REAL JARDÍN BOTÁNICO> Centuries of botanical history in the heart of Madrid P.3

XX International Botanical Congress July 21st-27th 2024 Madrid Spain

SEBOT SOCIEDAD BOTÁNICA ESPAÑOLA



SCSIC



Members of the Nomenclature Section at the door of the building of the Consejo Superior de Investigaciones Científicas, where the voting on the proposals for the new code was held. O DAVID GARCÍA HERRÁEZ

MADRID CODE IS NOW READY

The Nomenclature Section deliberated last week 433 proposals to amend the 'International Code for algae, fungi, and plants'

The five-day Nomenclature Section of the XX International Botanical Congress took place on 15–19 July at the central campus of the Consejo Superior de Investigaciones Científicas (CSIC) in Madrid. Led by Sandra Knapp as President, the Section deliberated on a total of 433 proposals to

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amend the International Code of Nomenclature for algae, fungi, and plants.

Expertise and guidance were provided by the Rapporteur-général, Nicholas Turland, and the Vice-rapporteur, John Wiersema. The decisions of the Section were recorded in precise detail by the

Recorders, Inés Álvarez and Anna Monro. The whole meeting was successfully livestreamed to a global audience. There were frank, open and respectful discussions about many topics of community and societal interest, like these:

[Continued on page 2]

REAL JARDÎN

BOTÂNICO

· IAPT — A hub for the global taxonomic community P. 2

BOTANY: A THRIVING SCIENCE IN SPAIN

Forty new plant species discovered in 2023

n 2023 alone, Spanish botanists, or those working in Spanish institutions, described approximately 40 new species. 'hese discoveries are not confined the Iberian Peninsula and the Canary Islands; some new species were found in tropical Africa, the Andes, and remote islands like Madagascar. The discoveries of 2023 have brought to light fascinating stories. For example, an interdisciplinary study of shrouds from Canarian aborigine mummies at The Canary Museum led to the identification of a new species from the orange family, Ruta museocanariensis. This apparently extinct species has provided valuable insights into plant usage by pre-Hispanic inhabitants of the Canary Islands and the evolution of this plant group. Some newly discovered plants are named in honor of our cultural icons. Carex quixotiana, an endemic species from La Mancha discovered by botanists from Pablo de Olavide University, pays

tribute to Don Quixote of La Mancha. Similarly, Helianthemum tibiabinae. endemic to the island of Fuerteventura, is named after Tibiabin, the mot of Tamonante, both of whom were aboriginal priestesses with significant social roles and influence in the island. The description of new species holds immense intrinsic value; we cannot protect what we do not know. This is exemplified by Helianthemum bilyanense, discovered in Villena (Alicante), with only 400 known specimens. This species is threatened by the construction of a solar power plant that could impact its habitat and that of other protected species. In 2023, not only new species but also several new genera were described. Most of these were found in Africa, including Zulusia, Austronea, and Nuriaea. The latter, a genus of thistles endemic to Ethiopia, was named in honor of Núria García-Jacas, a distinguished Spanish botanist who sadly passed away in 2023.





TEN EXAMPLES OF NEW SPECIES DISCOVERED IN 2023 BY SPANISH BOTANISTS.

From left to right and from top to bottom, the moss Aloina scindulosa (from Argentina) and the flowering plants Carex quixotiana (from La Mancha), Cathissa villasina (from the Sierra de las Villas, Iberian Peninsula), Cheirolophus barquinii (from Tenerife, Canary Islands), Frankenia anneliseae (from South Africa), Greenovia ignea (from La Palma, Canary Islands), Helianthemum bilyanenense (from Alicante, Iberian Peninsula), Iosanthus macrostigma (from Namibia), Linaria sagrensis (from the Sierra de La Sagra, Iberian Peninsula), and Sideritis artearensis (from Gran Canaria, Canary Islands).

