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The first cultivar database in Spain

Daniel Guillot Ortiz

Fundación Oroibérico, C/. Great 6,44113 Noguera de Albarracín (Teruel). E-mail: dguillot_36@hotmail.com.
Tel/Fax: 978706003.

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During the 2009 - 2010 periods, the “herbarium and horticultural variety database” project has been carried out in the town of Noguera (Teruel, Spain), the first project to dedicate its efforts to the creation of a database of cultivars marketed and/or cultivated in Spain, including 2124 cultivars.

Key words: Cultivar, database, herbarium, Spain.

INTRODUCTION

During the development of a research project carried out in the 2009 - 2010 period by the Fundación Oroiberico (Noguera de Albarracín, Teruel, Spain), consisting of the creation of a database of cultivated plant varieties in Spain, and financed by the Spanish Government, via the Biodiversity Foundation and the Trust Fund of Teruel of 2010, Asiader (Government of Aragon, Spain) and the Fundación Oroiberico, entitled “Herbarium and database of horticultural varieties”, the presence of 2,124 cultivars cultivated and/or commercialized in this country has been confirmed. This project also includes the creation of the first herbarium in Spain dedicated exclusively to cultivars.

This research project contains the results of the extensive work carried out during the 2001 - 2010 period, initiated at the Cavanilles institute of Biodiversity (University of Valencia, Spain) and based on the study and classification of ornamental and alien floras in Spain, the results have been used in the doctoral thesis of Dr. Daniel Guillot Ortiz entitled “Certain Aspects of the Ornamental Flora of Valencia”, directed by the Dr. Josep Antoni Rosselló Picornell and also in the publication in Spanish scientific journals of numerous articles together with several monographs and the creation of the first volume in 2006, the Bouteloua scientific journal, a Spanish journal dedicated to the study of ornamental flora from a scientific perspective. The results of this line of work have increased our knowledge regarding the number of species and cultivars cultivated and/or commercialized in Spain and also of the presence of these taxa in alien flora. This project has helped us to discover numerous cultivars that had not been mentioned in existing recent horticultural literature.

From the point of view of the study of the alien flora of ornamental origin and as a result of this line of inquiry, works have been published where cultivars belonging to different genus (Amaranthus L., Vinca L., Canna L., Dahlia Cav., Osteospermum L. etc.), by Guillot (2001, 2003a) and Guillot and Meer (2004a) have been cited, along with others that are centred in the study of families, genus or species, for example, by Guillot and Meer (2001, 2003, 2005c), Guillot et al. (2008 c) and Guillot (2010a), for the Cactaceae family , by Guillot (2001), Guillot and Meer (2003 b, c, d, and 2004c, 2005, 2006c, 2008b) and Guillot et al. (2008 to, d) the Agavaceae and Aloaceae families, by Guillot (2003c, 2006a), the Ipomoea L. genus , Guillot and Rosselló (2004, 2006a, 2008j) and Guillot (2008k), the Lavandula L. genus, by Guillot and Meer (2008d) and Guillot et al. (2008e), for the Crassulaceae family, within this family, for the Kalanchoe Adanson genus, by Guillot (2003d, 2005) and Guillot and Rosselló (2005), by Guillot (2008g) the Centranthus DC. Genus, by Guillot (2008h), the Papaver L. genus, by Guillot et al. (2008 b, g) the Aizoaceae and Portulacaceae families and by Guillot (2010 b) the Hedera L. genus.

