

Congress News

#4 WEDNESDAY 24 JULY



Sponsorship



GOBIERNO DE ESPAÑA

MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES



Edited by



REAL JARDÍN BOTÁNICO



SOCIEDAD BOTÁNICA ESPAÑOLA

DIVERSITY, EQUITY & INCLUSION

Three values towards which botany of the 21st century is heading



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Since the organizing team began preparing for the IBC, there has been a commitment to make incremental progress towards Diversity, Equity & Inclusion (DEI) in science. Science is no exception compared to other sectors of society in that more efforts are needed to achieve these goals.

For the selection of speakers in symposia, organizers were explicitly asked to consider gender, geographic origin, ethnic or cultural groups, as well as state of career, in addition to the topic of the abstract, its fit with the symposia, and its scientific quality. In addition, for the invited talks (plenary, keynote, public), 15 are by women

and 14 are by men, so that gender balance was taken into account in the difficult task of selecting only 29 scientists from thousands of potential excellent candidates from around the world.

The topics of some of the talks also helped to address some of these DEI issues. For example, some talks addressed

issues such as the representation and contribution of women in botany.

International face-to-face conferences are ideal opportunities for researchers from developing countries, especially early career researchers, to jump-start their careers by learning from interaction, [Continued on page 2]



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The heartbeat of the Congress

In the middle of the Congress, participation has increased in each of the sessions, generating debates and exchange of opinions between speakers and participants. The area where the physical posters are displayed and the stands, located on the way to the plenary room, are a coming and going of hundreds of people. This brings to life the comment made by the president of the Organizing Committee, Gonzalo Nieto Feliner, at the opening ceremony about the value of networking and interactions, face-to-face conversation, knowledge sharing, and personal relationships. With the coffee breaks and hallway talks as another opportunity for discussion. And, there is still a way to go in the next three days before reaching the closing ceremony. Congress is beating strong.

TODAY'S LECTURES

08:30 - 09:30
KEYNOTE LECTURES
Tanja Slotte
Steven D. Johnson
Keping Ma

09:30 - 10:25
PLENARY LECTURE
Pamela S. Soltis

[Abstracts on page 4]



XX IBC DINNER

- 🕒 20:00 h
- 📍 FINCA LA ALQUERÍA
Highway A-5, Km 12,8 Madrid
- 🚗 18:45 h Plaza de Colón
(North side by calle de Goya)
- 19:00 h Paseo de la Castellana, 214
(c. 200 m south of Plaza Castilla on the east side of the street)
- 19:15 h IFEMA
(Access Puerta Sur)
- 🚗 22:00 h After Congress dinner



DIVERSITY & EQUITY & INCLUSION

[...Comes from the front page]

broadening their perspectives, receiving informed feedback on their ideas, and learning new methodological approaches to address their basic and applied research questions. The opening presentation by Sandra Knapp was particularly illustrative of how international collaboration and partnership between countries can be achieved.

#BotanyIsNotDead it is one of the mottos that 'Jóvenes por la Botánica Española' has been exhibiting for two years, which was established in association with a cardinal objective: to connect youth and botany, including mycology, with the purpose of promoting and promoting botanical study and research among young people between 18 and 40 years old, promote training and become a citizen science channel to inform and guide students and botany fans. Currently there are more than 300 people who make up JxBE, in its acronym, of which approximately a hundred serve as volunteers in this IBC2024.

This Congress has also given space to the LGTBQIA+ community, with the inclusion of some workshops like 'Queerness in science', for discussion on terminology about sex and gender in botany or where queer theory intersects with science and nature writing, and 'Pride Botany', to support and empower LGTBQIA+ people in Botany.

By engaging underrepresented groups, fostering an environment where diverse voices are heard, and addressing systemic barriers, the IBC2024 is making great progress toward a more equitable and improved field.

The objective of this IBC2024 is to promote spaces for debate and dialogue where diverse voices are heard, all social sensitivities are represented and all types of ideological barriers are eliminated to achieve, also in the field of science and botany, a more diverse society, equal and inclusive.



People from all over the world attending IBC2024.



A representation of 'Jóvenes por la Botánica Española' (Young People for Spanish Botany).