MARÍA J. CANO, SANTIAGO MARTÍN BRAVO, AMANDA TERCERO ARAQUE, ÁGUEDO MARRERO RODRÍGUEZ, MARIO MARTÍNEZ AZORÍN, MARÍA ÁNGELES ALONSO, AND GABRIEL BLANCA.



MADRID CODE

[...Comes from the front page]

Proposals on culturally sensitive issues resulted in the establishment of a Special-purpose Committee on Ethics in Nomenclature, which will report to the next IBC in 2029, as well as the removal of a significant set of names based on a racially offensive term. This means that epithets with the root caf[f][e]r-, such as cafra, caffra, cafrorum, and cafrum, will be treated as orthographical variants to be replaced by afra, afrorum, and afrum (but not "affra", as incorrectly reported in the global media). This will come into effect with the close of this IBC on Saturday evening. There will also be a mechanism to propose names for rejection if they are derogatory to a group of people (derogatory meaning "having the effect of lowering in honour or estimation"), but this only applies to new names published from 2026 onward.

The Section also approved a clear mechanism for the voluntary registration of names and types of algae and plants (names of fungi already have mandatory registration).

Sets of proposals to allow DNA sequences to be types were rejected, but a Special-purpose Committee was established to look further into the issues of DNA types and typeless names and report back to the next IBC.

Several proposals on the names of fossil-taxa were accepted, and these will clarify the concepts of dual nomenclature in fossil-taxa, the distinction between synonymy and equivalence, and remove significant impediments to typification.

Institutional votes, which permit institutions to vote via a proxy at the Nomenclature Section, will in the future be limited to one vote per institution (instead of up to seven), thus reducing the geographical imbalance of votes and enshrining the equality of institutions no matter their size.





Waiting for closing ceremony

The decisions of the Nomenclature Section and the appointment of members of the nine Permanent Nomenclature Committees as well as the Rapporteur-général for the next IBC in 2029, will be proposed for acceptance in a resolution at the closing ceremony of this IBC on Saturday 27 July.

iapt

THE INTERNATIONAL ASSOCIATION FOR PLANT TAXONOMY

A HUB FOR THE GLOBAL TAXONOMIC COMMUNITY

The International Association for Plant Taxonomy (IAPT) was founded in non-profit organization com mitted to promoting, supporting, and facilitating taxonomic, systematic, and nomenclatural research in algae, fungi, and plants. With around 1,000 members from all over the World, the IAPT serves as a hub for the global taxonomic community. IAPT supports the taxonomic community worldwide through its grants (i.e., research, small collections, and travel support), publications (i.e., Taxon and Regnum Vegetabile), and education programs (e.g., Nomenclature). These opportunities contribute to fostering the next generation of taxonomists, ensuring continuous growth and development of the plant sciences. The IAPT has long supported the IBC meetings and is in charge of organizing the Nomenclature Section every time an IBC is held. The International Code of

Nomenclature for algae, fungi, and plants (ICN or the Code) is governed by its users, represented by members of Nomenclature Section of the IBC. The Nomenclature Section has the power to modify the Code by discussing and voting on formal proposals. This year, 433 proposals to amend the Shenzhen Code were analyzed. The results will be reflected in the Madrid Code that will become effective on January 1st, 2026. We invite all IBC attendees to visit the IAPT booth to learn more about our initiatives and take advantage of a 10% discount when joining the Association. Please stop by to say hello, meet IAPT officers and members, and pick up a little token of appreciation we have prepared for you. Don't miss this chance to connect with IAPT, engage with botanical experts, and become part of a global network dedicated to advancing taxonomy of algae, fungi and plants worldwide!



The IAPT council, at its meeting last Sunday before the IBC opening ceremony. O DAVID GARCÍA HERRÁEZ



Paseo del Rey Carlos III in the Royal Botanic Garden of Madrid.

