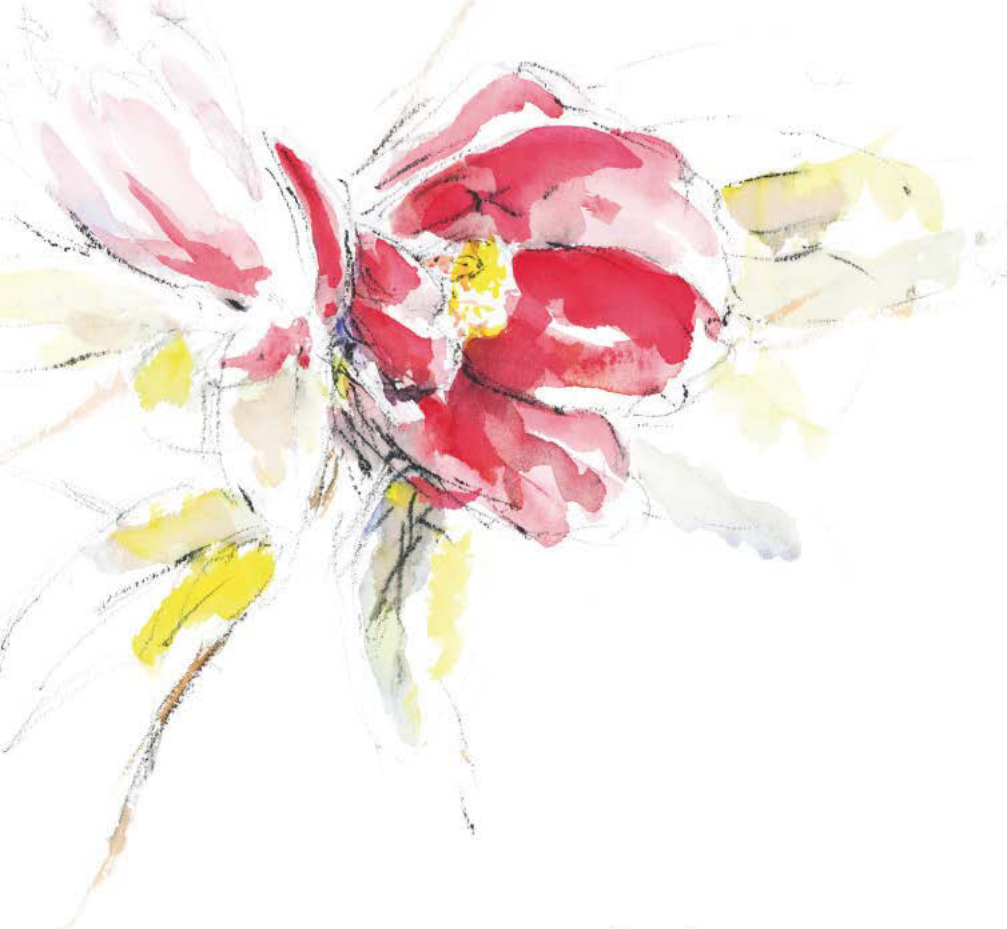

2014 International Camellia Congress 椿

PONTEVEDRA–SPAIN From March 11 to March 15, 2014

2013 2014 AÑO DUAL ESPAÑA-JAPÓN 日本スペイン交流400周年 400 AÑOS DE RELACIONES

Deputación Pontevedra | Camellia 2014 Pontevedra - Spain

INTERNATIONAL CAMELLIA SOCIETY

BOOK OF ABSTRACTS

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Rías Baixas Turismo | SEC

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2014 PONTEVEDRA INTERNATIONAL CAMELLIA CONGRESS

The city of Pontevedra, an important camellia producer, will host this world-renowned event organized by the Deputación de Pontevedra (Provincial Government of Pontevedra) through the Rías Baixas Tourist Board and the Estación Fitopatolóxica de Areeiro. The Congress is also supported by the Xunta de Galicia (Regional Government of Galicia), the University of Santiago de Compostela, the Spanish National Research Council and the Juana de Vega Foundation.

The Congress will be an important forum for the discussion and presentation of works on the different fields related to the camellia plant: touristic, artistic, plastic and botanic, and its uses and applications, combining scientific sessions and visits to the historic gardens in Pontevedra province.

The aim of this congress will be to exchange and transfer the results of the camellia research and its products among the participating countries so as to develop and enjoy our natural resources. This event will be pioneer since it is the first time that a camellia congress is held in Spain.

The Rías Baixas in the Pontevedra province are a camellia garden that brings colour and light to our autumns, winters and springs in streets, squares, gardens, castles and monasteries. In this region, the camellias are magnificent trees of amazing beauty.

Every public or private garden in the Pontevedra towns and cities has a camellia specimen. In some manor houses and historical gardens the camellias thrive since the 17th century.

Pontevedra and its surroundings constitute an incomparable setting for this congress, and moreover this province is an important camellia producer and has some of the most beautiful historical gardens in Spain, with plenty of *Camellia* specimens included in the Galician Monumental Tree Catalogue.

The heritage that Galicia and Portugal have in many of the camellias growing in their gardens will be transmitted by the congress attendants to any camellia enthusiast, nurserymen, or anybody interested in the genus in their countries of origin.

ICS President's message on the occasion of the International Camellia Congress, Pontevedra, Spain, 2014

After nearly a decade during which dreams turned into reality, the 2014 Congress in Pontevedra is now beginning. There is a huge amount of work involved in organising and planning such a Congress. Organisers must address a diverse range of topics including:

* The choicest gardens to be visited
* An appealing array of cultural and scenic offerings
* An appetising menu of the location's finest foods, in comfortable hotels

Doing all that for one person, a couple, or perhaps a small group is fairly easily done. Doing it for 200 people is another order of magnitude.

On top of that, Congress organisers must ensure they offer to camellia enthusiasts, researchers, and historians the opportunity to present the latest news and developments from the world of camellias.

This book of proceedings encompasses nearly 30 presentations, in five different sessions: camellia history; gardens and tourism; identification and characterisation techniques; pests and diseases; and the uses of camellias. In the last session, researchers explore in some depth the uses we already know and appreciate, from *Camellia sinensis* – our morning or afternoon tea – to camellia oils, which are suitable for a variety of consumer applications.

In addition to the presentations, there are another 26 posters that cover these subjects. There is a special section of posters showcasing the many fine camellia parks and estate gardens featuring camellias – one of which, Castelo de Soutomaior, is an ICS Garden of Excellence, and another of which, Pazo de Rubianes, is a candidate for this recognition.

Congratulations to all our organisers and presenters on this program, which I am sure will be a notable success!

Patricia L. Short
President

The International Camellia Society

Commitee of honour

Honorary President

HM the Queen Sofía

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Congress Venue

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Sociedad Española de la Camelia
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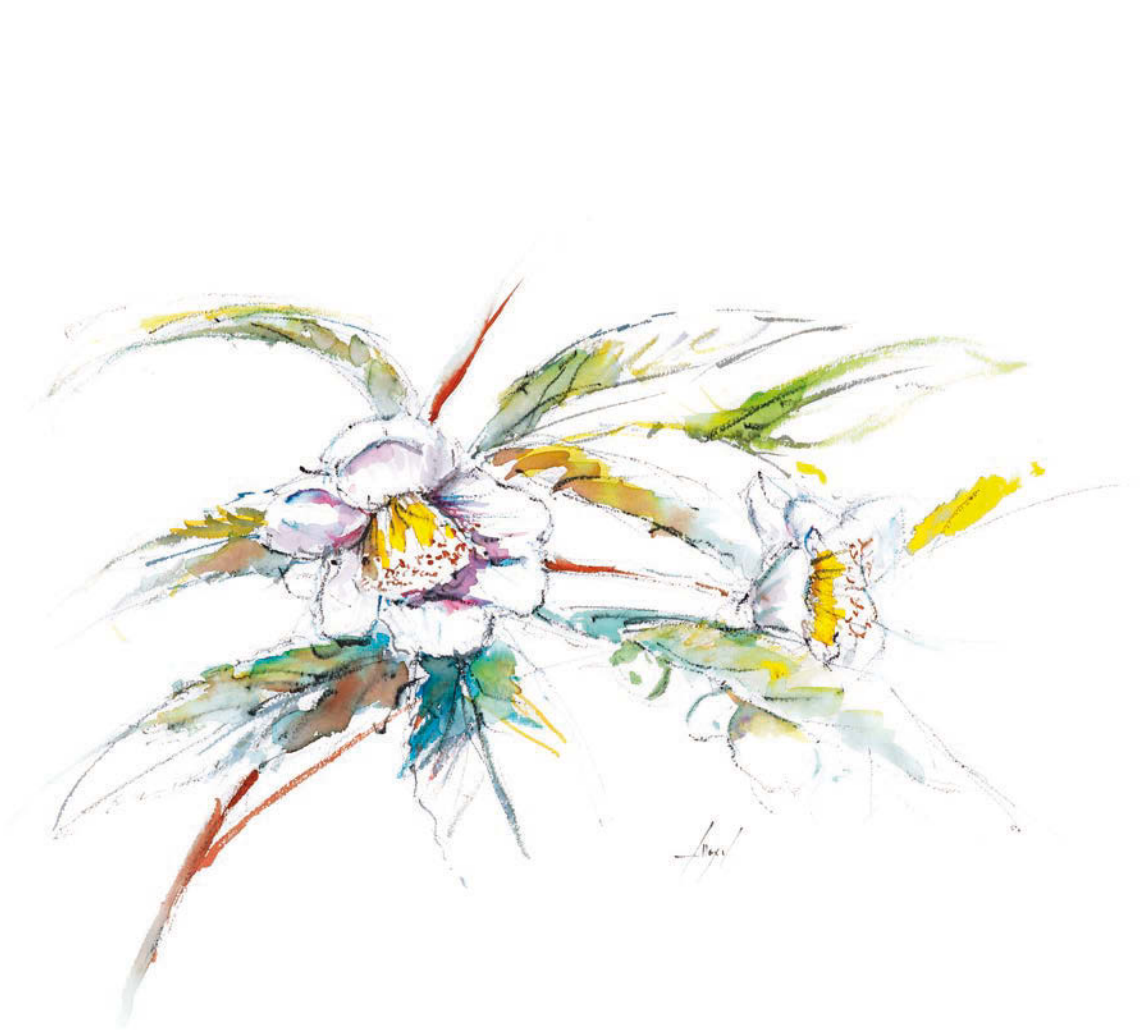
www.camellia2014.depo.es



SCIENTIFIC SESSIONS

TUESDAY 11 MARCH

16:00 - 19:00 Delegate registration at the congress venue

19:00 Welcome ceremony by the organising committee and welcome party

WEDNESDAY 12 MARCH

8:30 Welcome of the ICS President

9:00 Opening conference

* Camellias and globalization processes. Izco J.

10:00 Coffee break

10:30 - 12:30 Session A. History and ancient camellias

- Ancient camellias in Galicia and Portugal. Armada J. & Vela P.
- Remarkable, monumental and singular camellias of Galicia. Rodríguez-Dacal C. & Rodríguez García-Garabal M.
- Portuguese *Camellias* from the 19th century. Andresen-Guedes J.
- Old *Camellias*, new ways. Cordeiro L., Paz E. & Sales F.
- *Camellia x hortensis* T. Tanaka and the introduction of Chinese species to Japan in older times. Tanaka T.
- Successful recover for the exhausted ancient camellia tree in Wenzhou China. Wang J. & Li J.

Posters

- Camellias in Namban objects from the 16th and 17th centuries in Spain. Sainz M.J., Izco J. & Salinero C.

THURSDAY 13 MARCH

8:30 Session B. Gardens and tourism

- Development of a touristic route of winter gardens in Galicia based on the camellias: the Camellia Route. Salinero C., Vela P., Castiñeiras J.R. & Sainz M.J.

- Importance of the Route of the Camellia as part of the Galician tourist brand. Castiñeiras J.R.

- The camellias as part of the composition of the gardens of the city of Porto. Andresen T. & Ferreira A.

- Historic gardens of S. Miguel Island, Azores – Portugal. Soares de Albergaria I. & Forjaz Sampaio J.

- The camellia collection of José do Canto Woodland Gardens in Furnas (S. Miguel Island). Soares de Albergaria I. & Forjaz Sampaio J.

- The garden of Pazo de Rubianes (Vilagarcía de Arousa, Spain). Hermo G.

Posters

- Buçaco and Villar d'Allen: a story of the camelliomania in Portugal. Cordeiro L., Paz E. & Sales F.

- Opening north-western Portuguese camellia gardens to view. Ferreira R. & Paz E.

- Historic gardens of S. Miguel Island, Azores – Portugal. Soares de Albergaria I. & Forjaz Sampaio J. (2 posters)

- The Botanic Garden Project of the University of Santiago de Compostela (Spain): camellias as the central focus of living collections. Ortiz J., Aira M.J. & Ramil P.

10:00 Coffee break

10:30 – 12:15 Session C. Identification and characterization techniques

- A preliminary study on the genetic characteristics of inter-specific hybrids of *Camellia amplexicaulis*. Xinkai L., Naisheng Z., Guimei F., Danfeng Y. & Jiyin G.
- Genus *Camellia*: a review of extant taxonomic systems using the latest morphological and molecular data. Orel G. & Curry A.S.
- Current research advances in molecular characterization of ornamental camellias. Jiyuan L., Yingkun S. & Hengfu Y.
- The computer and the camellia: what computer can do for conservation, knowledge and research on camellias. Motta G. & Miceli G.
- Crowdsourcing information system for camellia cultivar identification. Ventura A., Campos G. & Zagalo H.
- Differentiation of camellia specimens with morphological similarities using morphobotanic descriptors and SSR. Vela P., Couselo J.L., Salinero C. & Paz C.

Posters

- Could some *Camellia* collections be considered as botanical gardens? Aboal J. & Salinero C.
- Presence of *Camellia* species and cultivars in the botanical gardens worldwide. Aboal J.
- *In vitro* culture techniques applied to the propagation of *Camellia reticulata* Lindley. San José M.C.
- Genus *Camellia*: a review of extant taxonomic systems using the latest morphological and molecular data. Orel G. & Curry A.S. (2 posters)

- Flower development and gibberellic acid application on flowering of *Camellia rosthoniana* 'Tianshanfen' Xu L., Chen F.Z., Ji X.M., Xie Y.F., Tong J., Yang S.K. & Chen W.D

FRIDAY 14 MARCH

8:30 Session D. Pests and diseases

- Sanitary status of camellias growing at the urban parks and gardens from the Pazos in Galicia (NW Spain). Mansilla J.P., Pérez-Otero R., Aguín O., Pintos C., Rial C., Chaves M. & Salinero C.