DAVID GARCÍA HERRÁEZ

THE PULSE OF THE PLENARY ROOM | Phylogeny reveals new insights into the historical and geographical evolution of plants

MICHAEL DONOGHUE

Plant geography in the light of phylogenetic evidence

Michael Donoghue's research career spans multiple institutions, including Professorships at Yale and Harvard Universities, Director at the Yale Peabody Museum of Natural History Botanical Gardens and Harvard Herbaria (and even a "tentative career" as a banjo player...). But he is best known for his studies on phylogenetic relationships inference at various scales, aiming to understanding evolution and ecology using phylogenetic information. In yesterday's plenary lecture, Prof. Donoghue presented the audience with historical and ecological approaches to plant biogeography. For plants, it is easier to move (disperse across continents) than to evolve (adapt to new challenging environments). Prof. Donoghue discussed how these special features have conditioned the expansion of plants, addressing classical hypotheses such as the tropical niche conservatism (diversity is higher in the tropics than in temperate latitudes due longer time of diversification (origins in tropical latitudes) and the difficulty to evolve tolerance to cold environments, i.e., freezing). He also presented a novel study in the model clade *Viburnum*, in which physiological information is used to model "biome repertoire" evolution, the possibility for a plant clade to colonize a biome that is outside their environmental tolerances.



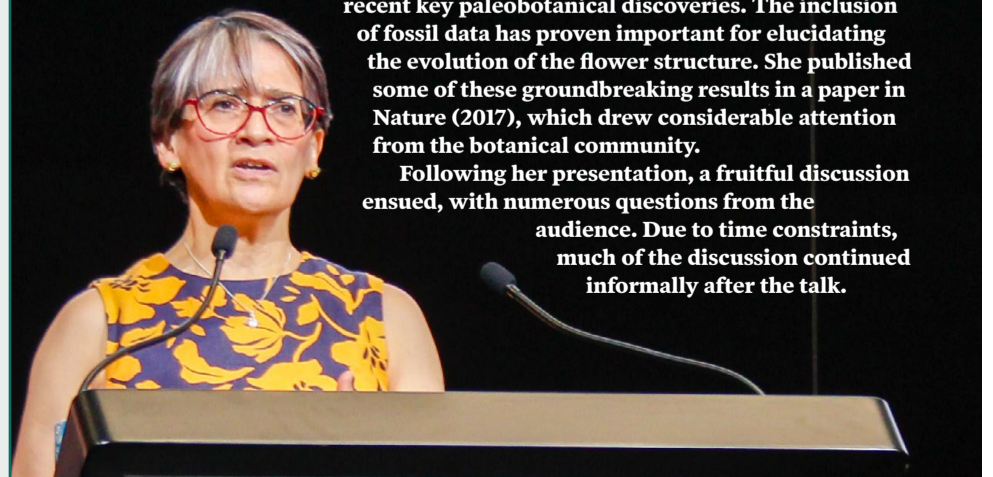
SUSANA MAGALLÓN

The morphospace of the ancient flowers

The plenary room was already full early in the day. Professor Susana Magallón, from the National Autonomous University of Mexico, offered a fascinating talk on the reconstruction of the morphological and anatomical "groundplan" of the ancestral flowering plant. She reconstructed the morphospace defined by several continuous variables and identified different related phenotypes. Her results highlight the wide range of flower architecture in these ancestral plants, as opposed to a more specialized flower design in the current taxa.

Her research has been crucial in understanding angiosperm evolution, integrating molecular data from existing species with morphological data from the fossil record of extant plants, and incorporating recent key paleobotanical discoveries. The inclusion of fossil data has proven important for elucidating the evolution of the flower structure. She published some of these groundbreaking results in a paper in *Nature* (2017), which drew considerable attention from the botanical community.

Following her presentation, a fruitful discussion ensued, with numerous questions from the audience. Due to time constraints, much of the discussion continued informally after the talk.



WELCOME TO MADRID

GREEN, CULTURED AND FUN CITY

Many parks and large green areas highlight the spectacular historical and artistic heritage of a city that celebrates the joy of living

Located in the heart of Spain, Madrid is the most populated city in the country and its capital since 1561. True to its history and committed to the present, Madrid is a welcoming and diverse city which offers a unique mixture of tradition and innovation.

From Prado Museum and the 'literary quarter' (*Barrio de las letras*) to *Puerta del Sol* square and the Royal Palace, to walk through Madrid is to follow in the footsteps of kings and queens, painters, poets and scientists. The city also comes alive with a vibrant offer of music, theaters and musicals, as well as bars and restaurants where enjoying tapas and traditional gastronomy is a must. Without forgetting the football heritage: the magnificent Atlético de Madrid stadium and

the *Santiago Bernabéu*, the spectacular Real Madrid Stadium recently renovated, one of the most visited places by Spanish and foreign tourists.

