. As a result the

cultivated area of flowers decreased from 2,036 ha in 2001 to 1,094 ha in 2005 (MMAMRM, 2008). Only the Canary Islands did not decrease their production due to favorable climate, new crops requiring less labor, a higher level of association, higher internal consumption, and exports to mainland Spain and other European countries (Cid and Pérez, 2008).

At present the ornamental plant sector is developed in Andalucía, Cataluña, Murcia, Valencia, and Galicia in addition to the Canaries (Table 1 and Fig. 1). In 2006, there were 2,889 ha devoted to ornamental plants and 2,388 ha in cut flowers (MMAMRM, 2008) with an estimated market value of € 600 million. Between 2002 and 2007 imports of ornamentals have increased because of increased internal consumption whereas exports have decreased (Cermeño Sacristán, 2009).

Innovative Changes

The successive crises experienced by the sector forced the Spanish industry to innovate and as a result it has rapidly expanded. Some of the most relevant changes in the supply chain are listed below.

Crop Diversification. The "carnation monoculture" of the 1980s was replaced by cultivation of a large set of ornamental species (Gorbe et al., 2008). Since 1990 cultivation of a wide range of cut flower and cut green crops has ended the era of carnation hegemony. More recently cut flowers production has shown regional shifts to ornamental plants (Fig. 2). Mediterranean species in Cataluña and Valencia, indoor pot and seasonal plants in

Figure 2. Gerbera crop in Seville (south of Spain).



Andalucía, acidophylic species in Galicia, and tropical and subtropical species such as *Strelitzia* (Fig. 3) and *Protea* in the Canaries (Table 1).

Improved Greenhouse Structures. In the 1970s and 1980s most greenhouses had a wooden structure, a height of 2 m, and limited or no tightness. Nowadays, high greenhouses (5 m) with computerized climate control are used and most crop management practices such as planting, harvesting, biocide or fertilizer application are mechanized.

New Production Systems. In the 1980s harvest of carnation was done between October and May. Yield and quality were fully dependent on temperature during that period and there was scant possibility to control and predict the amount and quality of the production. At present both harvest time and flower quality can be programmed and predicted with diverse cut flower crops such as *Dendranthema*, rose, lily, *Gypsophilla*, chrysanthemum or pot plants (Fig. 4) such as poinsettia or hydrangea. The use of plant growth regulators allows production of more compact plants in a number of species and results in significant labour savings.

Increased Water Use Efficiency. Better knowledge of the plant water requirements in connection to plant species and developmental stage, deficit irrigation and growing xerophyte species (*Lavandula*, *Thymus*, *Rosmarinus*) improve water use efficiency.

Improved Commercial Channels. The high dependency on Dutch auctions during the 1980s was replaced by internal and export selling of national companies and this has led to market enlargement.

Research, Consulting, and Specialized Communications. These areas have become increasingly important.

PORTUGAL

Although ornamental nurseries (*Companhia Hortícola Agrícola Portuense*, *Viveiros Alfredo*

Table 1. The main production regions for cut flowers and ornamentals in Spain.

Regions	Characteristics of production
Mediterranean Andalusia	Represents about 50% of the national area of cut flowers. Carnation (205 ha), chrysanthemum, lily, gladiolus, rose, gerbera, gypsophila, and cut greens (leather fern, <i>Asparagus</i> , <i>Ruscus</i> , <i>Viburnum</i> , <i>Monstera</i> , <i>Aralia</i>) are the most important. The area of ornamental plants was 474 ha in 2006. The main cultivated ornamentals are indoor tropical plants <i>Epipremnum</i> , <i>Schefflera</i> , <i>Syngonium</i> , <i>Nephrolepis</i> , <i>Spatiphillum</i> , <i>Geranium</i> , <i>Poinsettia</i> , <i>Chrysanthemum</i> , <i>Hibiscus</i> and <i>Hortensia</i> .
Catalonia	A pioneer in cut flower production and diversification. Mediterranean species are replacing indoor and seasonal plants. In 2006, 127 ha were dedicated to cut flowers and 253 ha for ornamental plants. Nurseries occupy around 1,200 ha on Gerona.
Murcian Community	Cut flower production is decreasing and increase in the production of ornamental plants (pot plants and garden like palms, <i>Ficus</i> , <i>Poinsettia</i> , <i>Hortensia</i> , <i>Cupressus</i> , <i>Nerium</i> , <i>Hibiscus</i> , <i>Bougainvillea</i>). In 2006, ornamentals accounted for 192 ha and cut flowers 234 ha.
Valencian Community	Cultivated area of ornamentals (including nursery) exceeds 5,000 ha; large Mediterranean species have become more important (1,630 ha) but species of <i>Cactaceae</i> and <i>Crassulaceae</i> are also produced. The community accounts for about 33% of national exports.
Atlantic The Canaries	There are 760 ha dedicated to ornamentals (359 ha for cut flowers, 364 ha for ornamental plants, 37 ha for cutting production). <i>Strelitzia</i> and <i>Proteaceae</i> emerged among the traditional cut flowers (chrysanthemum, rose), while cut greens have held up. Indoor plants have decreased, except palms. Other plants of interest are cacti, seasonal plants, <i>Cicadaceae</i> , <i>Poinsettia</i> , and flowering garden bushes and trees. Production of cuttings has fallen (37 ha).
Galicia	This autonomous community has the largest increase in ornamental production in recent years. The region has about 1,000 ha cultivated with ornamentals. Dominated by acidophilic genera such as <i>Azalea</i> , <i>Buxus</i> , <i>Camellia</i> , <i>Hortensia</i> , <i>Juniper</i> , <i>Magnolia</i> , <i>Rhododendron</i> , <i>Thuja</i> .