Similarly, regarding the cultivated ornamental flora, works have been published that analyse data contributed by historical Spanish botanical works, for example, by Cavanilles (Guillot and Meer, 2002; 2003 i; 2004 d), Teixidor (Guillot and Meer, 2003 f) or Balmis (2003 h), and numerous articles and monographs where cultivars are mentioned, including those by Guillot and Rosselló (2003) on the Berberis thunbergii DC. species, by Guillot (2003 b), the Hederasa genus, the Agavaceae family, the Agave L. genus (Guillot and Meer, 2004 b; 2005 b, f; 2006 b, d; 2009 to, b), Hesperaloe Engelm (Guillot and
Meer, 2005 d), Polianthes L. (Guillot et al., 2006 a) and Yucca L. (2008 c) genusses, by Guillot (2004 a), the Lantana L. genussus, by Guillot (2004 b), the Hibiscus rosa-sinensis L. species, the Caprifoliaceae family (Guillot and Meer, 2006 a), the Abies pinsapo Boiss species (Guillot, 2006 b), the Kalanchoe genus (Guillot et al., 2006 b), the Phoenix L. genussus (Dana et al., 2008), the Dracaenavand. ex L. genussus (Guillot and Meer, 2008a), the Pelargonium L’Hér. ex Alton genussus (Guillot, 2008 a), the Calceolaria L. genussus (Guillot, 2008 b), the Poaceae family (Guillot and Rosselló, 2008), the Anthurium Schott genus (Guillot, 2008 e), the Gazania Gaertn. genus (Guillot, 2008 f), the Osteospermum genus (Guillot, 2008 i), the Opuntia Mill. genussus (Guillot et al., 2008 h), along with the works of a general character (Guillot, 2009). The work of Guillot et al. (2008 f) entitled “Keys to the ornamental flora of the Province of Valencia” is notable, based not only in the bibliographic compilation of cultivars, but also on a broad field work classification of all species and cultivars cultivated in the city centres of municipalities of the Community of Valencia, with this work serving as the partial results for this Spanish province. As the ultimate aim of these works, we pose the need to create a database of cultivars present in Spain, cultivated and/or commercialized, or present in our alien flora, that in the future will be accessible to the general public (according to our initial estimates, it would exceed 10,000 cultivars), and that would include both cultivars cultivated as ornamental and agricultural varieties.

The importance of this work resides in the fact that it is the first classification system and creation of a database of plant varieties cultivated in Spain.

Numerous data is found regarding cultivated plant varieties in historical botanical works in Spain, for example, in the Muslim period numerous cultivars are mentioned in the medieval “Book of Agriculture” (Zaccaria, 1802), or in the sixteenth century, by Herrera (1970), an ecclesiastic and agronomist, in his “Book of Agriculture”, published for the first time in 1513. We find images that represent cultivars in “The Codex” by Jaime Honorat Pomar, from the sixteenth century, that shows numerous exotic plant engravings from new world species as well as those from the old world, where we can observe cultivars including the Tulipa L. genus (Guillot and Meer, 2003 g). This work has recently been published for the first time (López, 2000). We find works in the nineteenth century of a certain transcendence from a horticultural point of view, such as the “Treaty of the flowers” in which the method is explained to cultivate those that serve as adornment of the gardens, by Boutelou and Boutelou (1804), the “Test on the varieties of the common Grapevine” by Clemente (1807), or the “Descriptive Botany Handbook” by Cutanda and Amo (1848) that is the true gem for the current analysis and study of Spanish cultivated flora.

In the twentieth century, the book by Dantin (1920) must be emphasized as an example of significant compiled works on cultivated plants and varieties in Spain, along with the book by Pañella (1970) during the second half of the twentieth century, that present a list of plants and cultivars cultivated in this geographic area and by Sánchez et al. (2000 - 2009), with five published volumes of the work entitled “Spanish Ornamental Flora”, which is the most significant work published to date dedicated to the study and classification of cultivated ornamental plants in Spain. Along with these more general compiled works, Mr. José Manuel Sánchez has published numerous articles in technical magazines dedicated to the world of horticulture, such as Tecniflor, Horticulture, or Parjap, concentrating on the study of genus, plant families or specific groups, along with numerous books and publications dedicated to the study of ornamental flora on a local level (Sánchez et al., 1993; Robledo et al., 1997). These works have represented a significant point of reference for our studies.

The work entitled “Flora Ibérica” is also worth mentioning, with fifteen published volumes. This work is dedicated to the study of the indigenous flora of the Iberian Peninsula and Balearic Islands, and it also includes numerous ornamental-origin genus that are part of the alien flora of this geographical area. In the study of Spanish cultivated flora, we also emphasise the work of Dr. Emilio Laguna Lumbreras, who has published research on significant genus from the ornamental point of view in Spain, such as Hedera, Pinus L. and Plectranthus L’Hér. (2000a), Lablab Adans. (2001), Vitis L. (2003), Capsicum L., Jasminum L., Campsis Lour and Citrus L. (1997), among others, or concentrating on certain geographical areas such as the Iberian System (2000 b).