In addition, Madrid has a rich heritage of charming historical gardens and an increasing quantity of parks which add up to more than 6,000 ha of green areas and almost 2 million trees. The city possesses large 'green lungs', such as Casa de Campo and El Retiro, but also takes pride on being one of the cities with most tree-lined streets in the world. Furthermore, in the last years Madrid has developed an ambitious urban planning focused on green infrastructure and biodiversity, conscious of the current challenges posed by climate change, wild-life conservation and life quality in big cities.



Bar terrace in the *Plaza Mayor*. © DAVID GARCÍA HERRÁEZ

Landscape of light

Being one of the sunniest locations in Europe, with almost 3000 sun hours per year, if something characterizes the city of Madrid, it is precisely its light.

In 2021, 'Paseo del Prado and Buen Retiro, Landscape of Arts and Sciences', located in the true heart of the city, was declared a UNESCO World Heritage Site. It is one of the 49 sites in Spain on the UNESCO list, which includes more than 1,100 sites worldwide. Now known as Landscape of Light, it comprises the Retiro Park, the Royal Botanical Gardens and the Paseo del Prado, where several museums and cultural venues are present. This singular urban space has combined culture and nature since the 16th century, becoming a very precious part of the city, for both its citizens and visitors who come from many parts of the globe.

Paseo del Prado, the first of Europe's tree-lined promenades, The Retiro Park and the Royal Botanical Gardens represent magnificent green areas inside this singular space where nature, art and science coexist.



Retiro Park. © DAVID GARCÍA HERRÁEZ



Royal Botanical Garden. © ANTONELLO DELLANOTTE



The Prado Museum. © MADRID DESTINO



CASA DE CAMPO

Originally created by King Philip II, *Casa de Campo* is nowadays the largest public park in Madrid. Its more than 1,700 ha include a large forest area dominated by holm oak and stone pine, a lake of more than 80,000 m², Madrid's Amusement Park, Madrid's Zoo Aquarium, *Madrid Arena* pavilion, a public swimming pool, and a cable car connecting with *Parque del Oeste*. It is a favorite for outdoor sports, birdwatching and picnics.

◀ Lago ▶ Puerta del Ángel ▶ Batán



MADRID RÍO

Created between 2007 and 2011, this extensive park runs parallel to the Manzanares River. The design was part of a project to hide the road that used to cross the city and to recover biodiversity on the riverside. The area includes green spaces, monuments and bridges, walkways and sports areas. Visitors can even enjoy a shopping and beer day at *Príncipe Pío* Centre or a theatre show at *Matadero Madrid* cultural hub.

◀ Pirámides ▶ Marqués de Vadillo ▶ Legazpi



JARDINES DE SABATINI

This neoclassical garden, open daily to visitors, was created in the 1930s and is situated north of the Royal Palace of Madrid, where the old stables once stood. With its geometric design, multiple fountains, and marble sculptures, it is considered one of the most beautiful gardens in the area known as 'Habsburg Madrid' (*Madrid de los Austrias*). It is a perfect place to enjoy the breathtaking sunsets, after exploring Madrid's historic city centre.

◀ Plaza de España ▶ Ópera ▶ Banco de España



PARQUE DEL OESTE

Parque del Oeste was created in 1906 and rebuilt after the Spanish Civil War. Covering nearly 100 hectares, it features beautiful English-style gardens with natural lines, deep slopes, and a 600-meter artificial stream. Highlights include the cable car connecting to *Casa de Campo*, the 2nd century BC Egyptian Temple of Debod, and the 15000 square meters rose garden that welcomes the "International Contest of New Roses of the Villa de Madrid" since 1956.

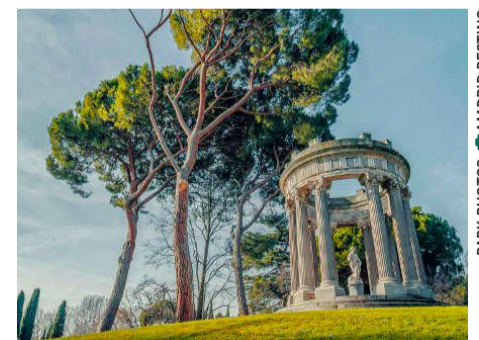
◀ Plaza de España ▶ Ventura Rodríguez



PARQUE JUAN CARLOS I

Less than 10 minutes from IFEMA, you will find *Parque Juan Carlos I*. Inaugurated in 1992 to celebrate "Madrid European Capital of Culture", it is a large park with more than 160 hectares distributed among sports areas, gardens, lakes, and art sculptures. Thanks to this park's creation, a centenary olive grove with more than 2800 trees has been restored. You can visit it by walking or using the free bicycle loan inside the park facilities.