- Occurrence of *Botryosphaeriaceae* species associated with *Camellia* dieback in Galicia (NW Spain). Mansilla J.P., Pintos C., Chaves M., Rial C., Aguín O. & Salinero C.

- Evaluation of *in vitro* parasitisation efficiency, persistence in the soil and biologic control in the field of a commercial product based on *Trichoderma* spp. against sclerotia of *Ciborinia camelliae*. Testone S., Corneo A., Marcacci D., Campana F. & Panno L.

- Biological diversity of resistance to flower blight of *Camellia japonica* caused by *Ciborinia camelliae* in Goto, Japan. Chuji H.

- Susceptibility trials of different *Camellia* species to *Ciborinia camelliae*. Couselo J.L., Mansilla P., Vela P. & Salinero C.

- Resistance to *Ciborinia camelliae* within inter-specific hybrids of *Camellia*. Denton-Giles M., Charvet D., Gordon T.R. & Dijkwel P.P.

Posters

- Limiting factors for the biological and chemical control of camellia flower blight. Couselo J.L., Vela P., Salinero C. & Mansilla P.

10:00 Coffee break

10:30 – 12:00 Session E. Uses and camellia products

- Yield evaluation of tea (*Camellia sinensis*) clones grown in Pontevedra (NW Spain). Vela P., Paz C., Mansilla P. & Salinero C.
- Variation in oil content in *Camellia japonica* seeds. De Ron A.M., Salinero C. & Vela P.
- Camellia oil quality indices from seeds harvested in Pontevedra (NW-Spain). Vela P., García-Sartal C., Salinero C. & González-García M.
- Variability in seed storage components (protein, oil and fatty acids) in a *Camellia* germplasm collection. De Haro A., Obregón S., del Río M., Font R., Mansilla P. & Salinero C.
- Bioactive compounds and biological properties of oils from three *Camellia* species. Salinero C., García-Sartal C., Tolentino G. & Estevinho L.M.
- Cold processed soap with Galician camellia oil. Tellez P.

Posters

- Assesment of the chemical composition of four varieties of *Camellia sinensis*. Lema M. J., Salinero C., Rodríguez P. & Vela P.
- NMR analysis of the triglyceride composition of cold pressed oil from *Camellia* species. Seijas J.A., Feás X., Salinero C., Vela P., Mansilla J.P., Sainz M.J. & Vázquez-Tato M.P.

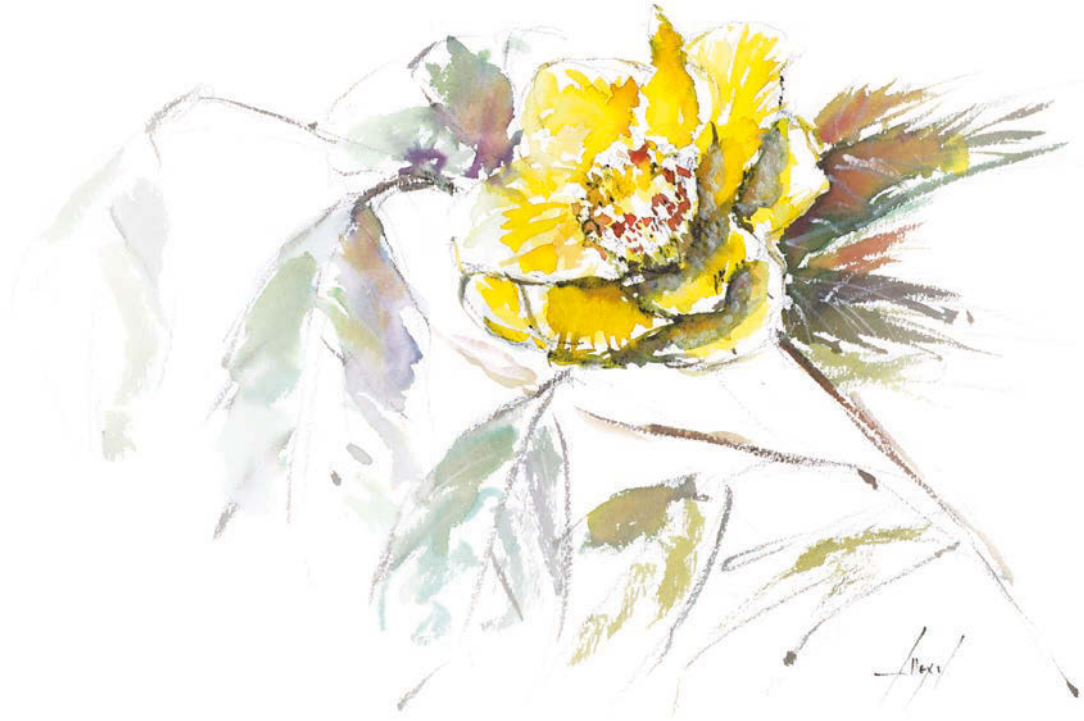
12:00 Presentation of the 2016 International Camellia Congress

12:30 End of the sessions

21:00 Farewell dinner and handover ceremony

Other posters:

- Camélias Portuguesas / Portuguese Camellias. Garrido J.
- Galician Camellia Gardens. Sociedad Española de la Camelia (SEC). Estación Fitopatolóxica de Areeiro, Deputación de Pontevedra
    - Parque do Castro (Vigo, Pontevedra, Spain)
    - Pazo Quiñones de León (Vigo, Pontevedra, Spain)
    - Parque Botánico "Castelo de Soutomaior" (Soutomaior, Pontevedra, Spain). SEC & EFAeeiro
    - Pazo de Gandarón (Pontevedra, Spain)
    - Pazo de Lourizán (Pontevedra, Spain)
    - Estación Fitopatolóxica de Areeiro (Pontevedra, Spain)
    - Quinteiro da Cruz (Ribadumia, Pontevedra, Spain)
    - Pazo da Saleta (Meis, Pontevedra, Spain)
    - Pazo de Oca (A Estrada, Pontevedra, Spain)
    - Pazo de Rubianes (Vilagarcía de Arousa, Pontevedra, Spain)
    - Casa Museo Rosalía de Castro (Padrón, A Coruña, Spain)
    - Pazo de Santa Cruz de Rivadulla (Vedra, A Coruña, Spain).
    - Alameda de Santiago de Compostela (Santiago de Compostela, A Coruña, Spain)
    - Pazo de Mariñán (Bergondo, A Coruña, Spain)



OPENING CONFERENCE

Camellias and globalization processes

Izco J.

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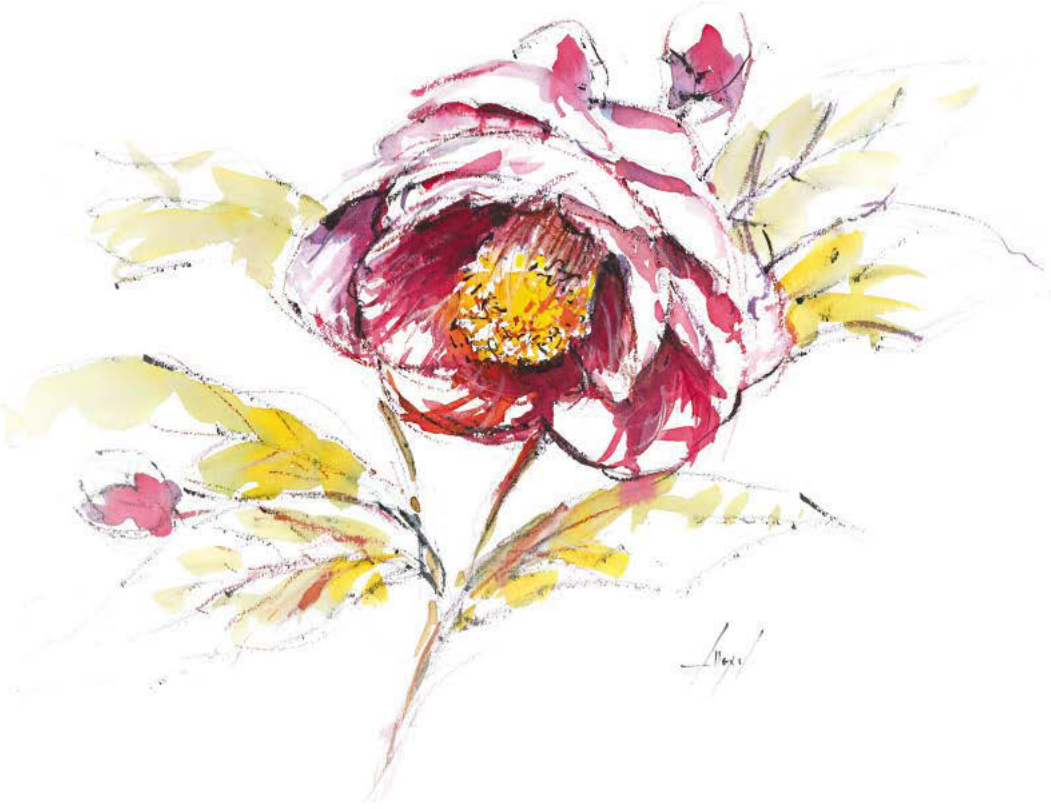
Abstract. The idea of globalization has become a cliché. We are aware of the close interconnection among the inhabitants of the planet Earth and their activities. Globalization is associated with the recent development of humanity and their technologies but this process started long time ago. It is linked to the first world circumnavigation of the Spanish expedition of Ferdinand Magellan and Juan Sebastián Elcano (1519-1522). The concept of globalization has not been exclusively economic or social; it has also affected animals and plants over an extended period of time.

Broadly speaking, the camellia is a group of plants that have also travelled around the world, first as part of nature and then as part of trade, social networks, or culture, as evidenced by the International Camellia Society, by its regions and other societies not officially linked to it.

In this context, for centuries the camellias have traveled from the East to the West and settled in the region that hosts the International Camellia Congress in 2014 (Pontevedra, Spain). The camellias arrived as a quality item, as an expression of beauty and harmony that could only be afforded and enjoyed by a few. Over time the camellias were no longer exclusive and were available for everybody, as part of a globalization process at a territorial level or rather as a socialization process. Today, it is dressed in new clothes, speaks a new language, arouses feelings in new minds, and decorates new gardens. The camellia is the flower of Galicia (Spain).

Keywords: *Camellia japonica*



Session A

History and ancient camellias

Ancient camellias in Galicia and Portugal

Armada J.[1], Vela P.[2]

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Abstract. In Galicia (NW Spain) and Portugal grow ancient camellias, both in public and private gardens. The first camellias planted in Galicia were brought from the East as seeds and they were planted isolated in gardens. Later, people started to have a better knowledge on the camellia culture outdoors, on the size of the trees and, on the distance that had to be left among trees when planting. Then, they started to be propagated and planted as groups of specimens. Afterwards, a selection was made from the seeds of the oldest plants so as to obtain floriferous specimens, with reddish, largest and brightest flowers. Specimens with semidouble, peony and anemone flowers started to be seen in these gardens. In the 17th and 18th centuries the trade routes between Europe and the East were frequent. In these travels live camellia plants were brought to the West and then planted in greenhouses, especially specimens of large and double flowers. But Spain and Portugal had started the route to the East in the 16th century.

The Pazo de Santa Cruz de Rivadulla (Vedra, Galicia, NW Spain) has the best documented collection of old camellias in Galicia. The evolution of the camellia collection in this garden can be determined by observing the garden layout. In the late 16th century and early 17th centuries a main walk starting in the west façade of the building was created. There we find four old camellia trees with red single flowers, planted in line and 3 metres apart. The fact that they were planted in rows and bordering the path suggests that in the early 17th century, the camellia was already a known plant.

Keywords: *Camellia japonica*, manor houses, Pazo de Santa Cruz de Rivadulla

Remarkable, monumental and singular camellias of Galicia (NW Spain)

Rodríguez Dacal C.*, Rodríguez García-Garabal M.

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Abstract: The rise of the camellia culture in Galicia (NW Spain) is evident by the number of events held (shows, exhibitions, seminars, tours, visits, and courses) and publications edited (books, journals, brochures and posters) in the last years. All have helped in the promotion and the knowledge of the historic botanic plantations, such as the private plantations of the Galician manor houses, popularly known as Pazos. Camellias were introduced in these historic gardens from the East and constitute a quintessential plant collection, a botanic treasure that gathers all specimens listed in catalogues of remarkable, monumental and singular trees in Galicia. The aim of the present work was to list, identify and describe the ten camellia trees listed in these catalogues, growing at the Pazos of the western Galicia (A Coruña and Pontevedra), with merits and qualities as regards their history, nature and life.

Keywords: historic botanic gardens, ancient camellias

Portuguese *Camellias* from the 19th Century

Andresen-Guedes J.

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Abstract. This work is about Portuguese camellias in the 19th century and the major sources of information about their inventory and origins. According to José Marques Loureiro (1830-1898), the "father of horticulture" in Portugal, the first camellias imported to Porto arrived in 1808-1810. However, they are often represented in decorative arts from the 16th and 17th centuries, such as tiles, carved wood, pottery and Namban Art. The first list of camellias obtained in Porto dates from 1844 and is published in Jornal Portuense, the first horticultural journal in Portugal. Marques Loureiro owned a nursery of international reputation and published his first catalogue of plants in 1865. This year became a landmark in the history of 19th century Portuguese camellias defining two periods: before and after Loureiro's first catalogue. In this catalogue, he makes a clear distinction between Portuguese and foreign camellias. Besides, Marques Loureiro lists 245 camellias he imported from France. Loureiro's catalogue no.9, 1872-1873, is another major source of information continuing the division between Portuguese and foreign camellias, listed in alphabetical order together with a description of each cultivar. This catalogue reflects the growing popularity of camellias. Another major source of information is the monthly publication Jornal de Horticultura Pratica, with many articles and news about camellias between 1870 and 1892.

Keywords: Porto, Jose Marques Loureiro, Jornal de Horticultura Pratica, Jardim Portuense

Old *Camellias*, new ways

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Abstract. The Mata do Bussaco is a classified site in Central Portugal for its rich floristic, historical and cultural heritage. Its collection of old camellias is a very interesting component of the arboretum. The history of the arrival of this collection to Bussaco reveals its origins, both European and Portuguese, the latter to a lesser extent. A main target of the recently established Mata do Bussaco Foundation is environmental education and tourism. In collaboration with the Foundation, we are developing a science-oriented tourism programme based on camellias. The approach is interactive but also allows autonomous discovery. Guided and self-learning walks, quizzes and games and outdoor talks, all about camellias, will take place in spectacular romantic surroundings.