Sources: MMAMRM, 2008; Cid and Pérez, 2008.

Moreira da Silva, *Viveiros Mário Mota*) were active by the end of the 19th and the beginning of the 20th centuries ornamental horticulture remained a marginal activity and only gained the status of an economic sector in the 1960s.

In the 1980s and 1990s the sector expanded rapidly due to increased consumption. More recently the rate of increase has slowed and consumption keeps largely supplied by imports (Costa and Monteiro, 2003; GPPAA, 2007).

Figure 3. *Strelitzia reginae* produced in the Canary Islands.

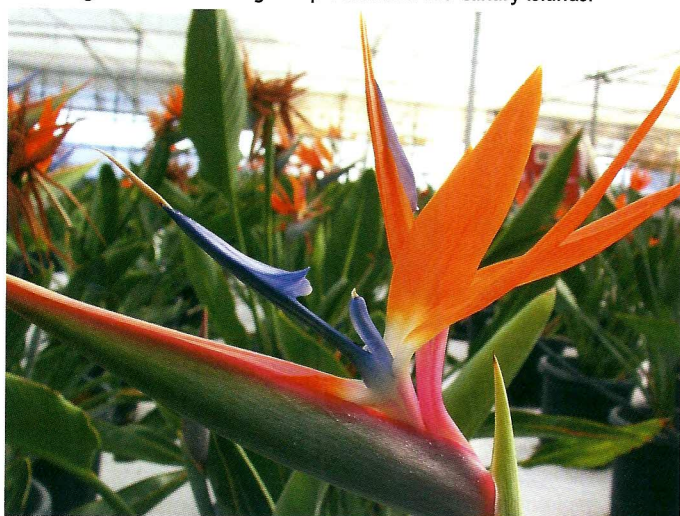
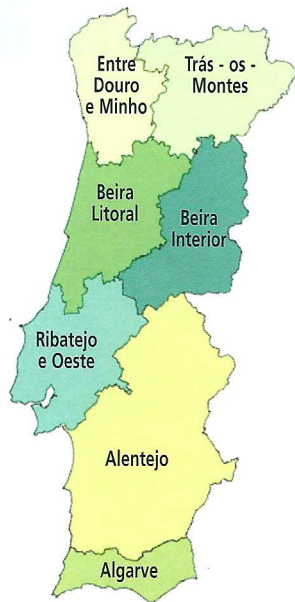


Figure 4. Pot plants in a Spanish greenhouse.



Figure 5. The seven agrarian regions in Portugal.



Ornamental horticulture now occupies an area of around 1950 ha (Madeira and Azores included) (Table 2). In the mainland, production concentrates in agrarian regions (Fig. 5) close to the littoral where climate is milder and the consumption is higher. The Portuguese market for ornamentals is limited within the European context. The country's population is small and it has one of the lowest consumptions per capita within the EU (14 € for flowers and 8 € for pot plants). The tendency is for an increase (Productschap Tuinbouw, 2007) and the same scenario is expected for outdoors plants, although the current economic crisis may alter such expectations.

Innovative Changes

Portuguese ornamental horticulture is based in small size enterprises, with limited specialization, know-how and capital resources (Costa and Monteiro, 2003; GPPAA, 2007). Nevertheless, several innovative projects have

emerged in the last 2-3 decades, most of them due to foreign investors who saw in Portugal an opportunity to use their know-how and their commercial network and produce ornamentals at competitive prices.

Exotic Flowers and Pot Plants. One of the first companies producing proteaceous plants was *Protealinhãs* in Alentejo. The company focus is the production of pot plants of *Leucadendron*, *Leucospermum*, and *Protea*, which are partly exported. This is facilitated by a partnership with a Belgian group. Another pioneer was *Europrotea*, also located in Alentejo. The company started its activity in the mid 1990s with the focus on cut flower production of species like *Banksia*, *Leucadendron*, *Leucospermum*, and *Protea*. The company exports large part of its production and carries out own breeding research.

Madeira and Azores have a larger tradition in the production of proteas and the tendency is for an increase. Both private companies and cooperatives are exporting taking advantage of producing in counter-cycle with leading producers like South Africa or New Zealand and having lower transport costs for Europe. Other relevant species produced in the islands include cymbidiums, various orchids, sterlitzias, heliconias, and various bulbous species.