MATERIALS AND METHODS

Information has been taken from several sources for the elaboration of this work:

i) Regarding cultivars, previous bibliographic works, many articles and books published by the authors of this present work, as well as other works concentrating on the study and classification of certain genus included in this database.

ii) Regarding genus and species, several botanical and horticultural works.

iii) Field work in several areas of the Spanish peninsular geography and Balearic Islands.

iv) Nursery catalogue compilations (Spanish and foreigners that market their products in Spain). From more than 1000 catalogues, book format nursery catalogues have been selected that contain cultivars produced, marketed and registered for these companies and if possible that contain descriptions of the series to which the cultivars belong (frequently registered series), and iconography of the cultivars (photographs).

v) Punctual enquiries from herbarium information sheets corresponding to various genus of the alien ornamental Spanish flora, mostly from the Agavaceae, Aloeaceae, Asclepiadaceae, Cactaceae, Compositae, Aizoaceae, Crassulaceae, Labiatae (genus Lavandula), Nymphaeaceae (genus Mirabilis L.), Portulacaeeae and Valerianaceae (genus Centranthus) families, that have allowed us to detect the presence of numerous horticultural forms in the Spanish alien flora. The VAL, SANT, MAF, ABH, and MA herbariums have been consulted in specific occasions.

vi) Visits to collections specialising in certain families, mostly of

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succulent plants. Based on these sources, we have selected and developed a portion of the information found to create a working base that can be expanded in the future. The database is structured by families that include genus, with a description and chorology for each, and within each one, species, synonyms, chorology and description have been indicated. Also, for each cultivar, the etymology, synonymy, iconography, description (taken of some bibliographic source) and history have been indicated. Information on series of cultivars taken from catalogues of consulted nurseries has also frequently been included.

RESULTS

2.124 cultivars (Appendix 1), cultivated and/or commercialized in Spain, corresponding to forty-four families, have been included. The “European Garden Flora” (Walters et al., 1986 - 2000), and the “Handbook of Cultivated Broad-leaved trees and Shrubs” by Krüssmann (1984 - 1986), have been used as the basic reference materials for genus and species, and the “Vascular Flora of Western Andalusia” (Valdés et al., 1987) and “Flora Europaea” (Tutin et al., 1964 - 1980) have also been used for specific cases. Regarding gymnosperms, the “Manual of Cultivated Conifers”, by Krüssmann (1985), has been used and for specific consultations on certain genus, other works have been used. The main plant catalogues from where the information has been extracted correspond to Aurora Variedades S. L., from 2006, Boyard, Bertrand and Kientzler, from 2008, “Gamme Jeunes Plants, Collection Printemps ‘08”, from S and G Flowers from 2005 and Fidelity Geranium by S and G Flowers from 2008, from Nuseries Grup Roig, from 2004 - 2005, from Fischer from 2007, entitled Fischer® 2007, Pelargonium, Impatiens Flowerbed and Balcony, from Nurseries Boyard from 2005, Nurseries Terra Nigra BV from 2006, from Jungpflanzen Grünewald from the 2003 - 2004 period, Giardino Toscani from 2006, Sakata Seeds Iberica S. L. from 2005 and from Torsanlorenzo, from 2007 and 2008. For cultivars, the information has been obtained from the following sources by families:

1. Aceraceae, represented by the Acer L. genus, has mostly followed Krüssmann’s book (1984 - 1986), extracting the information on cultivars commercialized/ cultivated in Spain mostly from catalogues from Torsanlorenzo from 2007 and 2008, and the previous work of Guillot et al. (2008 f). Twenty nine cultivars have been included.

2. Actinidiaceae, represented by the Actinidia Lindl. genus, including a cultivar mentioned by Guillot et al. (2008 f).

3. Agavaceae, represented by the Beschorneria Kunth, Furcraea Vent. and Phormium Forster and Forster genus.

In the case of Beschorneria and Furcraea, cultivars from the Agavaceae collection of Piet Van der Meer have been included. Jacquemin (2000 - 2001) and Irish and Irish (2000) were most frequently used for consultations. In the case of the Furcraea genus, Thiede (in Eggli, 2001) has been followed for species, and Jacobsen (1954) and Graf (1963) for cultivars. In the case of the genus Phormium, Walters et al. (1986-2000) have been followed. Twenty one cultivars have been included.

4. Aizoaceae, Apenia N. E. Br., Carpobrotus N. E. Br. and Delosperma N. E. Brown genus. In the case of first two genus, data have been obtained from Guillot et al. (2008 b). From a taxonomic perspective, Jacobsen (1954) and Hartmann (2001) have been consulted for species. In the case of the taxa called Carpobrotus acinaciformis ‘Affinis acinaciformis’, the criterion of Moragues and Rita (2005) has been followed. In the case of the Delosperma genus, the cultivars have been taken from the Boyard Bertrand Kientzler Catalogue from 2008. Eleven cultivars have been included.