Keywords: *Camellia japonica,* tourism

Camellia x *hortensis* T. Tanaka and the introduction of Chinese species to Japan in olden times

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Abstract. The morphological segregation of the seedlings of the cultivated camellia species suggests that they have a hybrid origin, and are not merely a result of the intra-specific mutation of *Camellia japonica*. There is no longer any doubt that one of the parent species of cultivated camellias is *C. japonica*, not just because of the morphological similarities but also the place of their birth, Japan, and the existence of small brown spots (tanniferous cork warts) on the abaxial surface of the leaves of most camellia cultivars, a character observed exclusively on the leaf of *C. japonica* within the genus *Camellia*. On this basis, I renamed the cultivars of camellias as *Camellia* x *hortensis* T. Tanaka from *C. japonica* in the book "The Concept of the Cultivar" written in 2012 in Japanese. Moreover, I figured the other parent species of the *C. x hortensis* from pictures and books written in the Edo period. It must be a species of the section introduced from China, such as *C.* x *reticulata*, in olden times.

Keywords: *Camellia japonica*

Successful recover of the ancient camellia tree in Wenzhou, China

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Abstract. In recent years, the ancient camellia tree in Mt. Daluoshan (Wenzhou, China) was in very poor conditions due to inappropriate measures of recovery carried out in the past ten years. Most of the trunk above ground and three fifths of the roots have been rotted because of being covered with concrete for a number of years. A program to save it was launched by the local forest department. From June to July 2011, some emergent measures were taken, for instance, pruning some branches and shoots, careful removal of the concrete, cleanup of the rotten bark, wood and root materials and replacement of the wet soil by fresh substrate, injection of a nutrient solution to the healthy side of the trunk. In 2012, an approach grafting in the healthy trunk side was carried out for several times during the spring season, and a root-root grafting in March 2013. After careful operations, the tree was getting better and better and a new shoot was sprouted from the healthy trunk side at height of 80 cm above ground in August 2012. Now, it is very vigorous even suffering from 'one hundred year drought' in the summer season in eastern China.

Keywords: ancient camellia, tree surgery, grafting, recover

Camellias in Namban objects from the 16th and 17th centuries in Spain

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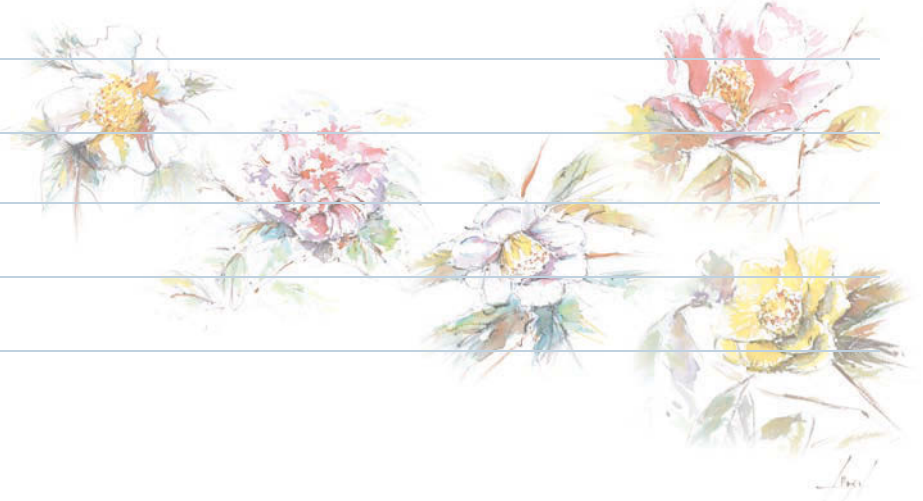
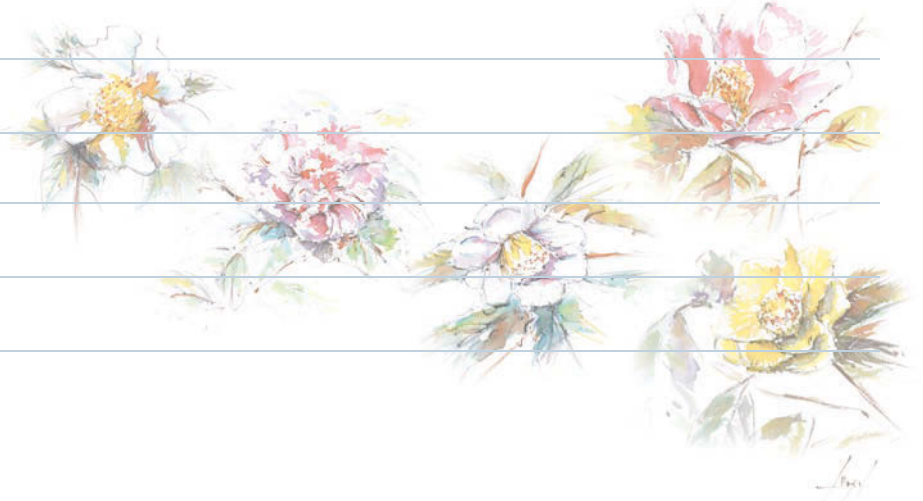
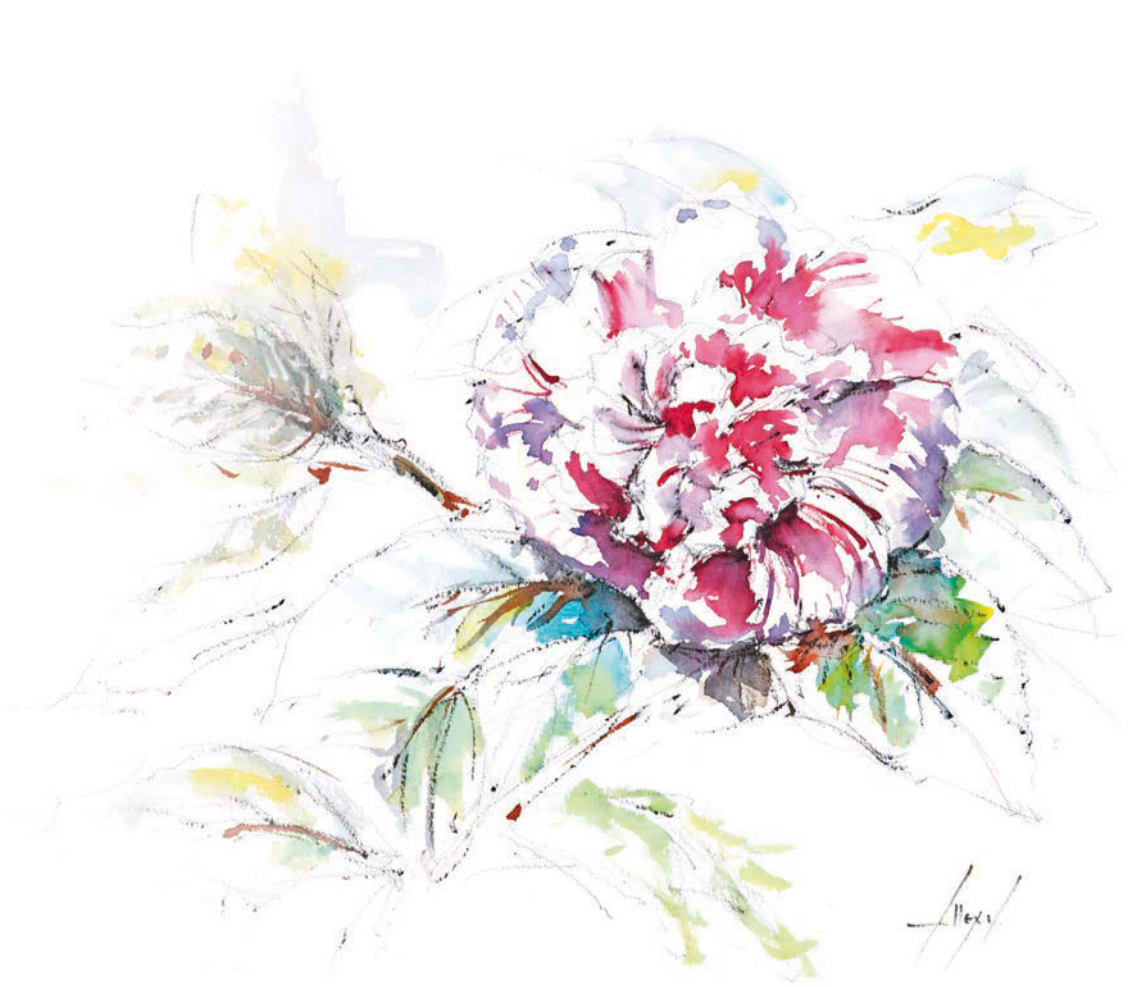
Abstract. Shipping routes discovered by Portuguese and Spanish sailors, in the 15th and 16th centuries, favored freight traffic between East and West. The first traders and missionaries who came to Japan in the first half of the sixteenth century realized the beauty and quality of lacquer ware and began to acquire them, especially those made with the lacquer urushi, obtained from the sap of *Toxicodendron vernicifluum*. Soon, objects and furniture made with oriental techniques began to be sued in Spain and Portugal. Imported centuries ago, there are many objects and furniture made with European characteristics, but with oriental techniques, that are still preserved nowadays. They are part of the so called namban art, a cultural and artistic manifestation that emerged in Japan with the arrival of Portuguese and Spaniards and lasted for almost 100 years (1543-1630s). Namban objects have a dense decoration of plants and flowers of oriental origin, camellias being one of the main ornamental patterns in many of them, as some kept at churches, monasteries, museums and private owners in Spain. Therefore, the first representations of camellias reached Europe, linked to namban art, long before the first camellia drawings could be seen on paper.

Keywords: lacquer *urushi,* furniture, sap







Session B

Gardens and tourism

Development of a touristic route of winter gardens in Galicia (NW Spain) based on the camellias: the Camellia Route

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Abstract. Camellias were introduced in the gardens of the nobility and bourgeoisie of Galicia (NW Spain) in the nineteenth century, being unavailable for the rest of the social strata. However, since the mid-twentieth century, camellias became popular in all the gardens and streets. In this work, a botanical survey was carried out in public and private gardens of Galicia to catalogue the camellias and specimens of other species with botanic, historical and cultural interest, in order to develop a tourist route of winter gardens, the *Camellia* route, making camellias a symbol of cultural identity within the tourism brand Galicia. Results showed that fourteen gardens presented valuable camellia trees of *Camellia japonica*, *C. reticulata* and *C. sasanqua*, and also monumental specimens of other plant species that increase their attractiveness: Pazo Museo Quiñones de León, Parque del Castro, Soutomaior Castle, Pazo de Lourizán, Pazo de Gandarón, La Saleta, Areeiro, Pazo de Quinteiro da Cruz, Pazo de Rubiáns, House-Museum of Rosalía de Castro, Pazo de Oca, Pazo de Santa Cruz de Ribadulla, Pazo de Mariñán, and Alameda de Santiago de Compostela. All but Areeiro and Pazo de Gandarón, which are closed during weekends, have been included in the Camellia route of Galicia.

Keywords: monumental trees, ancient camellias, *Camellia japonica*, *Camellia reticulata*, *Camellia sasanqua*, tourism brand

Importance of the Route of the Camellia as part of the Galician tourist brand

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Abstract. Tourism industry has undergone a dramatic change during the last years. The increasing emergence of new destinations in the market, the wide range of tourist experiences that a traveller can feel and the homogeneity of the destinations are important major factors that impede a destination to be visible in this competitive world. As a result, the need for countries to create a unique identity to differentiate themselves from their competitors is more critical than ever. In this context, Galicia has created 10 new tourist products, called head of brand, with the firm intention to stand out the Galician Tourist offer among the rest of its competitors.

One of these products The Route of the Camellia, a tourist experience unique in Europe, will be part of the Galician brand strategy, since this amazing experience, which lets the visitor know the history of Galicia through beautiful gardens and ancient manors, keeps an emotional appeal that will contribute to enhance the tourist image of the destination.

Keywords: gardens, destination

The camellias as part of the composition of the gardens of the city of Porto

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Abstract. In 2012 the definition and identification of the various typologies of planting camellias were analyzed in twenty four parks and gardens that are part of the existing green structure of the city of Porto. The selected parks and gardens, among the many green spaces in the city of Porto, are considered to be those that best represent the presence and long history of the camellias in the evolution and history of the city, allowing thus to achieve an accurate analysis and evaluation of the fact that Porto is considered the "City of camellias". The selected parks and gardens were part of an extensive study, which pretended to approach different questions in the historical evolution, its functions and its current condition. In view of the fact that the camellias assume an extreme and vital importance in the selected parks and gardens, they were subjected to extensive cartographic and photographic records. Several conclusions were drawn about the various typologies of planting, different uses, as well as the real importance of these elements in the parks and gardens of the city while considered as cultural and natural heritage in the city of Porto.

Keywords: typologies of planting, different uses

Historic Gardens of São Miguel Island in the Azores-Portugal

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Abstract. The first Portuguese sailors reached the Azores in 1427. The economy of the settlers was based on subsistence farming and some products for the export market. From a geo-strategic point of view, the islands were an excellent distributor between American and European markets. From the late eighteenth century the British presence and the establishment of an entrepreneurial spirit, based on reason and science, on appreciation for nature and the 'agrarista' thoughts, produced a generation of gentleman farmers that dictated the development of agriculture and pulled off the construction of magnificent exotic gardens, especially in São Miguel Island.
It is not known exactly when the first camellias arrived to the Azores. All we know is that, since the beginning of the eighteen hundreds, the presence of these exotic plants on estates and private gardens has been documented in travel accounts, namely by Peter Wallace in 1845: "camellias have long been the favourite plant (...) gentlemen have purchased plants of all the named varieties in the English and French nurseries", and by Roxana Dabney in 1859: "The Viscount of Praia has more than 500 varieties of camellias".

Currently there is still a considerable number of ancient camellias growing in gardens, manor estates and parks. It is the goal of this work to point out the historic gardens of São Miguel and their camellia collection as an important attraction for recreation and education within a garden tourism concept.