◀ Feria de Madrid



EL CAPRICHIO

Parque del Capricho, open weekends and holidays, is a beautiful yet lesser-known Madrid gem. Built between 1787 and 1839 for the Dukes of Osuna, it features French, English, and Italian garden styles. It is a great and refreshing place to walk in the summertime, surrounded by lilacs and "Judas trees". Enjoy the rich array of historic and artistic elements, such as fountains, temples, and the palace, or visit its unique Civil War bunker.

◀ El Capricho

PARK PHOTOS © MADRID DESTINO



Group photo of those registered for the IV annual SEBOT symposium held in León (2023).

THE YOUNG SPANISH BOTANICAL SOCIETY

National botanical societies began to be established in Europe, America, and Asia during the 19th century, and over the course of that century or the next, almost every country had its own scientific society dedicated to plants. In Spain, with little tradition of associationism, this process did not occur until much later, and moreover fragmentarily with the creation of societies focused on different botanical specialisations: from the pioneering Spanish Palynologists Association (1978) to the recent Ethnobiology Society (2021), societies of Bryology (1989), Geobotany (1989), Ibero-Macaronesian Herbaria (1992), Aerobiology (1995), and Plant Conservation Biology (2003) emerged. Finally, in 2019, the Spanish Botanical Society (SEBOT) was established, adopting the legal form of a federation of botanical societies, being currently constituted by the seven largest associations in the country in the plant area.



SEBOT excursion to the Natural Park of the Sierras de Segura and Cazorla.

SEBOT was founded with the mission to “unite the interests of the various scientific associations in the field of Botany and to promote the progress and dissemination of botanical science and culture and its applications.” More specifically, its objectives aimed to combat plant blindness and speak with a single voice on those issues and social debates where it is appropriate to intervene on behalf of plant diversity and scientific knowledge. In these few years, SEBOT has grown to almost a thousand members, mainly coming from the university staff, research centers, technical departments of the administration, but also students and botany enthusiasts. At the same time, SEBOT has established an agreement with the association *Jóvenes por la Botánica Española* (Youth for Spanish Botany, 300 members) to collaborate on activities promoting botany among young people.

Its founding congress brought together 300 botanists from all over the country in 2021, a significant milestone since it was held in a hybrid format right after the pandemic, thus highlighting the interest sparked by the idea of an association that would bring together all Spanish botanists and a meeting that would convene them periodically. Its activities include holding of an annual symposium, during an autumn weekend, on a topic of major current botanical interest (e.g. phylogenomics, biology of mountain plants, herbariomics, hybridization and polyploidization), especially focused on young researchers. Likewise, the annual excursion to explore the flora of a unique area of the country is very well received. SEBOT's internal functioning focuses on its working groups, which address areas not specifically covered by the federated scientific societies themselves: systematics and evolution, outreach, alien flora, chorology, international relations, or the recently formed gender equality and pteridology groups.

The event with the greatest external projection is the leadership of the Spanish Flora Biomathon, through the iNaturalist app, by far the largest citizen science event focused on Botany in our country. This year, with its fourth edition, 90 events were held, with around 1,500 people participating in person, recording 38,300 observations of 3,260 species.

Now, with the organization of this XX IBC, together with the Botanical Garden of Madrid, SEBOT presents itself to the international botanical community and expresses its desire to contribute to highlight the role of plants and fungi in human well-being and to act for the conservation of biodiversity in our era.

TODAY LECTURES

Distyly as a model for studying convergent evolution - insights from genomic studies

KEYNOTE LECTURE

08:30 - 10:25

Plenary Room



Tanja Slotte

Tanja Slotte is a Professor of Ecological Genomics at Stockholm University. Her research focuses on the evolutionary causes and genomic consequences of plant mating system shifts and the genetic architectures of phenotypic polymorphisms under balancing selection by combining both genomic and genetic analyses.

This talk focuses on using recent sequencing technologies and new simulation tools to explore the evolution of plant mating systems, particularly on the evolution of a balanced floral polymorphism, distyly. Distyly promotes outcrossing and pollen transfer through two floral morphs that differ in the positions of their male and female sexual organs. These differences are usually coupled with self-incompatibility and reduced self and intra-morph fertilization. Loss of distyly has occurred frequently, often in association with convergent evolution of floral selfing syndromes. Studying the evolution and loss of distyly offers an opportunity to address classic questions on the genetic basis of convergent phenotypic evolution, supergene breakdown and the genomic consequences of selfing. We have used high-quality genome assemblies to study the distyly supergene in *Linum*, a suitable non-model plant. Our research includes identifying the supergene, examining genetic causes for the loss of distyly, and documenting the genomic impacts of this transition. Studies in *Linum* and other plants reveal similar genetic structures and evolution patterns in distyly supergenes, highlighting the value of genomic analyses in addressing classic evolutionary questions.