5. Amaranthaceae, represented by the Celosia L. and Iresine P. Browne genus, have been taken from Guillot et al. (2008 f). Three cultivars have been included.

6. Asclepidaceae, represented by the Asclepias L. genus.

In the case of the cited cultivar, it has been observed in cultivation and away from cultivation in the Community of Valencia, and we found numerous sheets of this cultivar in the VAL herbarium.

7. Balsaminaceae, represented by the Impatiens L. genus. Data of cultivars and series of cultivars have been taken from S and G Flowers catalogues from 2005 and catalogues from Boyard, Bertrand and Kientzler from 2008. This is one of the more numerous families, with one hundred and seventy six cultivars.

8. Begoniaceae, represented by the Begonia L. genus. Data of cultivars has been taken from S and G Flowers catalogues from 2005 and Boyard, Bertrand and Kientzler catalogues from 2008. It has 148 cultivars.

9. Buddlejaceae, represented by the Buddleja L. genus, has mostly followed Krüssmann (1984 - 1986), Stuart (2006) and Kopp et al. (2009) for species and cultivars. The list of cultivars has been obtained from Guillot et al. (2008 f). Eleven cultivars have been included.

10. Cactaceae, represented by the Austrocylindropuntia Backeb., Cereus Mill., Cylindropuntia (Engelmann) F. M. Knuth, Mammillaria Haw. and Tephrocactus Lem. genus. In the case of first genus, data have been obtained from Guillot et al. (2008 c). The most significant bibliographic sources were Britton and Rose (1919) and Anderson (2001). In total, seven cultivars have been included.

11. Calceolariaceae, Calceolaria L. genus. Authors such as Erwin (1994) or Kopp (2006) have been consulted. One cultivar has been included.

12. Caprifoliaceae, represented by the Abelia R. Br. genus. We have based our information on Krüssmann (1984 - 1986) and Hatch (1999 - 2005), and have included cultivars mentioned in the previous works by Guillot and Meer (2006 a) and Guillot et al. (2008 f). Five cultivars have been included.

13. Commelinaceae, Tradescantia L. genus, has mostly followed Hunt (in Eggli, 2001) for species, and the list of cultivars has been obtained from the observation of
cultivars cultivated in gardens and commercialized in Spanish nurseries, distributed by Decorum Plants (2008). Graf (1986) has also been consulted. In total, fourteen cultivars have been included.

14. Compositae, with Bellis L., Tanacetum L. and Callistephus Cass. genus. For cultivars, the list and the information have been taken from the S and G Flowers catalogue from 2005. In the case of the Chrysanthemum L. genus, Aurora's Varieties catalogue of 2006 has been used, in the case of Gerbera L., the catalogues from Nurseries Terra Nigra B. V. from 2006 and S and G Flowers from 2005 have been used, in the case of Osteospermum L., the catalogue of Boyard, Bertrand and Kientzler from 2008 has been used. In total, three hundred and fifty six cultivars have been included. This is the most numerous family.

15. Crassulaceae, represented by the Aeonium Webb. and Berth., Crassula L., Hylotelephium H. Ohba and Sedum L. genus. We have based our information on the previous work of Guillot and Meer (2008 d), that refer to Burel et al. (1889), Jacobsen (1954), Eggli (2003), Graf (1963; 1986), Stephenson (2002) and Lord (2006) as their most important bibliographic sources. Eleven cultivars have been included.

16. Cruciferae, genus Brassica L. and Erysimum L. Cultivars have been taken of the catalogue of S and G Flowers of 2005. They have been included twelve cultivars.

17. Cupressaceae, cultivars mentioned in the work of Guillot et al. (2008 f) have been included. In the case of Calocedrus Kurz, Chamaecyparis Spach, Juniperus L. and x Cupressocyparis Dalimore, Krüssmann (1985) has been consulted for the treatment of cultivars, while for Cupressus L. and Thuja L. this same author has been consulted and cultivars of catalogues from Torsanlorenzo of 2007 and 2008 have been included. Thirty nine cultivars have been included.