Keywords: ancient camellias, historic gardens, garden tourism

The *Camellia* collection of the José do Canto Woodland Gardens, in Furnas (São Miguel Island, the Azores, Portugal)

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Abstract. In a notebook belonging to José Jácome Correia, dated 1870, there are listed about 300 camellias varieties planted in the 'rua da quinta' in the gardens of the Palace of Santana (São Miguel island, the Azores, Portugal). This nineteenth-century collection has now almost disappeared. Interestingly, most of the varieties survived in the nearby beautiful José do Canto woodland gardens, situated in Furnas, thanks to the constant work of Maria Josefa Gabriela Jácome Correia Hintze Ribeiro (1920-1983), the owner of the two estates in the mid XX century. Among the varieties known to have come from the Santana garden we can find cultivars of Camellia japonica from different European and American origins such as `Contessa Lavinia Maggi´, `Chandleri Elegans´, `Garafola´, `Honneur d' Amerique´, `Mathotiana Rubra´, `Mutabilis Trasversii´, `Princepessa Aldobrandini´, `Isabelle´, `Rubina´, `Spectabillis Loddiges´, `Pensylvanica´, `Zwethii Vera´ or the Portuguese `Bracarense´ and `Augusto Leal Gouveia Pinto´. On the extensive woodland owned by José do Canto, the plantation of camellias took place between 1858 and 1885. Some of the existing camellias date back from the first years, as showed by documentation. The correct identification of more than 150 old varieties is a challenge that has interested international experts and local scholars. The present owners Henrique and Margarida Oliveira Rodrigues are working on the layout of a camelieto with about 200 specimens of different species and varieties of old Portuguese, European, Japanese, Australian and American cultivars. This work aims to publicize the existing collection and the work involved in their correct identification as well as to explain the plan designed for the new *camelieto* in José do Canto Woodland Gardens.

Keywords: ancient camellias, camellia cultivars; *camelieto*

The garden of Pazo de Rubianes (Vilagarcía de Arousa, Spain)

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Summary. The *pazos* as an integrated part of the historical heritage of Galicia have as a challenge, for the twenty-first century the achievement of its sustainability. We must have the aim to perpetuate and preserve them for future generations. *Pazos* are a symbol of the botanical and architectural heritage that makes up a great attraction for both national and international tourism. Tourism is one of the key activities that may contribute the most to the sustainability of this heritage with reference to the economic, environmental and social aspects.

The Route of the Camellia provides a wide range of botanical, architectural, historical and cultural offer that makes it unique.

Pazo de Rubianes has planned its tourist product strategy on the basis of the main resources of the land: its vineyard and botanical gardens, both with the main attraction of the land as an outstanding feature: the *Camellia*. Its history, botany, pazo, architecture, vineyard and Rías Baixas wine, golf and the camellia world makes this space a great experience for any visitor. The tour guide is essential to guarantee the highest level of satisfaction of the visitor. A rational tourist approach is one of the most compatible activities with this heritage in search of social and economical sustainability. The commitment of this garden with the environment is basic and so it must be perceived. Thus, the visitors to the Pazo de Rubianes stand out for their environmental awareness and conscious contribution to perpetuating this important heritage.

Pazo de Rubianes has a solid commitment with its botanical and architectural heritage and wants this heritage to be shared and known, as the only guarantee so that it is preserved and respected in the future.

Buçaco and Villar d'Allen: A story of the camelliomania in Portugal

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Abstract. For centuries, the genus *Camellia* played an important role as ornamental. In Portugal, the fascination for these plants had its climax in the 19th century, mainly in the Northwest and in the city of Sintra (West of Lisbon), where conditions are particularly favourable for their cultivation. A less known area of camellias is Mata do Bussaco, an arboretum in the central part of the country. This is a collection that dates from this period when camellias were collector's items for the nobles. The Quinta Villar d'Allen, a major camellia centre in Porto, donated in 1884 a collection of different cultivars to Bussaco. In a manuscript list at the estate are the 30 camellias offered then. The names in this list indicate that most of these old cultivars were developed in European nurseries during the 19th century, but some were Portuguese. It is obvious that the camellias received in Bussaco were a first class selection of the material at Villar d'Allen. Historical data reveals that this was a time of major planting in Bussaco and enrichment of ornamental species.

Keywords: *Camellia japonica*, gardens

Opening North-western Portuguese camellia gardens to view

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Abstract. Interpretation tools – guidebooks, sitemaps, signing, etc. – are very important to make gardens come to life for their visitors. Nowhere is their need more clearly felt than in gardens with outstanding camellia collections and/or ancient camellia trees.

The Pre Congress Tour of the 2014 International Camellia Congress, which took place in the Northwest of Portugal, provided a great opportunity to encourage investment in interpretation material on the camellia gardens selected.

Following a systematic survey and some historic research, a set of leaflets were developed, one for each site. This was the first effort of this kind in Portugal. One of the aims was to make the material relevant to both experts and amateurs interested in camellias. All leaflets share the same general structure. The central element is a detailed map suggesting particular routes around the garden for self-guided trails and spotting ancient camellias trees, rarities or other important features.

In addition to its direct effect in attracting vaster audiences to experience, explore and enjoy these particular sites, this work can also have an indirect effect in spreading good site interpretation practices across this region of outstanding camellia heritage. This can naturally lead to more extensive surveys and deeper studies of camellia cultivars in Portuguese gardens.

Our vision for future work is to improve these interpretation materials and spread their usage as much as possible, in order to stimulate visitor interest and involvement in camellia heritage conservation. For this purpose, a top priority is to list the rarest and most endangered camellia cultivars (especially those of Portuguese origin).

The University of Santiago de Compostela Botanic Garden Project (Spain): camellias as the central focus of living collections

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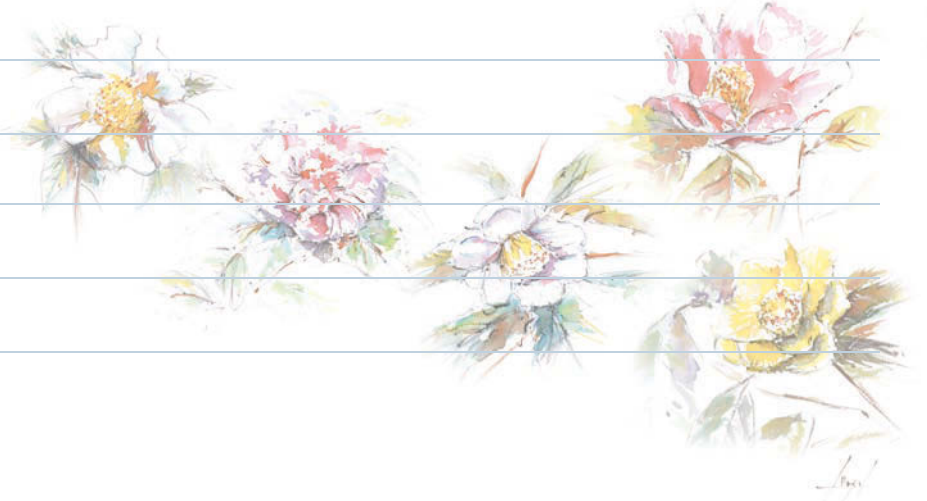
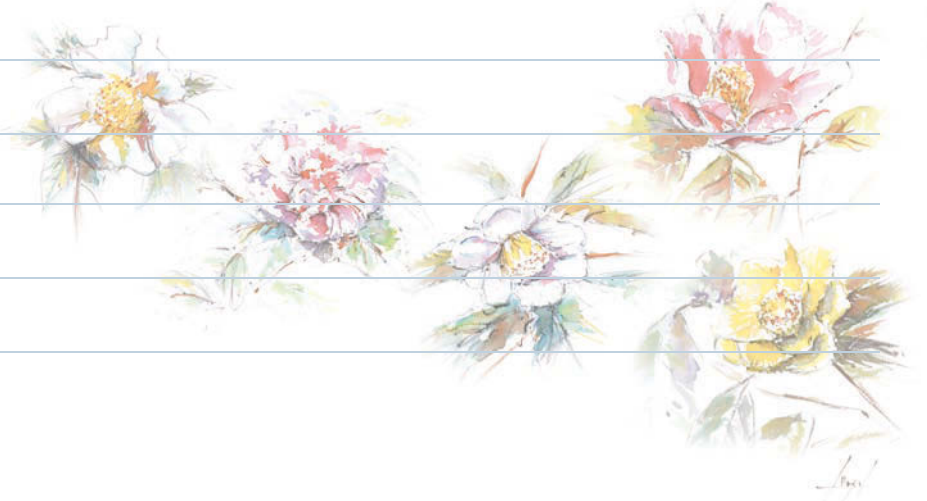
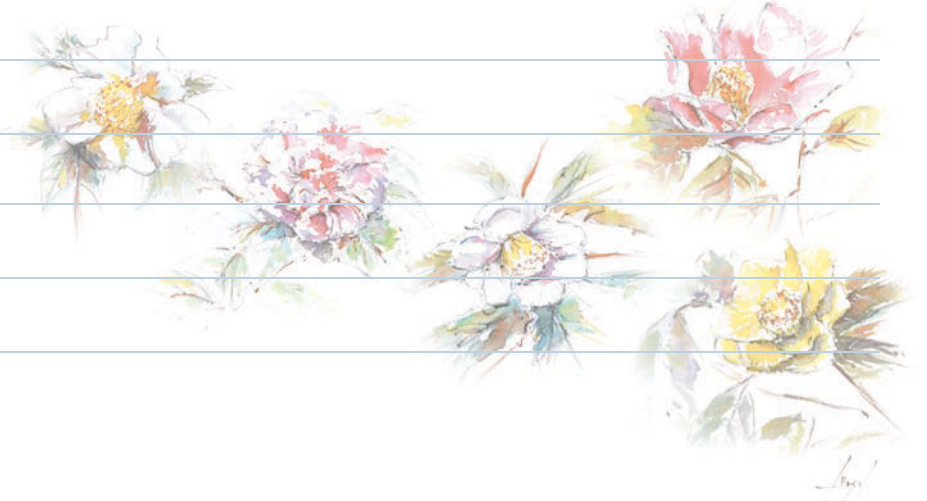
Abstract. University of Santiago de Compostela Garden in Galicia (NW Spain) exists since 1845. The garden was successively located at "Plaza de Galicia", "Pazo de Fonseca" and the "Residencia de Estudiantes". Only a small part of two latest gardens is still preserved in landscaped spaces of Compostela campus. The new Botanic Garden of the University of Santiago de Compostela (BGUSC) is being built. Among its objectives are to promote the conservation of the genus *Camellia*.

Keywords: botanic garden, Santiago de Compostela







Session C

Identification and characterization techniques

A preliminary study on the genetic characteristics of inter-specific hybrids of *Camellia amplexicaulis*

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Abstract: Nine cross-combinations between *Camellia amplexicaulis* and other camellias were done in 2006 and 2007, resulting in 125 hybrids. Eighteen bloomed hybrid plants were selected, on the basis of the beauty of their flowers and their ornamental value, for the study of genetic characteristics. Except for some individual exception, in all hybrids the flower bud density, color, pedicel length and blooming period tended to be similar to those of *C. amplexicaulis*, but the flower form, size and petal quantity tended to their other cross-parents. Leaf color, shape, size and thickness tended to *C. amplexicaulis*, but petiole length tended to other cross-parents. The hybrids presented a fast growth rate, a trait probably inherited from *C. amplexicaulis*. All hybrids showed improved resistance to hot and cold climate compared with their cross-parents. The application prospects of the hybrids are also discussed.

Genus *Camellia*: A review of extant taxonomic systems using the latest morphological and molecular data

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Abstract. Comparisons of the taxonomic systems of Sealy, Chang & Bartholomew, Ming & Bartholomew and of the synopses of Gao et al. and Ho were undertaken. The vegetative and reproductive characters of the member species were considered, although in some cases their details vary from author to author. The problems of species duplication and the publication of new *Camellia* species, where the descriptors of the extant species varied greatly in quality and detail, are also discussed. In this work the latest molecular data was utilised and analyses of sectional and specific divisions were made. Our research highlighted sometimes irreconcilable differences between the five existing taxonomies. Differences between morphologically based and molecularly based data were also evident. The possibility of the creation of a unified taxonomic system for genus *Camellia* is discussed.

Keywords: species, molecular

Current research advances in molecular characterization of ornamental camellias

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Abstract. The flower form is one of the most important ornamental characteristics in DUS (distinctness, uniformity and stability) tests for camellias and for camellia breeders. The human selection of the most aesthetic flowers in camellias dates back to 210 B.C in China. The collections of varieties with diverse floral morphologies provide a useful system to study the genetic regulation of flower forms of perennial woody species. The excessive number of petals of double flowers in cultivated camellias tend to be derived from conversions of floral organs, although the modification of floral meristem determinacy is potentially involved in some varieties regarding an extremely high number of petals. The classic ABC model provides an excellent molecular explanation to predict the formation of double flower from single flower by modification of gene functions. This model proposes a group of genes, categorized into A, B, and C classes, regulating master switch of floral organ identities. In the present work, several MADS-box genes in *Camellia japonica*, corresponding to different ABC functions, were isolated. The gene function was characterized through gene expression profiling and transgenes in model systems. The functional divergence of key regulators between wild and cultivated camellias was also investigated. A genetic engineering approach to overcome the breeding bottleneck in camellias is proposed.

Keywords: camellia, flower form, ABC model, molecular biology, domestication

The computer and the camellia: what computers can do for conservation, knowledge and research on camellias

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Abstract. In 2008, the Camellia Register was published on the web of the University of Pavia (Italy). Despite, at that time, this gathered a lot of objections and doubts, today the webpage of the Register works very well and is reaching 1 million hits. In the last four years the advances of Information and Communication Technology (ICT) have disclosed charming opportunities to the camellia lovers. A first obvious one is to make available the Register (with pictures and additional descriptions of camellias) on the smart phone. Moreover, by a simple software, each Garden of Excellence could link his catalogue to the Register. In this way, a visitor could have a complete information before and during the visit of the garden. Furthermore, all information can easily be geo-referenced. So, the visitor could know how to get to the garden and where historic varieties are located. Also, it is easy to define some kind of forum on the gardens and varieties. Finally, an application can support the identification of a new variety, by displaying the properties to be defined and directly loading pictures. These services can be implemented on social networks such as Facebook or as an App, this latter solution being preferred. The app could be downloaded from the ICS website. Why all this is important? New generations surf on the web, and a club or society must be there, if it wants to survive in the era of Internet.