Real Jardín Botánico (Royal Botanic Garden) - CSIC NEARLY THREE CENTURIES OF BOTANICAL HISTORY IN THE HEART OF MADRID

The Royal Botanic Garden, founded in the 18th century, are located in the center of Madrid, in the so-called "cultural golden mile" that constitutes the Prado-Recoletos axis. Covering an area of eight hectares, they house and exhibit an important collection of more than 5,600 species of living plants, organized in terraces and greenhouses according to scientific and aesthetic criteria. In addition, the Royal Botanic Garden is an important historical and cultural heritage, and a center for biodiversity research linked to the Spanish National Research Council (CSIC). The Gardens have more than 250 years of history and were declared "artistic gardens" in 1942. The anniversary of its foundation in 1755 is celebrated on October 17.

The garden has a geometric configuration with three main terraces: the terrace of the Grids, the terrace of the Botanical Schools, and the terrace of the Flower Outline. A fourth terrace of most recent creation (2005), known as the terrace of the Laurels or the Bonsai terrace, overlooks the other three. The first two terraces have a neoclassical design and preserve in the middle of each parterre the primitive fountains, which were restored in 1979. The terrace of the Flower Outline ("Plano de la Flor") includes two greenhouses. The Exhibition Greenhouse, inaugurated in 1993, is climate-controlled for desert, tropical or subtropical plants. Next to it is the so called Graells or Palms Glasshouse, built in 1856 when Mariano de la Paz Graells was the director of the Gardens. This historic construction continues to be used since its creation as an unheated greenhouse, maintaining a more or less constant temperature and humidity throughout the year, without any other means of regulation other than the occasional use of water sprinklers. Graell's Greenhouse contains mostly ferns and mosses, and there is a small pond with aquatic plants such as water lilies.



Glorieta de Linneo in the Royal Botanic Garden of Madrid.

Also on the terrace of the Flower Outline, and across the pond of Linneaus, is located the architectural ensemble known as Villanueva Pavilion. Throughout its history, this unique building was first used as a greenhouse and later housed the Herbarium and the Botanic Research Center, but today it is dedicated to exhibitions and a range of cultural activities.

The building of the Botanical Research Center houses one of the most important European herbaria (with more than one million specimens), a botanical library and a collection of historical archives, all of which are essential resources for research in botany and related fields. The library has a modest collection of incunabula and a rich collection of botanical literature. The archives consist of documents, records and drawings, mostly from botanical expeditions, including 7,000 drawings from the Royal Botanical Expedition to the Kingdom of New Granada (1783-1816), directed by José Celestino Mutis. Because of its size and artistic value, the Mutis collection is considered the most important one held in the Archives.

The Botanical Research center is composed of 20 scientists, in addition to postdoctoral fellows and graduate students, whose main objectives are to understand the current diversity of plants and fungi and how this diversity is generated and maintained. The Royal Botanic Garden offers self-guided itineraries, guided tours, and diverse activities and workshops for children of all school ages, families, and adults. Information about these activities can be found on the Garden's website, www.rjb. csic.es, and must be booked in advance. The Botanical Garden is open every day throughout the year, except Christmas and New Year's day. The RJB is part of the 'Paisaje de la Luz' ('Landscape of Light'), a historical, artistic and natural space in Madrid declared a UNESCO World Heritage Site on July 25, 2021, in the Chinese city of Fuzhou.



Drawings of Botanical Expeditions from the historical archive of the Royal Botanical Garden.

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CongressNews

TUESDAY 23 JULY

pulse of the symposial The

Dr. Laura Holzmeyer during her presentation.

Deciphering tropical diversity evolution

The processes originating the enormous plant diversity in the tropics are still poorly understood. Researchers from around the world gathered yesterday to discuss recent advances in understanding tropical biodiversity generation. The symposia on Biogeography and **Diversification of Intercontinental** tropical plant diversity featured 18 talks, distributed across three different sessions, and was coordinated by Dr. Francis Nge. This symposium aimed to bring together studies ranging from phylogenetics to fossil records, ecological data, and paleoclimatic analyses to provide a comprehensive overview of the scientific community's work on plant diversification and to unify theories across continents. The selected speakers were a diverse sample in the geographic origin of the researchers as well as early and advanced career level and balance between gender and the talks included multiple topics from this IBC2024, such as macroevolution, paleobotany or plants-animal interactions.