18. Euphorbiaceae, Acalypha L. and Ricinus L. genus. The cultivars and the information have been obtained from the catalogue of Boyard, Bertrand and Kientzler from 2008 for Acalypha L. and by direct observation of cultivated plants in gardens for Ricinus L. Two cultivars have been included.


20. Hamamelidaceae, represented by the Hamamelis L., Loropetalum R. B. and Liquidambar L. genus. For the Hamamelis genus, Küßmann (1984 - 1986) has been followed, for the Liquidambar genus, Breen (1999-2006), Junker (2005) and The Royal horticultural Society (2005) have been followed, and for the Loropetalum genus, Guillot et al. (2008 f) has been followed. Sixteen cultivars have been included.

21. Hippocastanaceae, Aesculus L. genus. Krüssmann (1984 - 1986) has been consulted. Three cultivars have been included.

22. Iridaceae, Iris L. genus. Cultivars are commercialized by Giardino Toscani, from its catalogue from 2006. 26 cultivars have been included.

23. Labiatae, Lavandula and Ocimum L. genus. For the Lavandula genus, cultivars are commercialized by Boyard, Bertrand and Kientzler, in its catalogue from 2008. Cultivars observed under cultivation in gardens have also been mentioned. Upson and Andrews (2004) has been consulted. For the Ocimum genus, cultivars cited by Guillot et al. (2008 f) have been included. In total, ten cultivars have been included.

24. Leguminosae. For the Albizia Durazz. genus, Krüssmann (1984 - 1986) has been followed. The cited cultivars have been observed in gardens. Regarding the Cercis L., Genista L., Gleditsia L., and Robinia L. genus, Krüssmann (1884-1986) has also been followed, mentioning cultivars cited previously by Guillot et al. (2008 f), except for Robinia x holdii Beissn that have recently been observed as cultivations. In total, twenty two cultivars have been included.

25. Liliaceae, Chlorophytm Ker Gawler genus. The list of cultivars has been partially taken from Guillot et al. (2008 f), and some observed in commercialized nurseries have been included, taking the information from flower council Holland (2008), Foremost Co. (2008) and Hatch (2001 - 2008). Five cultivars have been included.

26. Nyctaginaceae, Mirabilis L. genus. Cultivars have been observed out of cultivation.

27. Oleaceae, Olea L. genus. The information has been taken from Iñiguez et al. (2001). Twenty one cultivars have been included.

28. Onagraceae, Fuchsia L. genus. 61 cultivars have been included from the catalogue of Boyard, Bertrand and Kientzler from 2008.

29. Oxalidaceae, Oxalis L. genus. 5 cultivars mentioned in the catalogues from Junngpflanzen Grünewald from 2003 - 2004 and Boyard, Bertrand and Kientzler from 2008 have been included.

30. Paoniacae, Paeonia L. genus. Cultivars present in the catalogue of Giardino Toscani from 2006 have been included, and some mentioned by Guillot et al. (2008 f). 26 cultivates have been included.

31. Pinaceae, for the Abies Mill. genus, Krüssmann (1985) and Guillot (2008 b) have been consulted. The list of cultivars has been obtained from Guillot et al. (2008 f) and from observations in gardens. Nine cultivars have been included.

32. Plumbaginaceae, Plumbago L. genus. Three cultivars have been included that are present in the Junngpflanzen Grünewald catalogue from 2003 - 2004, and some were cited previously by Guillot et al. (2008 f).

33. Portulacarieae, of the Portulaca L. and the Portulacaria Jacq. genus. Portulaca L. cultivars observed
in the catalogues from Boyard, Bertrand and Kientzler from 2008 and Jungpflanzen Grünewald from 2003-2004 have been included along with one previously cited by Guillot et al. (2008 f), and for the Portulacaria Jacq. genus, one cultivar is included that was previously cited by Guillot et al. (2008 f). 17 cultivars have been included total.

34. Primulaceae, Primula L. genus. Cultivars present in the Sakata Seeds Iberica S.L. Catalogue from 2005 have been cited. Thirty eight cultivars have been included.

35. Rosaceae. For the Cotoneaster Medicus, Crataegus L. and Chaenomeles Lindley genus, cultivars cited by for Guillot et al. (2008 f) have been included, and Krüssmann (1984-1986) has been consulted, whereas for the Rosa L. genus, cultivars cited by Guillot et al. (2008 f) have been included. Fifty three cultivars have been included.