Crowdsourcing information system for camellia cultivar identification

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Abstract. Reliable identification of camellia cultivars remains a very demanding challenge. The difficulty lies not only in the sheer size of the International Camellia Register (over 20,000 entries), but also in its temporal span: the breeding and naming of new varieties started centuries ago and it is often impossible to trace them based on the rather incomplete text descriptions available, with no pictures associated. New information technologies can help overcome this problem and gradually work towards a comprehensive and reliable cultivar identification system. The strategy proposed here is based on a crowdsourcing information system of camellia specimens. The entries on this system will originate in cultivar identification requests submitted online. The request forms will allow all available, relevant information to be entered, but mandatory fields, which must include, at least, precise location of the specimen and photo of the flower, will be as few as possible. The system will be equipped with a register of cultivar names and will be fed with an initial set of entries pre-identified with absolute certainty. Through cultivar identification quizzes presented online, the system will then gradually collect responses to the requests. Simultaneously, based on their performance in the quizzes, the system will apply metrics to establish the reputation of the respondents and weigh their answers accordingly. This is expected to provide increasingly reliable identification of the system entries. User requests can be answered with a quantifiable degree of certainty according to the number of answers, their agreement and the reputation of each respondent.

Keywords: descriptions, register, cultivar names

Differentiation of camellia specimens with morphological similarities using morphobotanic descriptors and SSR

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Abstract. The first documented camellias arrived in England from China. One of the most popular of these cultivars is *Camellia japonica* 'Pompone' that was introduced in Kew Gardens (UK) in 1810 from China and was disseminated in Europe. In Galicia, there are several camellia specimens that could belong to this cultivar, since its flowers match the description included in the International Camellia Register.

Morphobotanic descriptors showed to be efficient in differentiating among *C. japonica* cultivars. In highly similar cultivars these descriptors need to be complemented with microsatellite molecular markers. In four Galician gardens, 30 plants morphologically similar to the cultivar 'Pompone' were selected and characterized using 30 morphobotanic descriptors of the plant, leaf, flower and fruit and eight SSR markers. Using the morphobotanic descriptors eight groups of plants with common features were differentiated, whereas molecular markers were able to characterize 11 groups.

Keywords: *Camellia japonica*, Pompone, microsatellites

Could some *Camellia* collections be considered as botanical gardens?

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Abstract. According to the Botanical Gardens Conservation International (BCGI) organization, Botanical Gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education. This organization also lists some criteria that may be met in part or whole by any institution to be considered Botanic Garden. Other regional institutions (e.g. Ibero-Macaronesian Association of Botanical Gardens) have their own criteria, which are similar to those of BCGI. In this study, it was examined whether *Camellia* collections could be recognized as Botanical Gardens. These collections fulfil usually some of the proposed criteria, like: i) a reasonable degree of permanence; ii) an underlying scientific basis for the collections; iii) registering of proper documentation of the collections; iii) monitoring of the plants in the collections; iv) adequate labelling of the plants; and v) be open to the public. The possible consideration as Botanical Garden of the *Camellia* collection of the Deputacion de Pontevedra (Provincial Governat of Pontevedra) was also shown.

Keywords: camellieto, cultivars

Presence of *Camellia* species and cultivars in Botanical Gardens worldwide

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Abstract. In this work, the representation of *Camellia* species and cultivars in Botanical Gardens worldwide was studied by using the PlantSearch database of the Botanical Gardens Conservation International (BCGI) organization, which includes the list of living collections submitted to BCGI by Botanic Gardens around the world and the Web Camellia Register. There are 96 *Camellia* species and subspecies and more than 4770 cultivars included in the PlantSearch database. Most cultivars are present in only one botanical garden. *Camellia japonica* 'Debutante', *C. x williamsii* 'Donation', *C. japonica* 'Elegans', *C. sasanqua* 'Setsugekka', *C. japonica* 'Blood of China', *C. sasanqua* 'Yuletide', and *C. x williamsii* 'Debbie' were the most common cultivars, each of them growing in more than 15 botanical gardens. Due to the high number of registers, five letters (a, d, l, j, x) were randomly selected to study the correspondence between both databases. The results showed that only 12% of the species and cultivars included in the Web Camellia Register are included in some Botanical Gardens.

Keywords: databases, cultivars, collections

In vitro culture techniques applied to the propagation of *Camellia reticulata* Lindley

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Abstract. Micropropagation can be successfully applied to rapid clonal propagation of *Camellia*. This would have several advantages over conventional methods: clonal propagation would allow rapid multiplication of selected mother plants and it is independent of season; *in vitro* culture of very small meristems or shoot tips would hopefully rid several high prized existing clones of the viruses with which they are naturally infected; and in the future it would be possible to approach the genetic improvement of existing clones to produce new types of camellia. The improvement of plant quality would make the camellia more generally popular, and the possibility of all-year-round production would make it easier for growers to respond to increased demand. *Camellia* has been regenerated *in vitro* by three methods: induction of adventitious buds, somatic embryogenesis, and development of axillary buds from shoot tips and nodal explants.

Keywords: adventitious buds, axillary shoots, cold storage, micropropagation, somatic embryogenesis

Flower development and gibberellic acid application on flowering of *Camellia rosthoniana* 'Tianshanfen'

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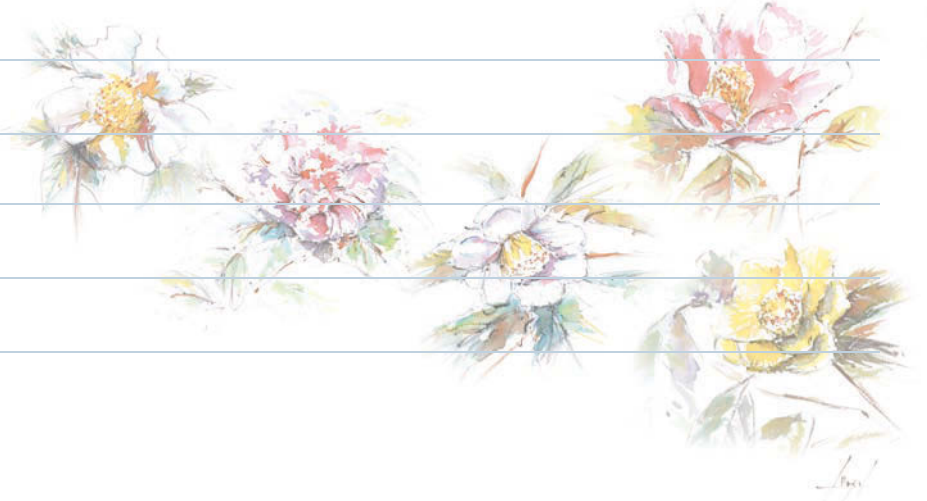
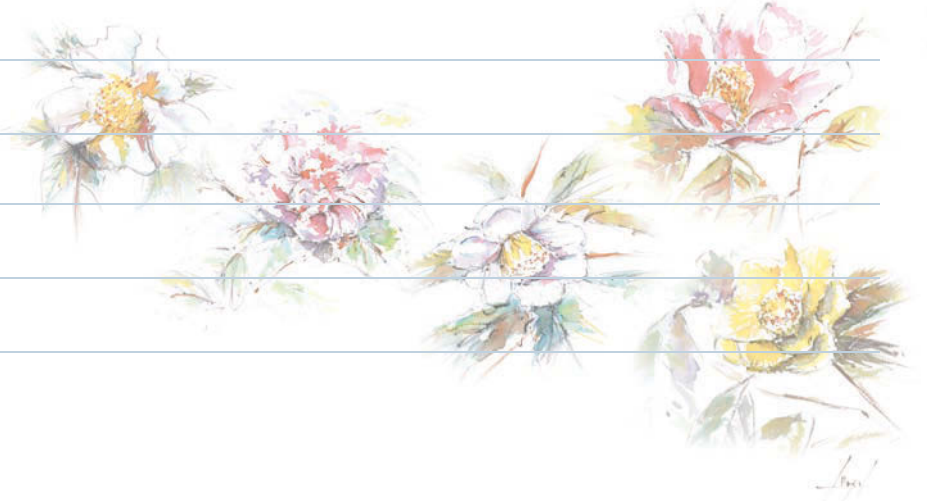
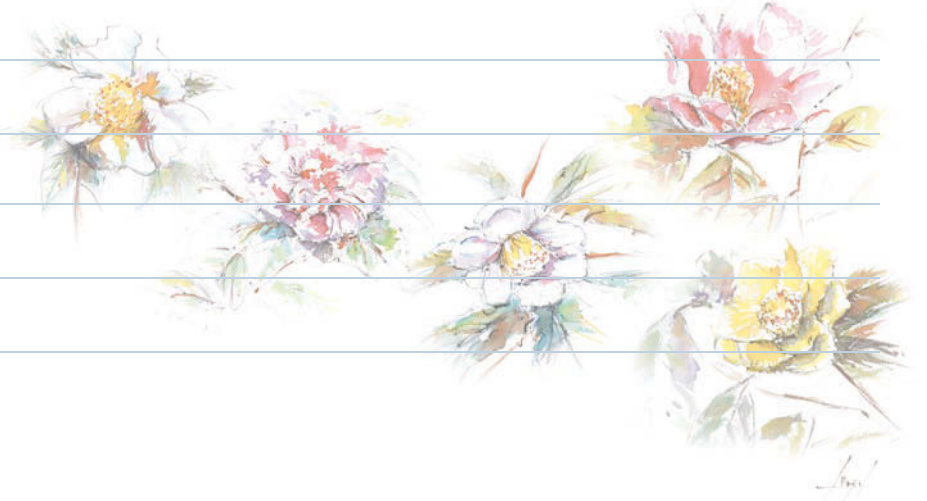
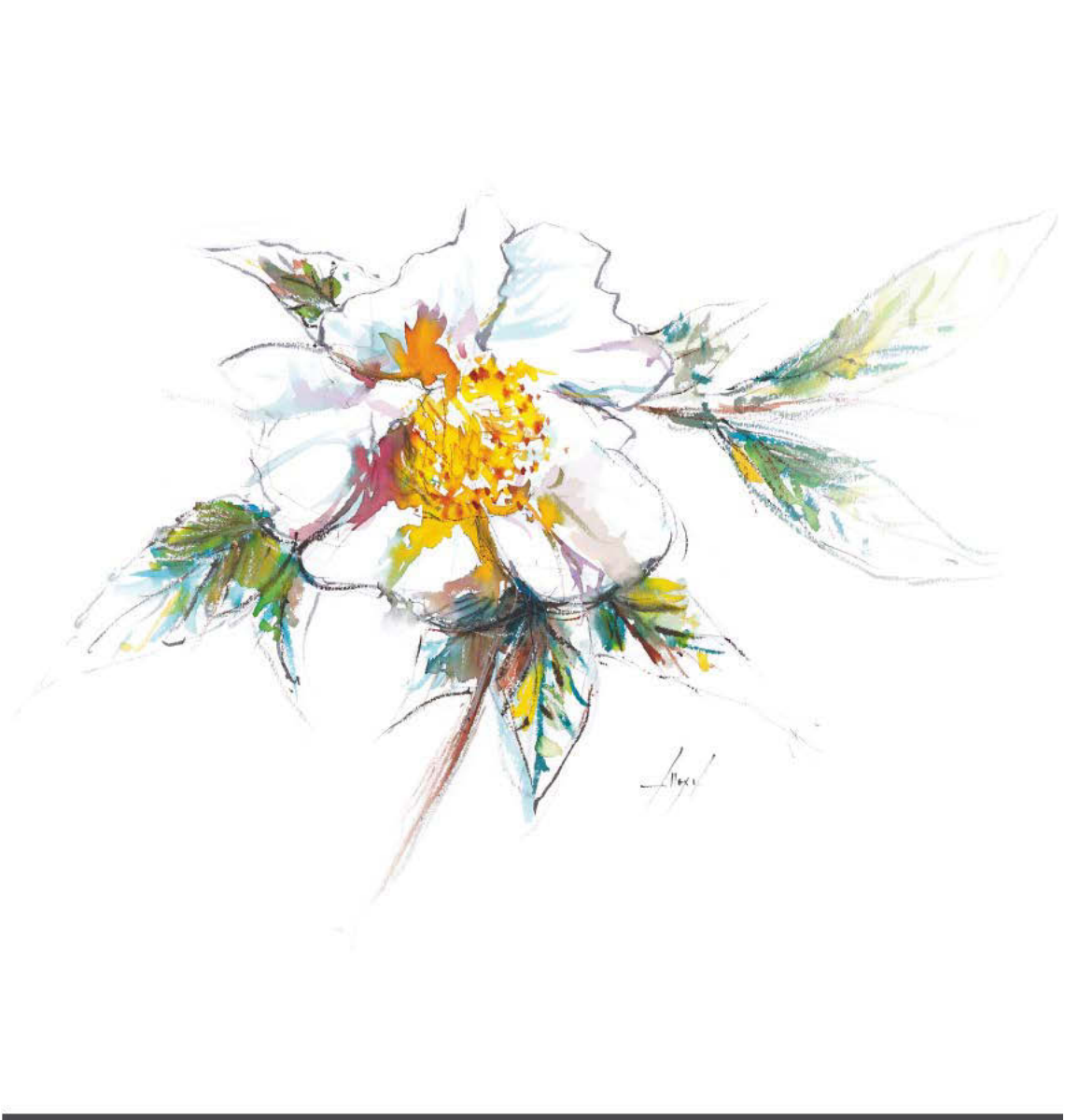
Abstract. *Camellia rosthorniana* Hand.-Mazz., native to China, is an evergreen shrub with many excellent characteristics, such as compact plant type, small and elegant leaves and fragrance. Thus, some natural varieties could be used as landscape plants for their excellent characteristics. Based on its pink, abundant flowers, fragrance, elegant round tree shape and high resistance to diseases, the ornamental variety 'Tianshanfen' was selected from domesticated wild plants of *C. rosthorniana* through seedling selection. China has an ancient custom of purchasing potted flowers during the Chinese Spring Festival which takes place from January to February. 'Tianshanfen' is one of the potential flower species for the Chinese New Year. However, 'Tianshanfen' naturally blooms from late February to late March, thus missing the New Year's Day and Chinese Spring Festival. In order to obtain the right flowering date, researches on flower development and GA3 applying period to 'Tianshanfen' were carried out in this work.