Pollination ecotypes: niche-driven floral evolution below the species level

KEYNOTE LECTURE

09:30 - 10:25

N103



Steven D. Johnson

Steven Johnson is a Professor at the University of KwaZulu-Natal (South Africa). His research focuses on the role of pollinators in the diversification of plants, the development of specialized pollination systems, floral mimicry and deception and the role of floral volatiles in plant-pollinator interactions.

Ecological niche shifts drive phenotypic divergence among populations and contribute to reproductive isolation. Historical ecological shifts and trait-environment correlations are well documented at the macroevolutionary level, but the process is initiated below the species level, as shown originally by Turesson, Clausen and others in their studies of plants edaphic and climate ecotypes. Pollinators are critical for the establishment and persistence of most plant populations. Novel floral trait combinations allow plants to exploit particular pollinator niches in local habitats, evolving primarily through sexual selection due to their effect on plant mating success. Shifts in pollinator niches lead to the formation of “pollination ecotypes”. These pollination ecotypes arise by contemporaneous ecological gradients from the mosaic-like spatio-temporal distribution of pollinators. I discuss case studies on the evolution of pollination ecotypes and use these to identify a number of challenging practical and conceptual issues. These include the paucity of reliable natural history data, difficulty of knowing when ecotypes should be considered species, reconstructing the number and direction of intraspecific shifts, and distinguishing between extinctions and isolating barriers as explanations for phenotypic and genetic discontinuities among population clusters.

Biodiversity and ecosystem functioning in subtropical forest

KEYNOTE LECTURE

09:30 - 10:25

N104



Keping Ma

Keping Ma is a professor in the Institute of Botany at the Chinese Academy of Sciences. His works on biodiversity and its conservation. He initiated the Forest Biodiversity Monitoring Network, the Biodiversity Monitoring and Research Network and the National Specimen Information Infrastructure of China.

To explore the relationship between biodiversity and ecosystem functioning, a large experiment was established in subtropical China in 2009-2010. German, Swiss and Chinese scientists collaborated on this project. Key findings include. 1, After 8 years, 16-species mixtures accumulated over twice the amount of carbon found in average monocultures and similar amounts as those of two commercial monocultures. Species richness effects were associated with functional and phylogenetic diversity. 2, Functional diversity (FD) had a greater impact on productivity than community-weighted mean (CWM) values after 7 years. FD values consistently increased productivity across different species pools. 3, Tree species richness improved community stability by increasing asynchrony, buffering the community against productivity declines due to stress. This was mediated by the diversity of species' hydraulic traits related to drought tolerance and stomatal control. 4, Increased tree species richness positively affected the species richness and abundance of herbivores, predators, and parasitoids, though effects decreased at higher trophic levels. Multitrophic arthropod diversity mediated plant diversity effects on tree productivity. These studies emphasize the importance of planting diverse, mixed-species for ecosystem restoration, biodiversity maintenance, and climate change mitigation.

The Changing Face of Herbarium Collections

PLENARY LECTURE

09:30 - 10:25

Plenary Room



Pamela S. Soltis

Pamela S. Soltis is a Distinguished Professor and Curator at the Florida Museum of Natural History, Director of the University of Florida Biodiversity Institute and member of the National Academy of Sciences (USA). Her research focuses on patterns and processes of plant evolution.

Herbaria are foundational for understanding plant diversity and distributions. Beyond taxonomy, the world's 400 million herbarium specimens, spanning space and time, provide invaluable resources for plant science. Preserved plant tissues are reservoirs of genetic information that can be used to reconstruct the evolutionary history of plants and a foundation for basic biology and for solving many societal problems, such as food security and the search for new medicines. Digitized specimens offer new research opportunities in climate change and conservation by integrating massive amounts of data from organismal biology, ecology, genetics, and climatology. The number of online records continues to grow, providing excellent information on species distributions, changes in distributions over time, phenology, and a host of traits. Integration of information from specimen records with phylogenies, climate data, and other resources enables new questions to be addressed while also providing new perspectives on longstanding questions in ecology and evolutionary biology. Case studies illustrate diverse current applications of herbarium specimens and their digital data. High-throughput molecular analysis and artificial intelligence applied to centuries-old herbarium specimens address a range of evolutionary, ecological, and societal problems.