36. Scrophulariaceae. For the Antirrhinum L. genus, cultivars from S and G Flowers catalogue (2005) have been included, and for the Nemesees Vent. genus, cultivars from the Boyard, Bertrand and Kientzler catalogue from 2008 have been included. 46 cultivars have been cited.


38. Sterculiaceae, Fremontodendron Coville genus. One cultivar cited by Guillot et al. (2008 f) has been included.

39. Taxaceae, Cephalotaxus Siebold and Zucc. genus. Krüssmann (1985) has been followed and two cultivars cited by Guillot et al. (2008 f) have been included.

40. Taxodiaceae, Cryptomeria D. Don. genus. Three cultivars previously cited by Guillot et al. (2008 f) have been included.

41. Theaceae, Camellia L. genus. Cultivars cited by Cunqueiro et al. (2001) and Salinero and Vela (2004) have been included. Three hundred and twenty one cultivars have been cited.

42. Valerianaceae, Centranthus genus. 3 cultivars previously cited by Guillot et al. (2008 f) have been included.

43. Verbenaceae, Lantana L. genus. 12 cultivars have been included from Boyard, Bertrand and Kientzler catalogue from 2008, some previously cited by Guillot et al. (2008 f).

44. Violaceae, Viola L. genus. 146 cultivars cited in the S and G Flowers catalogue from 2005 have been included.

**DISCUSSION**

This work is the largest study carried out in Spain regarding the varieties of cultivated plants, although there are numerous existing projects financed by the public administration destined to the recovery of horticultural forms, as well as important public and private collections. The creation of an extensive database that eventually would group all of the families and genus of cultivated plants in Spain had never been considered, especially on that was available to the general public. The results of this research work provide an extensive database with great amounts of information that had never before been catalogued and structured from a scientific perspective.

The compilation of important information included in commercial plant and seed catalogues in our country has been notable.

Concerning other similar initiatives in other countries, with access to the general public, primarily in the Internet, it must be pointed out that this database collects not only cultivars, but also the relative information of the series of cultivars present in the catalogues.

The creation of this database together with the herbarium may become important in the future from various perspectives:

i.) Legally, it would be an important source of information when dealing with future conflicts to obtain and commercialise a certain cultivar.

ii.) It could serve as a base for future studies destined to the preservation of the autochthonous varieties of cultivated plants (creation of collections).

iii.) It could serve as the base information to create future germplasma banks of families, genus or specific species. It could be used as a research base for ornamental flora at a local level.

iv.) It could be a basic instrument to study cultivars and hybrids present in the autochthonous flora of the Iberian Peninsula and the Balearic Islands, keeping in mind especially those that present an invasive character.

v.) Fundamentally, it would be a measure destined to conserve an important part of our biological, historical and cultural heritage. The need to protect flora that was once cultivated is demonstrated by authors like Laguna et al. (1998).

**APPENDIX 1**

**Aceraceae**

**Acer L**


**Actinidiaceae**

*Actinidia* Lindl.

*Actinidia arguta* Miq.: ’Hayward’
Agavaceae

Beschorneria Kunth
Beschorneria yuccoides K. Koch: ‘Quick Silver’
Cultivars: ‘Hidalgo’, ‘Queretaro Coll Delight’, Beschorneria septentrionalis x dekosteriana

Furcraea Ventenat
Furcraea foetida (L.) Haw.: ‘Mediopicta’
Furcraea selloa C. Koch: var. marginata Trel.

Phormium Forster and Forster
Phormium cookianum Le Jolis subsp. hookeri (Gunn ex Hook.f.) P. Wardle: ‘Cream Delight’, ‘Tricolor’

Aizoaceae

Aptenia N E Br.
Aptenia cordifolia Schw.: ‘Variegata’
Aptenia lancifolia L Bolus: ‘Purple’
Other cultivar: ‘Red Apple’

Carpobrotus N. E. Br.
Carpobrotus acinaciformis (L.) L. Bolus: ‘Affinis acinaciformis’

Delosperma N. E. Brown

Amaranthaceae

Celosia L.
Celosia argentea L.: ‘New Look’, ‘Yellow’
Iresine P. Browne
Iresine herbstii Hook.: ‘Purple lady’

Asclepiadaceae

Asclepias L.
Asclepias curassavica L.: ‘Red Butterfly’

Balsaminaceae

Impatiens L.


Begoniaceae


Boraginaceae

Heliotropium L.
Heliotropium peruvianum L.: ‘Incense’, ‘Violet’

Buddlejaceae

Buddleja L.