Session D

Pests and diseases

Sanitary status of camellias growing at the urban parks and gardens from the Pazos in Galicia (NW Spain)

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Abstract The aim of the present work is to know the sanitary status of the *Camellia* species, and their hybrids and cultivars, which are widely distributed in parks and historic gardens of Galician Pazos (NW Spain). In a continuing survey in 2013, six Galician Pazos and five urban public parks were sampled. A total of 170 samples were collected from camellia plants. Samples of soil and branches with leaves of the canopy were taken and translated to the diagnostic laboratory. Pure cultures of the fungi isolates were obtained and identified by morphological features in culture media. The identity of the fungal species isolated was confirmed by DNA sequences analysis. Insect species determination was carried out using microscopic preparations. Soil fungi including *Phytophthora* spp. and *Armillaria* spp. and several aerial fungi including species of *Botryosphaeriaceae* family, among others, have been isolated. Different species of arthropod pests, including aphids, Coccoidea species (especially *Chloropulvinaria floccifera* and *Diaspididae*) and mites have also been identified. The results of this study indicate that although the number of genera and species of fungi and arthropods identified is high these have only been isolated in a few specimens of *Camellia* sampled. So we can to conclude that the health status of the camellias in Galicia is good.

Keywords: pathogens, disease, fungi, arthropod, pests

Occurrence of *Botryosphaeriaceae* species associated with *Camellia dieback* in Galicia (NW Spain)

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Abstract. Camellia species, and their hybrids and cultivars, can be found in public parks and historical gardens in Galicia (NW Spain). Several species in the *Botryosphaeriaceae* family are common plant pathogens associated with dieback and cankers of woody plants. The possible influence of these pathogens on sanitary status of *Camellia* has great interest in Galicia. In 2013 samples of declined *Camellia* spp. plants were received in the laboratory of the Estación Fitopatológica de Areeiro. Affected plants showed leaf spots, cankered branches and dieback. Symptomatic samples of leaves and wood tissue from stems and branches were processed and four *Botryosphaeriaceae* species were isolated: *Neofusicoccum parvum, Neofusicoccum luteum*, *Botryosphaeria dothidea* and *Diplodia mutila*. Isolates were identified by morphological characteristics and identity was confirmed by DNA sequences analysis of ITS regions. Pathogenicity tests were conducted by inoculating detached leaves and stems of *Camellia japonica* and *C. sasanqua* with one representative isolate of each *Botryosphaeriaceae* species identified. Plants were incubated at 25 ± 2°C in moist chamber (70-80%) humidity. Seventeen days after foliar inoculation the discoloration that developed was measured. *Botryosphaeriaceae* species were consistently recovered from symptomatic tissues of inoculated leaves but not from the controls. Four months after stem–wound inoculation *Camellia* plants have not yet shown symptoms.

Keywords: pathogens, diseases

Evaluation of *in vitro* parasitisation efficiency, persistence in the soil and biologic control in the field of a commercial product based on *Trichoderma* spp. against sclerotia of *Ciborinia camelliae*

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Abstract. *Ciborinia camelliae* is a fungus widespread in many temperate regions including Italy. The aim of this work was to evaluate the efficiency of Remedier® (a wettable powder formulation containing spores of *Trichoderma asperellum* and *T. gamsii*) against sclerotia of *C. camelliae*. Moreover, the influence of temperature and humidity on the production of apothecia and on the course of the disease was assessed. Finally, studies on the persistence of the product in the soil and on the biological control were conducted. An study carried out *in vitro* showed that all sclerotia inoculated with *Trichoderma* resulted parasitized and no longer viable, indicating that Remedier® works well under laboratory conditions. Data on temperature, humidity, flowering and sclerotia forming-apothecia were collected in Villa Anelli and Parco delle Camelie. The results showed the formation of peaks of disease in conjunction with an increase of humidity of the air. These peaks were anticipated from peaks of maximum in the production of apothecia in the soil, which, in turn, were produced in conjunction with the reduction of the humidity of the air.

Regarding the persistence in the soil and biologic control in the field of Remedier®, two different sites were studied. Boxes containing 100 sclerotia of *C. camelliae* inoculated with Remedier® were arranged in order to investigate the efficiency of the product for biological control in the field. This study is still in progress. In conclusion, the present work contributes to the better understanding of the biologic cycle of *C. camelliae* and of *Trichoderma* spp. as biologic control agent.

Keywords: flower blight, diseases

Biological diversity of resistance to flower blight of *Camellia japonica* caused by *Ciborinia camelliae* in Goto, Japan

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Abstract. Flower blight of yabu-tsubaki (*Camellia japonica*) in the Goto islands is believed to be endemic for many years and a possible cause of the irregularity of seed production. To establish a technical base to stabilize the production of camellia seed for the utilization of camellia oil, yabu-tsubaki trees were selected from a gene bank and Goto City streets and examined for evaluating seed productivity under field conditions where all trees were exposed to natural infection with *Ciborinia camelliae*. Only one tree yielded fruits from more than 50 percent of flower formed among 10 best selections of yabu-tsubakis from the gene bank. In 2012 ten street trees were selected in each of the five sampled areas of Goto City (50 trees).

The results obtained showed disease resistance of different degrees. There was only one tree which produced fruits from more than 50 percent of flowers among 50 street camellia plants examined. 'Tama-no-ura' was highly susceptible to flower blight and produced least fruits.

Keywords: resistance, flower blight, yabu-tsubaki, diseases

Susceptibility trials of different *Camellia* species to *Ciborinia camelliae*

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Abstract. The ascomycota fungi *Ciborinia camelliae* is the causal agent of the disease known as "camellia flower blight" (CFB) that affects the flowers of the genus Camellia. It is regarded as the main phytosanitary problem affecting the camellia flowers and up to date, none of the strategies aimed to control this disease has been effective. During the last two decades, some species and hybrids of the genus *Camellia* seemed to show resistance to CFB. The aim of this work was to determine the susceptibility of the flowers from several *Camellia* species to CFB. In addition, the ability that this fungus has to complete its life cycle in the flowers of these species until sclerotia development has been also studied. Therefore, flowers were artificially infected by spraying with ascospore suspensions, and naturally infected were also collected in the field for further study. Important differences were observed in the susceptibility and ability of *C. camellia* to complete its life cycle among the flowers of the different *Camellia* species. However, *C. camelliae* was capable to initiate an infection in the flowers of all the species studied. All the flowers showed brown spots, from which the fungus was isolated *in vitro* and grown in PDA medium. The flowers of *C. lutchuensis*, *C. longicarpa*, *C. transnokoensis* and *C. yuhsienensis* showed smaller brown spots and the fungus was not capable to complete its life cycle on them. These results justify the need to study the genetic and molecular bases that make it possible that *C. camellia* is unable to complete its life cycle in these species. Results obtained would determine the viability of using these less susceptible species in breeding programs aimed to obtain ornamental *Camellia* cultivars resistant to the disease.

Keywords: camellia flower blight, diseases

Resistance to *Ciborinia camelliae* within interspecific hybrids of *Camellia*

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Abstract. The host-specific fungal pathogen *Ciborinia camelliae* (Kohn) is a significant pest of ornamental *Camellia* and is the causal agent of 'camellia flower blight'. Recent research suggests that natural resistance to *Ciborinia camelliae* exists within *Camellia* species of section Theopsis. This study aimed to determine whether resistance to *Ciborinia camelliae* is conserved within interspecific *Camellia* hybrids that contain a species from section Theopsis within their parentage. A total of 18 hybrids, containing either *C. lutchuensis*, *C. transnokoensis*, *C. fraterna*, *C. forrestii* or *C. grijsii* within their parentage, were selected for resistance screening. Petals were harvested and infected with field-collected fungal ascospores via a spray-inoculation technique. The majority of hybrids developed flower blight, although the speed and intensity of disease development varied. Hybrids containing high genetic dosages of *C. lutchuensis* within their parentage were the most effective at resisting *Ciborinia camelliae* infection. These results suggest that crossing desirable ornamental hybrids to *C. lutchuensis* would be a suitable strategy for increasing natural resistance to *Ciborinia camelliae*.

Keywords: camellia flower blight, *Camellia lutchuensis*

Limiting factors for the biological and chemical control of camellia flower blight

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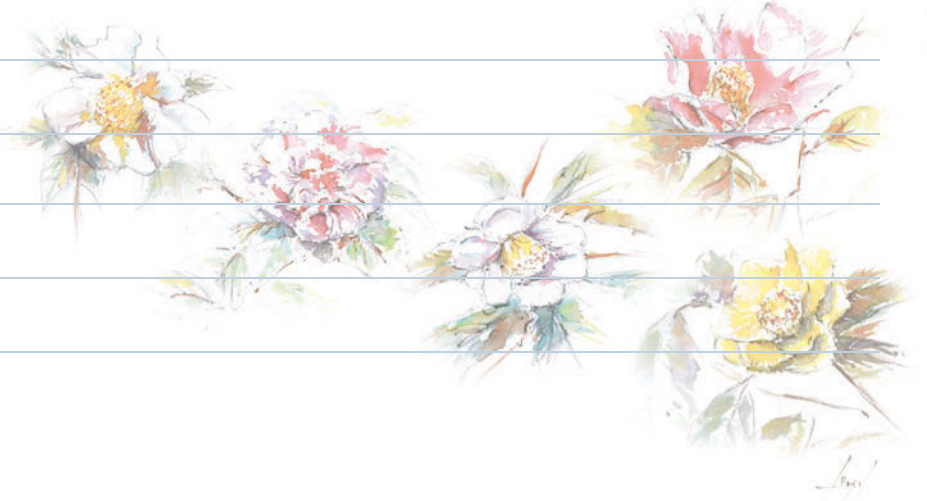
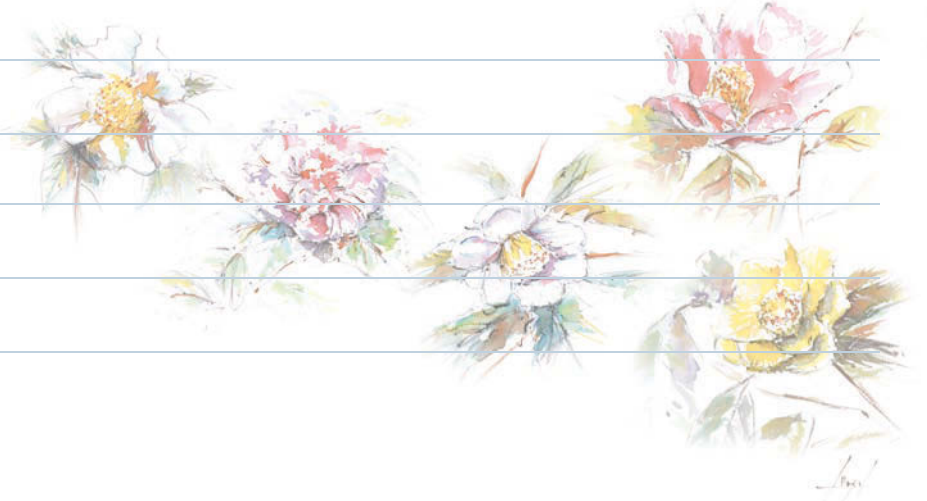
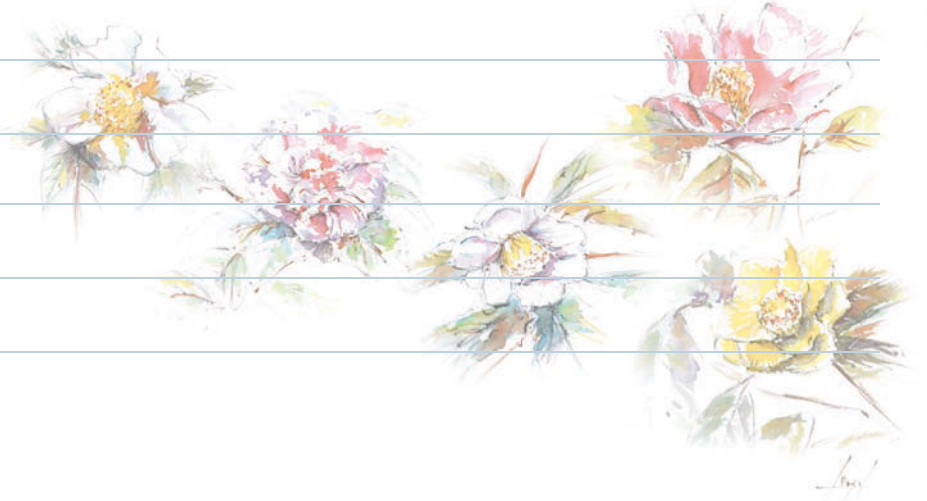
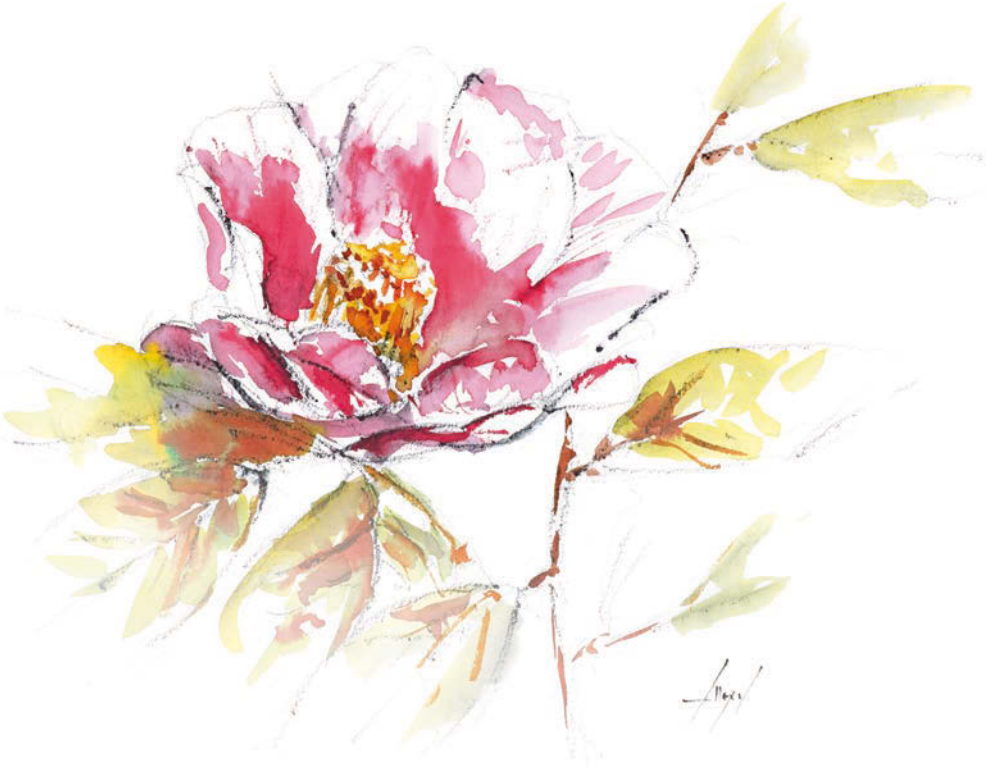
Abstract. The fungus *Ciborinia camelliae* (*Sclerotiniaceae, Ascomycota*) camellia flower blight (CFB), a disease that results in browning and premature drop of flowers of *Camellia* species. It is considered the most important phytosanitary problem affecting camellias. The control of CFB by using chemicals and biological control agents (BCAs) on sclerotia and flowers so far has not proved to be effective. However, in past studies specific tests on their effect on the mycelium and spores of *C. camelliae* were not performed. In the present work different strategies for the control of the disease have been developed, with the aim to interrupt, at some stage, the life cycle of *C. camelliae*. Therefore, chemicals (pyraclostrobin, trifloxystrobin, tebuconazole, carbendazim, ciproconazole, cymoxanil, copper calcium sulphate, captan, azoxystrobin, boscalid, cyprodinil, fludioxonil) and BCAs (*Phanerochaete chrysosporium, Bacillus mojavensis, Coniothyrium minitans* and *Trichoderma atroviride*) were used. Different in vitro tests have been carried out to evaluate the effect of these chemicals and BCAs on spore germination, mycelium growth and viability of fungal sclerotia. At the same time, their effect was also observed in *ex vitro* conditions. Although most fungicides and BCAs were able to control the fungus *in vitro*, there are some factors such as the mobility/persistence of fungicides or the difficulties found by BCAs on the colonization of plant/soil, that influence totally or partially their use for an effective control of the disease.