Dr. Conchita Alonso, from Doñana **Biological Station.**

Multiple views on Evolutionary **Ecology of plants**

Yesterday, 24 oral presentations amazed assistants analyzing how micro and macroevolutionary patterns can be explained through the lenses of the ecological processes. This symposia, organized by Rubén Milla, Silvia Matesanz and Marcos Méndez, brought together research on several biological systems united by the use of common tools such as comparative phylogenetic methods or the analysis of ecological interactions. Topics included plantanimal complex interactions, the relation of gene flow and flower color variation, above- and belowground trait covariation, convergent evolution of mimetic seeds and the influence of fire on pollination, among many others. Highlights were given to Gaku Kudo, who showed how seed predation can act as a selective force on plant mating systems; Rachel Spigler, who talked about constraints on the evolution of floral lifespan; and Conchita Alonso, who summarized the importance of plant epigenetics in changing environments.



The phylogenetics of plant geography: past,



present and future

Michael J Donoghue

Michael J. Donoghue has been a Professor at Yale and Harvard Universities, among others, and Director of institutions as the Harvard Herbaria or the Yale Peabody Museum of Natural History. His research concerns the diversity and evolutionary history of plants, especially Viburnum genus.

O 09:30 - 10.25 **Plenary Room**

In decades past, vicariance/cladistic biogeographers focused on the importance of discovering general biogeographic patterns and their underlying causes. Since then, most of the focus has been on inferring geographic movements using phylogenetic trees of individual clades and the application of phylogenetic approaches to major biogeographic patterns of interest especially to ecologists. I have revisited and updated two papers from 2004, one on the latitudinal gradient in species richness and another on major disjunctions around the Northern Hemisphere, by a systematic review of progress based on plant studies published over the past twenty years. Although a number of hypotheses have been well-supported and others can now safely be set aside, there are still substantial gaps in our understanding and a need for further coordination of efforts and methodological improvements.

I will present the results of these studies while highlighting the value of syntheses that draw upon multiple primary analyses. These observations also highlight improvements that can be made in studying individual clades. To illustrate many of the central points I will make special reference to our ongoing studies of Viburnum biogeography.



treasures

TODAY LECTURES

Nokwanda P. Makunga

Professor at Stellenbsch University, Nokwanda P. Makunga's research focuses on medicinal plants from the greater Cape Floristic Region and their responses to the environment, as well as the connection of plants and society and the biotechno-logical applications for the conservation of medicinal plant biodiversity. where plants serve diverse ethno-cultural and medicinal purposes. Exploitation of medicinal plants has opened doors to global markets for natural products and offer unique opportunities by interfacing various biotechnologies to study these medicinal plants. This talk will touch on historical aspects of the exploitation of medicinal plant resources and define the importance of indigenous knowledge. Specific examples from the greater Cape Floristic Region's medicinal plants highlight the application of LC-MS-based metabolomics technologies in studying mesembrine alkaloids produced by Sceletium tortuosum (Aizoaceae) and the phytochemistry and cytotoxicity of Sutherlandia frutescens (Fabaceae). In addition, proteomic analyses under stressed conditions provided new insights into the impacts of salinity and drought stress with respect to both central and specialized

metabolism of S. frutescens. Microsatellite and chemometric analyses confirmed biogeographical-based genetic structure amongst populations of Dodonaea viscosa (Sapindaceae) and Aspalathus linearis (Fabaceae), pinpointing chemotype(s) that may fit domestication and industrialization for phytopharmaceutics. These studies illustrate the potential of medical plants of South Africa that remain chemically underexplored.

diversity

KEYNOTE LECTURE

Evolution of floral disparity

through integration of fossil

and extant morphological

Evolution of woody plants on the tropical coasts inferred from a full set of mangrove genomes

KEYNOTE LECTURE

() 09:30 - 10.25

• N103

() 09:30 - 10.25

• N104



Susana Magallón Susana Magallón is a research scientist and director of the Institute of Biology of the National Autonomous University of Mexico, and a member of the American Academy of Arts and Sciences and the National Academy of Sciences. She works on evolution of angiosperms and flowers.