Buddleja davidii Franch.: ‘Black Night’, ‘Empire Blue’,
'Harlequin', 'Nanho Blue', 'Nanho Purple', 'Nanhoensia Alba', 'Opéra', 'Royal Red', 'White Profusion'  
*Buddleja fallowiana* Balf. F. and W. W. Sm.: 'Alba'  
*Austrocylindropuntia* Backeb.  
*Austrocylindropuntia cylindrica* (A. L. Jussieu ex Lamarck) Backeberg: 'Monstruosa'  
*Austrocylindropuntia subulata* 'Cresta'  
*Cactaceae*  
*Cereus* Mill.  
*Cereus peruvianus* (L.) Mill.: 'Monstruosus', *monstruosus minor* Salm.-Dyck  
*Cylindropuntia* (Engelmann) F. M. Knuth  
*Cylindropuntia rosea* (DC.) Backeberg  
*Mammillaria* Haw.  
*Tephrocactus* Lem.  
*Tephrocactus articulatus* (Pfeiff. and Otto) Backbg.: 'Inermis'  
*Calceolariaceae*  
*Calceolaria* L.  
*Calceolaria × herbeohybrida* Voss.: Clou F Mix'  
*Caprifoliaceae*  
*Abelia* R. Br.  
*Abelia x grandiflora* (André) Rehd.: 'Francis Mason', 'Prostrata', 'Snowdrift'  
Other cultivars: 'Edward Goucher'  
*Commelinaceae*  
*Tradescantia* L.  
*Tradescantia fluminensis* Vellozo: 'Albovittata', 'Argenteo-variegata', 'Aurea', 'Variegata'  
*Tradescantia pallida* (Rose) D. R. Hunt: 'Purpurea'  
*Tradescantia zebrina* Heynhold: 'Discolor' 'Little Hill' 'Purpurlis' 'Quadricolor'  
Other cultivars: 'Dark Green', 'Green Hill', 'Pink', 'Tricolor Rose', 'Yellow Hill'  
*Compositae*  
*Bellis* L.  
*Callistephus Cass.*  
*Chrysanthemum* L.  
*Gerbera* L.  
Tanacetum L.


Crassulaceae

Aeonium Webb. and Berth.
Aeonium arboreum (L.) Webb. and Berth.: ‘Atropurpureum’, ‘Zwartkop’

Crassula L.

Crassula lycopodioides Lam. var. pseudolycopodioides (Dint. and Schinz.) E. Walter

Hylotelephium H. Ohba
Hylotelephium sieboldii (Sweet ex Hooker) H. Ohba: ‘Medio-variegata’, ‘Variegatum’
Other cultivars: ‘Herbsfreude’

Sedum L.
Sedum x rubrotinctum R. T. Clausen

Cruciferae

Brassica L.


Erysimum L.


Cupressaceae

Calocedrus Kurz
Calocedrus decurrens (Torr.) Florin: ‘Aureovariegata’

Chamaecyparis Spach.
Chamaecyparis obtusa (Siebold and Zucc.) Endl.: ‘Nana Gracilis’
Chamaecyparis pisifera (Siebold and Zucc.) Endl.: ‘Boulevard’, ‘Sungold’
Cupressus L.
*Cupressus sempervirens* L.: ‘Totem Pole’.

Juniperus L.
*Juniperus chinensis* L.: ‘Stricta’
*Juniperus communis* L.: ‘Hibernica ‘Repanda’
*Juniperus horizontalis* Moench: ‘Blue Chip’
*Juniperus oxycedrus* L.: ‘Variegata’
*Juniperus procumbens* (Siebold ex Endl.) Siebold ex Miq.: ‘Nana’
*Juniperus sabina* L.: ‘Tamariscifolia’
*Juniperus scopulorum* Sarg.: ‘Blue Chip’
*Juniperus squamata* Lamb.: ‘Blue Carpet’, ‘Blue Star’
*Juniperus virginiana* L.: ‘Grey Owl’

Thuja L.
*Thuja occidentalis* L.: ‘Danica’, ‘Emeraude’
*Thuja orientalis* L.: ‘Aurea nana’, ‘Pyramidalis aurea’

Euphorbiaceae

*Acalypha* L.
*Acalypha ‘Cats taï’*

*Ricinus* L.
*Ricinus communis* L.: ‘Nigra’

Geraniaceae

*Pelargonium* L’Hér.