Keywords: pathogens, diseases, *Ciborinia camelliae,* biologics









Session E

Uses and camellia products

Yield evaluation of tea (*Camellia sinensis*) clones grown in Pontevedra (NW Spain)

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Abstract. Tea yield was evaluated in an experimental plantation of tea (*Camellia sinensis*) established in Pontevedra (NW Spain) in 2009. The plantation consisted in 48 clones produced from seeds in a four-year nursery period. In 2013, new shoots were harvested once a week from early February to early November. For each tea clone, shoots were counted and weighed. Data were used to calculate the annual mean shoot weight, and monthly and annual tea production. The annual mean shoot weight was between 0.27 g (clone EFA99) and 0.60 g (clone EFA10), and the number of shoots per plant between 235 (clone EFA9) and 2,660 (clone EFA3). The annual tea production ranged from near 109 g/plant (clone EFA90) to 1,194 g/plant (clone EFA10). The production of tea was over 600 g for 19 of the 48 clones under study, being higher than 1,100 g for three of them.

Keywords: tea plant, new shoot, sprouting

Variation in oil content in *Camellia japonica* seeds

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Abstract. The seeds of *Camellia* species can be pressed to obtain high quality oils, some of which have been used for years in Asian cultures. Galicia (NW Spain) has a strong and increasing presence in Camellia markets. Today, the bulk of the industry's exports are as young plants for flowering and gardening purposes, but this is gradually increasing to provide a more diverse and value added portfolio, and in this context the production of Camellia oil appears as a new opportunity. In the present work 61 seed samples of *C. japonica* seeds, growing in different locations, were analysed to evaluate the oil content and its density. The results showed that are differences among locations in the seed oil content. The seed oil content is not correlated with the seed weight, but there negatively correlated in a subsample of varieties with the lower values of oil content. These results are relevant to improve the oil production of *C. japonica* considering the location and the seed characteristics.

Camellia oil quality indices from seeds harvested in Pontevedra (NW Spain)

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Abstract. Different types of *Camellia* oil were obtained from seeds collected from different *Camellia* species and *Camellia japonica* cultivars. Oil samples were extracted from camellia seeds by cold-pressed extraction. Standard methods for moisture, density and acid and iodine values were used to analyse the stability of the fresh oils. Peroxide values were obtained photometrically. Even though great differences among oil recovery percentages were observed (2.4-30.4% calculated on a dry weight basis), the study of the physico-chemical parameters showed good agreement of the results between samples. The results obtained confirmed the freshness of the camellia oils analyzed.

Keywords: iodine value, peroxide value, acid value

Variability in seed storage components (protein, oil and fatty acids) in a *Camellia* germplasm collection

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Abstract. Camellia seed oil has been the main culinary oil used throughout the southern provinces of China. In addition to being an important cooking oil, cold pressed Camellia oil is a nutritive cosmeceutical oil that is said to be the ancient beauty secret of the geishas. The aim of this work was to study the chemical composition of seeds from camellias grown in a live *Camellia* germplasm collection maintained at the Estacion Fitopatoloxica de Areeiro, in NW (Spain). Five to ten seeds from each of 22 varieties of *Camellia japonica* and 2 varieties of *Camellia sasanqua* were individually analyzed for protein content, oil content and fatty acid composition of the oil. A wide range of variation for all the characters analysed was found. The protein content (Nx6.25) ranged from 8.11 to 18.26%, with an average content of 11.74%. The oil content (% of dry matter) ranged from 17.9 to 75%, with an average content of 59.95%. The average fatty acid composition of seed oil from the *Camellia* germplasm analyzed was: 8.76% of palmitic acid (C16:0), 2.16% of stearic acid (C18:0), 83.16% of oleic acid (C18:1), 5.51% of linoleic acid (C18:2), 0.13% of linolenic acid (C18:3), 0.02% of arachidic acid (C20:0), and 0.27 of eicosenoic acid (C20:1). A significant positive correlation between oil content and oleic acid content was found, and no correlation between oil and protein content. Results indicate that it is possible to exploit some varieties of *Camellia* spp. as oilseed crop in NW Spain by selecting genotypes with high oil and high oleic acid content in their seeds.

Keywords: *Camellia japonica, Camellia sasanqua*

Bioactive compounds and biological properties of oils from three *Camellia* species

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Abstract. The concentration of polyphenols and antimicrobial and antioxidant properties of oils obtained from seeds of *Camellia japonica, Camellia sasanqua* and *Camellia grijsii*, grown in Pontevedra (NW Spain), were studied. Oils were obtained by cold-pressed extraction. Standard methods for moisture, density and acid and iodine values were used to analyse the stability of the fresh oils. Strains of Klebsiella *pneumonia*, *Salmonella* sp., *Staphylococcus epidermidis* and *Cryptococcus neoformans*, all infectious pathogens in humans, were used to assess the antimicrobial properties of the oils.

The concentration of polyphenols ranged from 0.022 ± 0.006 to 0.039 ± 0.001 mg of gallic acid per g in oils from *C. japonica* and *C. grijsii*, respectively. Concerning the antioxidant activity, determined using the DPPH• scavenging activity and the β-carotene bleaching assay. The highest value was found in *C. grijsii* and the lowest in *C. japonica*.

All the oils showed antimicrobial activity, and exhibited different selectivity and Minimum Inhibitory Concentrations (MIC) for each microorganism under study. The most sensitive was K. *pneumonia*, followed by *Salmonella* sp., *S. epidermidis* and *C. neoformans*, the highest MIC value being found for *C. neoformans*. For all the microorganisms, the higher antimicrobial activity was obtained from the oil of *C. grijsii*, followed by *C. sasanqua* and *C. japonica*.

Since the highest biological properties were found in the oil containing the highest concentration of polyphenols, it can be hypothesised that these bioactive compounds might play a role in those properties.

Keywords: antimicrobial activity, antioxidant activity, phenolic compounds

Cold processed soap with Galician camellia oil

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Abstract. Camellias are widely used in both public and private gardens in Galicia, especially varieties belonging to *Camellia japonica*. Many varieties produce fruits whose seeds are rich in oil. Four years ago the nuns of the Armenteira Monastery, in collaboration with the Estación Fitopatolóxica de Areeiro, both located in Pontevedra, Spain established a line of handmade soap from oil obtained from seeds of camellias grown in Galicia. The manufacturing process is called 'cold process' which maintains the properties of the oil. This method requires a long drying period, so as to maintain the active ingredients of the oil having therapeutic effects on the skin: supply of A, B and E vitamins and antioxidants, improvement in the elasticity and softness of the skin.

The activity of the Cirstercian Nuns of the Armenteira Monastery, apart of following the Rule of Saint Benedicte (a monk who lived in the 6th century) whose motto is *ora et labora* meaning "pray and work"

This activity of the community of Cistercian sisters of the Monastery is among the tasks aimed to follow the Rule of St. Benedict (monk of the sixth century), which encourages prayer and work ("ora et labora").

Assessment of the chemical composition of four varieties of *Camellia sinensis*

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Abstract. The analysis of the chemical composition of several tea samples from plants growing in Galicia and in other regions such as Azores or Turkey shows that it is a plant with high levels of nitrogen and phosphorous and poor in calcium. However, as regards the levels of manganese, copper and zinc differences were observed between the tea samples from Japan and those from other countries.

A detailed study of four local varieties of C. *sinensis* showed that tender leaves are excellent energy accumulators of some macronutrients such as nitrogen, phosphorous and potassium, as well as copper and zinc. However, these young leaves recorded lower levels of calcium and manganese than those of adult leaves.

These differences in the accumulation of nutrients in the diverse parts of the tea plant, --also observed in C. *japonica* plants but not in C. *sasanqua*-- may allow with a simple analysis of the tea sample the determination of the probable origin of the plant, whether it has tender and/or adult leaves, and if minerals essential for human health are present.

Keywords: tea, macronutrients

NMR analysis of the triglyceride composition of cold pressed oil from *Camellia* species

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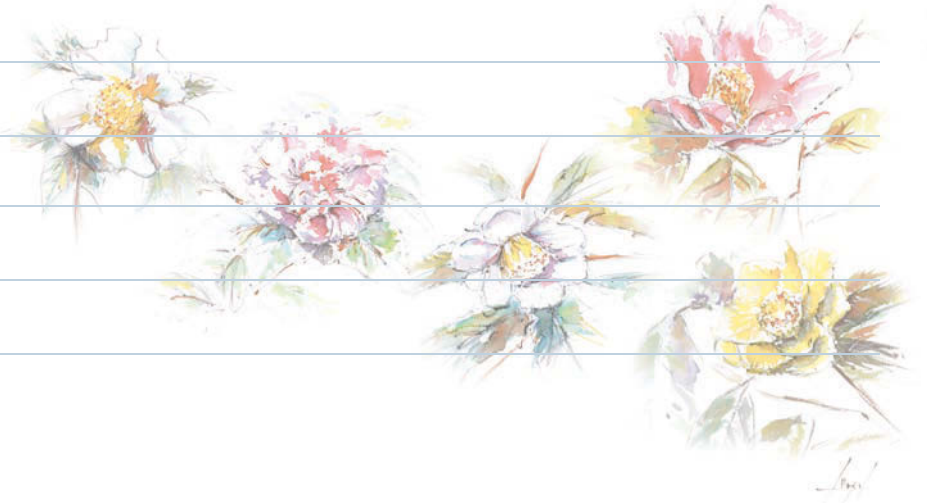
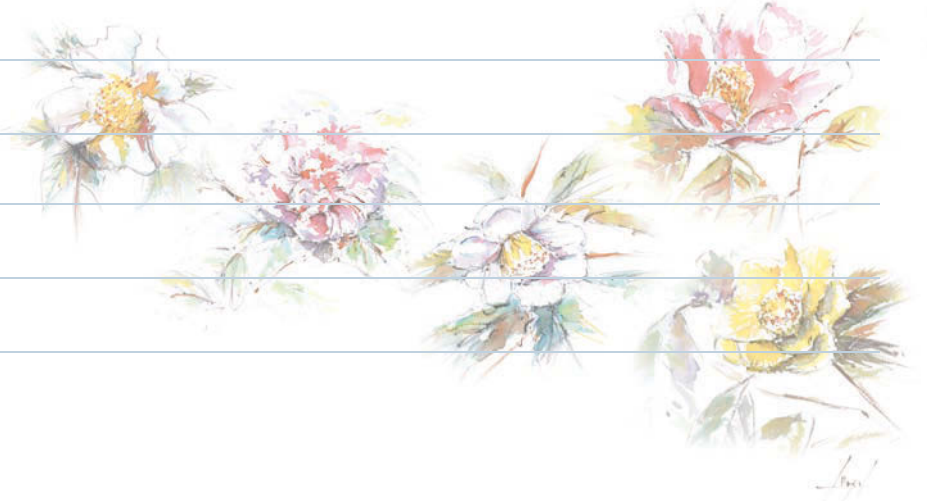
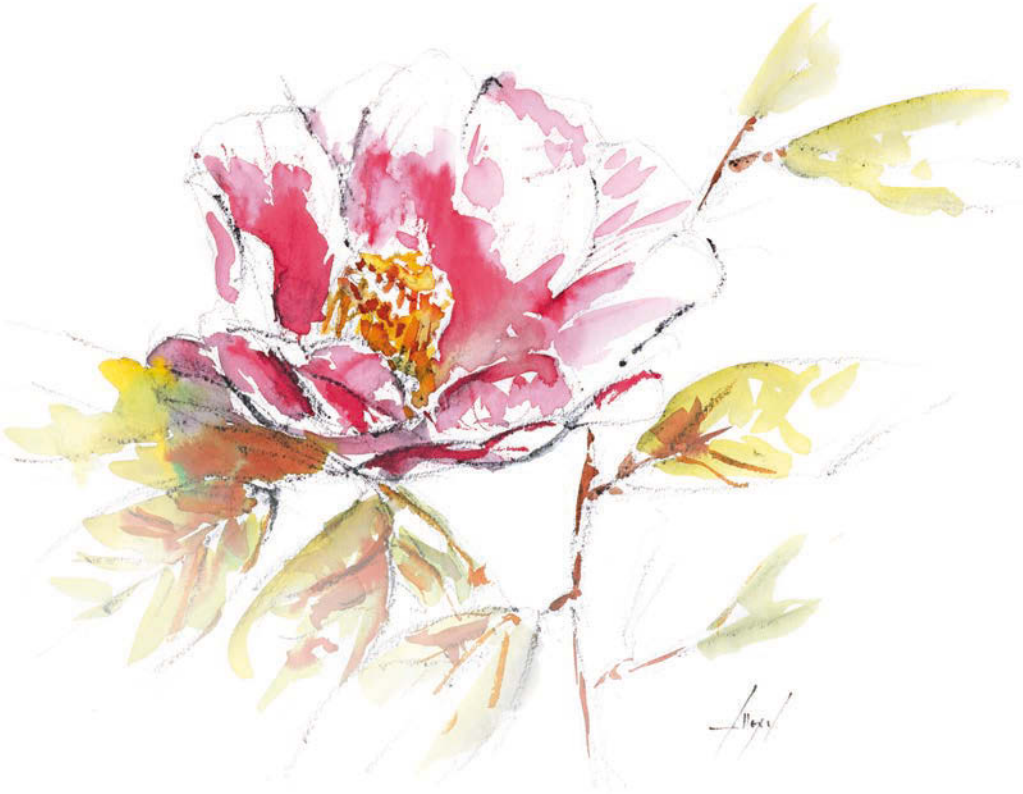
Abstract. Oil from *Camellia* species, mainly *C. oleifera*, is used in cooking and cosmetics in Asia. In western countries, camellias are grown as ornamentals. In NW Spain there are important nurseries producing mostly *C. japonica* cultivars for gardening, but the obtention of camellia oil might add value to the existing production.