Integrating molecular and morphological data is crucial for studying evolution over deep time. A morphological matrix for 1201 extant species representing all angiosperm families and 121 well-preserved fossil flowers, combined with a molecular database for extant species, helped us address methodological issues in phylo and divergence time estimation using a Total Evidence approach, and in estimating theoretical floral morphospace. Phylogenetic analyses used different optimization criteria and kinds of data to estimate relationships, as well as uncertainty in fossil placements. Combining molecular and morphological data in a parametric context yields a phylogenetic framework consistent with molecular estimates, with fossils placed on branches according to detailed morphological comparisons. Estimating divergence times with morphological, molecular, and temporal data reveals significant advances in integrating extant and fossil species in the same diversification process, though practical difficulties exist for fossils with few characters. Theoretical floral morphospace was estimated by constructing a pairwise distance matrix among species, estimating disparity, and using ordination techniques. We observed a decrease in morphospace occupation towards the present and canalization among derived clades, aligning with previous observations.

Integrating plant hydraulics and ecological processes across scales

KEYNOTE LECTURE

() 08:30 - 10.25 **Plenary Room**



Rafael Silva Oliveira did his PhD at the University of California. He is a Professor in the Plant Biology Department at University of Campinas (Brazil). He works on plant functional ecology community and ecosystem ecology and the use of isotopes in ecological studies.

Understanding the functional mechanisms underlying ecological patterns and processes is essential to develop functional-trait based approaches to assist ecosystem restoration initiatives. Plant hydraulics is increasingly recognized as a central link between plant biology and fields such as community and ecosyste ecology, climatology, and earth-system science and to understand and predict the dynamics of tropical vegetation in scenarios of changing water availability. Understanding the intricate interactions between plant hydraulics and ecological processes is essential for predicting plant responses to environmental changes and managing ecosystems effectively. In this talk, I will present an overview of recent findings that demonstrate how hydraulic traits can explain species distributions across various spatial scales and influence ecological processes such as growth. demography, community assembly, and carbon dynamics, particularly in tropical ecosystems, which are crucial for global water and carbon cycles, Furthermore, I will discuss how plant hydraulics can offer a mechanistic explanation for vegetation resistance or vulnerability to predicted climate changes, and how this knowledge can be used to forecast future dynamics of species and communities in changing climatic conditions.

Suhua Shi Suhua Shi is a Professor at the School of Life Sciences at Sun Yat-Sen University (Guang-

zhou). Her research focuses on adaptive evolution and speciation in plants, especially on the interface of divergent convergence and geographical mechanisms of speciation in mangroves

Genomic studies are poised to explore whole communities of species. The approximate 70 species of woody plants that anchor the coastal ecosystems of the tropics, referred to as mangroves, are particularly suited to this exploration. Using De novo Sequencing, we obtained whole genomes of 32 mangrou we combined with sequences of 30 additional species, comprising almost all mangroves globally. While the data revealed 27 independent origins of mangroves, the total phylogeny shows only modest increases in species number, suggesting that mangrove extinction is common. A possible explanation is the frequent sea-level rises (SLR) and falls documented in the geological record. Indeed, near-extinctions of species with extremely small population size often happened during periods of rapid SLR, as revealed by the genome-wide heterozygosity in most mangroves. Population size reduction has possibly been further compounded by population fragmentation and accumulation of deleterious mutations, pushing mangroves even closer to extinction. The impact of the next SLR will be exacerbated by human encroachment into their habitats. In addition to possible extinctions, this talk will cover the opposite phenomenon, namely, the speciation patterns along the tropical coasts.



PUBLIC LECTURE **(**) 19:05 - 19:55

Delving into South African medicinal plant

Plenary Room

South Africa has an incredible floral heritage

deeply intertwined with local culture,