Hamamelidaceae

Hamamelis L.

Hamamelis mollis Oliver ex Forb and Hemsl.: ´Pallida’

Hamamelis x intermedia Rehder: ´Diane’, ´Jelena’

Liquidambar L.


Loropetalum R. Br.

Loropetalum chinense (R. Br.) Oliver var. rubrum: ´Fire Dance’

Hippocastanaceae

Aesculus L.

Aesculus hippocastanum L.: ´Baumanii’, ´Pyramidalis’

Aesculus x carnea P. Watson

Iridaceae

Iris L.


Labiatae

Lavandula L.


Ocimum L.

Ocimum basilicum L.: ´Genovese’, ´Minima’

Leguminosae

Albizia julibrissin Durazz.: ´Ernest Wilson’ var. rosea Mouill.

Cercis L.

Cercis siliquastrum L.: ´Alba’
Genista L.
Genista lydia Boiss.: ‘Porlock’, ‘Vancouver Gold’
Genista pilosa L.: ‘Goldilocks’, ‘Lemon Spreader’

Gleditsia L.
Gleditsia triacanthos L.: ‘Sunburst’

Robinia L.
Other cultivars: Robinia x holdtii Beissn., Robinia x margaretta Ashe, Robinia x margaretta ‘Pink Cascade’, Robinia x slavinii Rehd, Robinia x slavinii ‘Hillieri’

Liliaceae

Chlorophytum Ker Gawler
Chlorophytum orchidastrum Lindl.: ‘Green Orange’.

Nyctaginaceae

Mirabilis L.
Mirabilis jalapa L.: ‘Broken Colours’

Oleaceae

Olea L.

Paeoniaceae

Paeonia L.

Pinaceae

Abies Mill.
Abies pinsapo Boiss.: ‘Glaucá’, ‘Minor’
Other cultivars: Abies x masjoanni Hort.

Cedrus Trew.
Cedrus atlantica (Endl.) Manetti ex Carrière ‘Aurea’, ‘Fastigiata Glaucá’, ‘Pendula’
Cedrus deodara (Roxb.) G. Don: ‘Aurea’, ‘Pendula’

Plumbaginaceae

Plumbago L.
Plumbago auriculata Lam.: ‘Blau’, ‘Dunkelblau’, ‘Weib’

Portulacariaceae

Portulaca L.
*Portulacaria* Jacq.

*Portulacaria afra* Jacq.: ‘Variegata’

**Primulaceae**

**Primula** L.


**Rosaceae**

**Chaenomeles** Lindley

*Chaenomeles japonica* (Thunberg) Spach: ‘Sargentii’

**Cotoneaster** Medicus

*Cotoneaster conspicuus* Comber ex C. Marquand and G. Klotz: ‘Decorus’
*Cotoneaster horizontalis* Decne ‘Dart’s Splendid’
*Cotoneaster salicifolia* Franch.: ‘Autumm Fire’, ‘Gnom’, ‘Repens’
*Cotoneaster x watereri* Exell.: ‘Cornubia’, ‘Pendulus’

**Crataegus** L.

*Crataegus laevigata* (Poiret) DC.: ‘Paul’s Scarlet’
*Crataegus x lavallei* Herincq ex Lev.: ‘Carrierei’
*Crataegus x prunifolia* (Poiret) Pers.

**Rosa** L.


**Scrophulariaceae**

**Antirrhinum** L.


**Nemesia** Vent.


**Solanaceae**

**Petunia** Juss.


Sterculiaceae

Fremontodendron Coville
Fremontodendron ‘California Glory’

Taxaceae

Cephalotaxus Siebold and Zucc.
Cephalotaxus harringtonia (Forbes) Koch: ‘Fastigiata’, ‘Prostrata’

Taxodiaceae

Cryptomeria D. Don
Cryptomeria japonica (L. f.) D. Don: ‘Elegans’, ‘Globosa nana’, ‘Vilmoriniana’

Theaceae

Camellia L.


REFERENCES

Bouteloua C, Bouteloua E (1804). Tratado de las flores en que se explica el método de cultivar las que sirven de adorno de los jardines. Madrid.
Cutanda V, Amo M (1848). Manual de Botánica Descriptiva ó resumen de las plantas que se encuentran en las cercanías de Madrid, y de las que se cultivan en los jardines de la Corte. Imprenta de D. Santiago Saunaque. Madrid.

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