The relative composition of the fatty acid components of the triglycerides of oil obtained from seeds of *C. reticulata*, *C. japonica*, *C. reticulata* and *C. oleifera* grown in NW Spain was studied by ^{1}H-NMR. All oils presented very high levels of oleic acid, ranging from 80.7% in *C. japonica* oil to 84.5% in *C. reticulata* oil, indicating they all have a low risk of oxidation. The percentages of saturated fatty acids were low, the highest value being found for *C. sasanqua* oil (11.2%) and the lowest one for *C. oleifera* oil (8.8%).

Keywords: *Camellia japonica, C. reticulata*, *C. reticulata*, *C. oleifera*







Other posters

Portuguese Camellias

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Abstract. A new book dedicated exclusively to Portuguese Camellias from its cradle to the West, their origin and history, the great camellias' passionate creators (from the XIX century to the XXI century), some collections of Portuguese reference camellias and more than 250 photos of old and new Portuguese cultivars.

Keywords: Portuguese camellias, great creators, collections, photos

Galician Camellia Gardens

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Parque do Castro (Vigo, Pontevedra, Spain)

Abstract. Urban park, located on a top, where it can be enjoyed a beautiful view of the city of Vigo, its port and the estuary. First, the Celts at the end of the 1st century and then the Romans settled down in this area. In the Middle Ages the Castillo do Penço was built, and then, several years later it was replaced, between 1656 and 1665 by the Castillo of Santa María do Castro, the Castillo de San Sebastián and the walled area that used to join them.

It is a real botanic garden located in the heart of the city of Vigo. It has several exotic species, of a great size and of an important ornamental value. Walking along the paths, we can contemplate the camellia collection, with specimens such as 'Jane Andresen', 'Angelina Vieira','Pomponia Estriata Portuensis', 'Augusto L. Gouveia Pinto', 'Alba Plena' or 'Incarnata'.

Gardens of the Pazo Quiñones de León (Vigo, Pontevedra, Spain)

Abstract. Popularly known as Pazo de Castrelos, it is one of the main public parks in the city of Vigo. The history of the property had been already documented in the 15th century as an old fortress, but it was restored in the 17th century. In 1924, the Marquis of Alcedo donated the *pazo* to the city of Vigo to create a Museum of regional art. In 1995 it was declared Site of Cultural Interest.

The garden was created at the time of the I Marquis of Alcedo, and comprises three levels: on the top *A rosaleda* (rose garden). In the middle, the French garden which has a box hedge maze. The lower level corresponds to the English garden, also known as *Pradeira do té* (tea meadow). Besides the collection of palms introduced from different countries, we can enjoy the specimens of eucalyptus, *Araucaria*, *Liriodendron*, and pittosporum, always surrounded by camellias. In 1860s the first camellias were planted, introduced from the Portuguese nursery Marques Loureiro. Of these ancient specimens, it is worth to mention the tree popularly known as Camellia Methuselah, a remarkable tree with five strong trunks, more than 8 metres tall and a tree crown of 17 metres in diameter.

Botanic garden of Soutomaior Castle (Soutomaior, Pontevedra, Spain)

Abstract. In Soutomaior, in the Pontevedra province, in the valley of the Verdugo River, we find a medieval castle in perfect condition. Although, its origin dates back to the 12th century, the period of maximum splendour of the castle took place in the 15th century, at the time of Pedro Madruga.

The garden, was started in 1870 by the Marquis de la Vega de Armijo, now belongs to the Deputación de Pontevedra that restored the garden and the buildings, and turned it into a botanic and tourist reference point.

In this hill, orange trees, azaleas, camellias and giant magnolias live in harmony among conifers, oaks and eucalyptus. In an area of 25 hectares, it is worth to mention the Botanic Park of Soutomaior Castle, that was recognized in 2012 as International Camellia Garden of Excellence by the International Camellia Society for its important camellia collection. The first camellias were planted when the garden was created, at the end of the 19th century and now has around 500 specimens belonging to different species and cultivars.

Pazo de Gandarón
(Pontevedra, Spain)

Abstract. The Pazo, located in Salcedo parish in Pontevedra was built by the Archibishop Malvar Pinto at the end of the 18th century, but the garden was created in the second half of the 19th century. The estate, belonging to the Deputación de Pontevedra (Provincial Government of Pontevedra), is since 1928 the headquarters of the Misión Biológica de Galicia, research centre belonging to the Spanish National Research Council. The *pazo* and the gardens were restored between 2005 and 2009.

The conifers are the plants most abundant in the garden, especially the Atlas cedar, the *Araucaria bidwillii*, and some *Cryptomeria* trees. Besides the magnificent specimen of *Magnolia soulangeana*, there are also lime trees, lagerstroemias,palm trees and camellias. The oldest camellias date from the last quarter of the 19th century and among them, it is worth to mention the specimens 'Prince Eugene Napoleon', 'Dama del Pazo', 'Federicci', 'Francesco Ferruccio' and 'Malvar'.

Pazo de Lourizán
(Pontevedra, Spain)

Abstract. Pazo de Lourizán is situated between the towns of Pontevedra and Marín. The modernist-style palace, was designed by the architect Genaro de la Fuente and built in the early 19th century, when the politician Eugenio Montero Ríos was the owner. For years, it was an important forum for the discussion of political affairs and where important decissions for the history of Spain were taken. In the middle of the 20th century the pazo was acquired by the Deputación de Pontevedra (Provincial Government of Pontevedra) and then became a forestry and agricultural research centre, the Centro de Investigación Forestal de Lourizán, still in operation.

The Pazo has 54 hectares, including the gardens, estate and woodland. The estate owns an important botanic garden established in 1949 under the name of Arboreto with both exotic and native species. It is worth to mention the Lebanon cedar, the *Metasequoia glyptostroboides* and the groups of Japanese and Chinese chestnuts. The camellia collection was initiated at the end of the 19th century, with plants from the old Agricultural School of A Caeira and from the Marques Loureiro nursery in Porto, and at present it comprises more than 600 specimens.

Estación Fitopatolóxica de Areeiro (Pontevedra, Spain)

Abstract. The popularly known as Areeiro farm was bought in 1963 by the Deputación de Pontevedra (Provincial Government of Pontevedra), and in 1981 the Estación Fitopatolóxica de Areeiro was created with the aim to assess growers on the sanitary conditions of their crops, evolving until it was turned into a research centre specialized in the diagnosis of pathogens and pests, providing information to individuals and companies on the measures they need to take. Nowadays this centre has sections dedicated to soil analysis, fruit and ornamental sciences.

The small camellia garden has been enlarged along the years with specimens belonging to several genus, among them these included in the camellia collection of the Deputación de Pontevedra, with more than 35 species and around 1,000 cultivars of this genus.

Quinteiro da Cruz
(Ribadumia, Pontevedra, Spain)

Abstract. It is located in O Salnés Valley, in Ribadumia. The manor house constitutes a beautiful example of neoclassic Galician stately architecture. It has two *cruceiros* (stone crosses), the chapel, stone fountains and two hórreos (Galician granary houses), one of them dating from the 18th century. There is also a winery, where they produce Albariño wine, with a barn with stone columns and an antique fireplace, a wine press and farming implements.

The gardens, with a great variety of species both native and exotic, introduced by the current proprietors are surrounded by Albariño vineyards. The camellias are the main protagonists, among the specimens of *C. sasanqua*, *C. nitidissima, C. fluviatilis*, and *C. cuspidata*, stand out a great variety of cultivars belonging to *C. japonica* and *C. reticulata*. Their flowers were awarded with several prizes in several editions of the International Camellia Show.

Pazo da Saleta
(Meis, Pontevedra, Spain)

Abstract. The *pazo* is located in Meis, Pontevedra. It was named after the chapel of the Virgin of la Salette built between 1863 and 1870, by the Colonel Severo Pérez Cardecid from Cambados. This English garden covering five hectares of land, was ordered by Robert Gimson owner from 1968 to 2005, and designed by the landscape architect Brenda Colvin. The current proprietors performed several actions to preserve the garden, but respecting its original appearance. In the forest, oaks, eucalyptus and cork oaks grow surrounding the pigeon house of octagonal ground. In the garden, we find Eastern species such as rhododendrons and

azaleas, Protaceae and Myrtaceae specimens, South American Ericaceae and a great variety of camellias belonging to different species, specially *Camellia reticulata*, which together with *C. sasanqua* and some hybrids offer us their spectacular colours.

Pazo de Oca
(A Estrada, Pontevedra, Spain)

Abstract. Sheltered by the Sacro Peak in A Estrada, on Pontevedra's side of the Ulla Valley it is the most visited baroque Pazo in Galicia. The property, dating from the 15th century, and modified in the 18th century in barroque style, now belongs to the Fundación Casa Ducal de Medinaceli and in 1982 it was declared Site of Cultural Interest.

The indivisible unit of the water, stone and plants, turns this monument into a piece of work of architecture, engineering and gardening. The gardens diagonally crossed by the river are surrounded by several plots bordered with ancient box hedges, where specimens of the Japanese red cedar, the yew tree, the evergreen magnolia, the crape myrtle, the coastal redwood, the sycamore, the cherry laurel and a great mass of ancient camellias that shelter walks grow. The avenue of lime trees, also known as 'Carreira do Conde' and the box walks on both riversides are also worth to mention. In the garden, behind the church grows the remarkable specimen of *Camellia reticulata* 'Captain Rawes', regarded as the oldest in Europe.

Pazo de Rubianes
(Vilagarcía de Arousa, Pontevedra, Spain)

Abstract. The legend "Caamaño avante con la cruz delante" (Caamaño, go ahead with the cross always before you) opens the door of this 18th century manor house, proof of the old condition of fort-house. A fisherman district developed around the family García Caamaño, which later became the town of Vilagarcía de Arousa.

It has 68 hectares of land that cover three distinctive areas: garden, orchard-garden, forest, vineyard, a cork oak forest and a golf course, surrounding a perfectly preserved manor house.

Among the more than one hundred botanic species, we can mention the specimens of *Eucalyptus globulus* and *E. piperita*, the magnolias, the oldest camphor tree in Spain, the *Araucaria* and the cryptomerias. The first specimens of camellia, that date back to the 19th century are part of a large collection, whose flowers were awarded in several international camellia shows.

Casa Museo Rosalía de Castro
(Padrón, A Coruña, Spain)

Abstract. In Padrón (A Coruña) we find the "Casa da Matanza", where the famous Galician poetess Rosalía de Castro lived. In 1947 the Patronato Rosalía de Castro was created and the building was restored and turned it into a museum dedicated to her memory.

It is a space with typical elements of the Galician house, such as the grapevine trellis, the stone tables, the winery, and the well. This garden has charming corners that take us to past times, where next to the famous fig tree that inspired Rosalía, other species such as the ombu, the *Erythrina crista-galli*, the olive tree and a descendant

of the oak of Guernica grow. The camellia collection was recently enlarged, and new specimens were planted in new areas of thew garden. We can enjoy some old camellia cultivars such as 'Maria Irene', 'Pomponia Portuense', 'Magnolia Rosea' and specially the cultivar 'Rosalia de Castro', originated in the nursery Moreira da Silva in Porto and named after the poetess.

Pazo de Santa Cruz de Rivadulla (Vedra, A Coruña, Spain)

Abstract. On A Coruña's side of the Ulla River, stands this magnificent manor house built in the 16th century. In 1981 this property was declared Site of Cultural Interest. This space is regarded as one of the most important botanic examples in Galicia, due to its garden, landscape and plant value. The property has an important tree collection with boxes, giant magnolias, the Australian fern, the Japanese cedar, the tulip poplars, the ombu, the columnar English oak, the Mexican Washingtonia, and specially the olive walks, and an orange tree that is an old remain of the citrus plantation that used to be in the estate. The camellia, growing here since the 18th century is found creating paths and it is the protagonist of the garden, giving colour to all the garden areas.

Alameda de Santiago de Compostela (Santiago de Compostela, A Coruña, Spain)

Abstract. It is the most important public park in Santiago de Compostela and it is located halfway between the University Campus and the old town. In 1546 the Count of Altamira donated an agricultural area to be used and enjoyed by the people of Compostela. This area is made up of three distinctive areas: Santa Susana Oak

Grove, with more than 300 oaks being more than one hundred years old; the Ferradura Walk, where we can enjoy an excellent panorama of the old town and the Cathedral framed by oak and elm tree branches; and the Alameda Walk. It has a large number of exotic species, of a great botanic interest such as eucalyptus, the *Abies nordmanniana* specimen, the elms, the horse-chestnut, and the silver lime growing at the Campo da Estrela. The camellia is well-represented in this garden, with a total of 66 specimens.

Pazo de Mariñán
(Bergondo, A Coruña, Spain)

Abstract. The Pazo de Mariñán is immersed in As Mariñas de Betanzos, in the Brigantium Estuary. Its origin dates back to the middle of the 15th century. In 1972 it was declared Historic-artistic and Monumental Grouping for its architecture, with beautiful stairs and balustrades, sculptures, fountains and gardens.

The main garden, where we find important plant monuments such as eucalyptus, myrtles, palm trees, black poplars or yews, is divided in two parts that extend around the geometric garden, which comprises a net of internal perpendicular walks bordered by box hedges. It has a wide camellia collection, of which stand out the groups of camellias arranged in groups 8+1.

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