Foliage and Cut Flowers (Fig. 6). A pioneer and leading company in cut foliage production in Portugal is *Frupor* (Odemira, Alentejo). Started by foreigners, the company produces either in the open field or under shade greenhouses (16 ha for different fern species). Besides ferns the company produces cut greens from species such as *Eucalyptus*, *Arbutus*, *Unedo* or *Salix*.

Several Portuguese and foreign growers have been investing in more modern greenhouses and cultivation techniques for cut flowers (e.g. use of substrate, computerized climate control) in order to produce higher quality flowers (e.g. roses, gerbera, carnation or anthurium) for the internal market. The major part of these projects locates in agrarian regions of Ribatejo & Oeste, Algarve, Entre-Douro & Minho.

Figure 6. Production of cut flowers in greenhouse (Ribatejo & Oeste). Photograph by courtesy of A. Monteiro.



Figure 7. Outdoor plant production in Algarve and in Entre-Douro & Minho. Photograph by courtesy of A. Monteiro.



Figure 8. Production of turf grass carpets in Alentejo (Odemira). Photograph by courtesy of A. Monteiro.



Outdoor Plants and Turfgrass (Figs. 7 and 8). The increased demand by the national public and private sectors as well as by foreign markets supported expansion of this sub-sector in Portugal. Palm trees, bamboos, and various other ornamental species such as *Nerium*, *Lavandula*, *Solanum*, and *Citrus* are propagated in the South. In the North, production is mainly

Table 2. Cultivated areas (in ha) of ornamental crops for the seven agrarian regions in Portugal mainland and in Madeira and Azores.

Agrarian Region	1986	1989	1995	1999	2002	2005	2007
Entre Douro & Minho	78	129	154	218	214	327	
Trás-Montes & Alto Douro		2	12	45	30	79	
Beira Litoral	30	64	118	170	249	179	
Beira Interior		5	7	5	7	3	
Ribatejo & Oeste	210	339	403	370	242	532	
Alentejo		5	32	122	140	110	
Algarve	15	67	89	66	96	145	
Total mainland	333	611	815	995	893	1375	1768
Madeira			30		36		80
Azores		12		70	107		110

Sources: Bettencourt, 1990; GPPAA, 2007; Instituto Nacional de Estatística, 2003, 2009.

of deciduous trees, conifers, camellias and azaleas. The nursery *Alfredo Moreira da Silva & Filhos*, one of the oldest ones in the country has about 100 ha of nurseries near Oporto and Coimbra. The company produces camellias, azaleas, rhododendrons, diverse conifers and various ornamental shrubs and trees, part of which is exported. Another nursery with operations in the North (near Oporto) and also in Algarve, is the *Viveiros Monte-Rosa*. Under Swedish ownership, the company produces a large diversity of outdoor climbers and shrubs, herbaceous herbs and palms and also exports part of the production. The *Viveiros do Foral* in the Algarve is owned by British specialized in propagation of ornamental citrus and is also exporting to the Netherlands due to a close partnership with a Dutch distributor. Since the 1990s, French growers are also propagating different bamboo species in Alentejo for export. The area for production of potted bamboos is about 50 ha.

Camposol (Odemira Alentejo) is a pioneer and a leader in the production of grass turf for sport and leisure purposes. The production area is estimated at 120 ha (Soares, 2008). Other smaller companies active in Algarve export turf to Spain (DRAPA, 2007).

CONSTRAINTS AND FUTURE CHALLENGES

Spain has a considerably larger and more professionalized ornamental sector than Portugal and should have more opportunities for innovation. Although Portugal has several innovative and competitive companies, small company size, low level of specialization, and limitations in capital resources are a hindrance. The introduction of new technologies via foreign investors or by importation only partly solves the problem.

A major constraint for the sector in both countries is related to labor availability, and increased labor costs. Thus competitiveness will depend on cultivation of new ornamentals with less labor requirements and by increased mechanization.

A more efficient use of water, biocides and fertilizers is needed. Water scarcity is becoming a major limitation of irrigated horticulture in the Mediterranean basin and increased consumption and competition with other sectors exacerbates the problem. In addition, the sector needs to be prepared to accommodate more strict EU legislation (EU Water Directive). Consequently, research on more efficient methods of irrigation, monitoring of plant water and nutrient status, water and waste plastic recycling, and breeding for stress resistance could contribute to overcome this problem. Consumers also need to be educated for a more environmentally friendly use of ornamentals.

The Spanish ornamental sector requires the coordinated efforts of government (central,

regional and local), research institutes, and the academy (Universities, Consejo Superior de Investigaciones Científicas, Institutos Autonómicos) to maintain competitiveness. In Portugal, the creation of technological and operative centers for horticulture and irrigation (COTH and COTR) promotes the interaction between grow-

ers, government, and research institutions. The sector requires larger grower associations and more active research institutes, to support innovation. Government in turn, must provide more up-to-date statistics to permit the correct estimation of risks and trends for the sector.

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