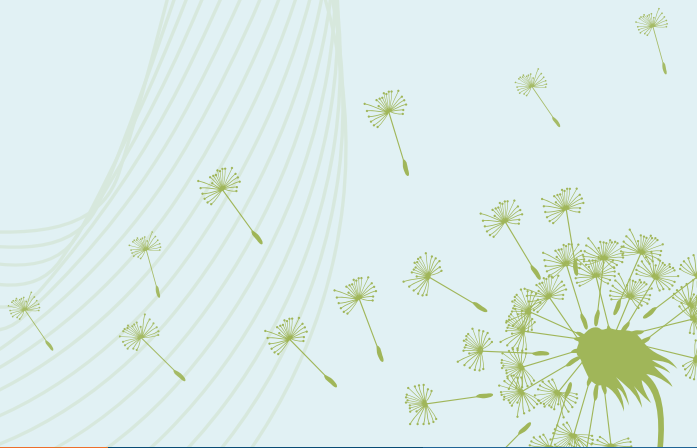


# IV INTERNATIONAL CONGRESS ON APOMIXIS

December 3 - 7, 2023 • ROSARIO, ARGENTINA

Book of Abstracts



Introduction .....	3
Committees .....	4
Sponsors .....	5
Scientific program .....	6
List of Posters .....	9
Apomixis Awards .....	10
Abstracts .....	11
Invited Speakers .....	11
Oral Communications .....	20
Posters .....	29

The **IV International Congress on Apomixis Research** gave us the opportunity to celebrate 28 years of nonstop progress in this field since our first international meeting, which was held in Texas (USA) in 1995. After that, the apomixis community met in Como (Italy) in 2001, and Wernigerode (Germany) in 2007.

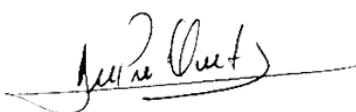
This conference brought together 80 participants coming from 18 different countries. The most represented communities were the argentinian and the italian ones, but there were also eminent professors and scientists from Albany, Australia, Bangladesh, Canada, China, Czechia, France, Germany, India, Mexico, Perú, Portugal, Switzerland, The Netherlands, The United Kingdom and The United States.

We discussed 47 scientific contributions and enjoyed the presentations of 16 invited speakers, 9 session talks selected from the submitted abstracts, 1 round table on scientific policies and a discussion session on perspectives. Finally, we organized an open-to-the-community session in order to share our work with the general public of all ages.

During their stay in Rosario, the attendees had the opportunity to visit some of the iconic places of the city. We hope they found this congress inspiring and went back home with creative new ideas, collaborations and friends, as well as an increased interest in their work.

We would like to thank the institutions and consortiums that provided financial and practical support to the event: the Italian Embassy in Argentina, the Italian General Consulate of Rosario, the Ministry of Foreign Affairs of Italy, the University of Milano, the Government of the Santa Fe Province, the National University of Rosario, the National Agency for the Promotion of Research, Technological Development and Innovation of Argentina, the National Council for Scientific and Technological Research of Argentina (CONICET), the Rosario Board of Trade and the Agricultural Science Foundation (FCA UNR). The congress organization has also received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No [872417], Project MAD and No No [101007438], Project POLYPLOID. We are also grateful for the support received from the Faculty of Agronomy of the National University of Rosario, the Research Institute of Agricultural Sciences of Rosario (IICAR), the Scientific and Technological Centre of CONICET Rosario (CCT Rosario) and the ROSCYTEC Foundation.

Finally, we would like to thank all the members of the Apomixis Argentina Group, for their valuable help during the organization of this event, and specially the people of the IICAR Plant Reproductive Development group.



**Dr. Juan Pablo Ortiz**  
IICAR Director  
Local Host



**Dra. Silvina Pessino**  
IV International Congress on Apomixis  
President of Organizing Committee

### Local Scientific Committee:

IICAR-CONICET-Universidad Nacional de Rosario:

Silvina Pessino  
Juan Pablo Ortiz  
Juliana Stein  
Lorena Siena  
Luciana Delgado  
Maricel Podio

CERZOS-CONICET-Universidad Nacional del Sur:

Viviana Echenique

IBONE-CONICET-Universidad Nacional del Nordeste:

Francisco Espinoza

### International Scientific Board:

Lucia Colombo (University of Milan, Italy)  
Olivier Leblanc (IRD Montpellier, France)  
Juan Pablo Amelio Ortiz (CONICET, National University of Rosario, Argentina)  
Silvina Pessino (CONICET, National University of Rosario, Argentina)  
Emidio Albertini (University of Perugia, Italy)  
Fulvio Pupilli (IBBR Perugia, CNR, Italy)  
Thomas Dresselhaus (Universität Regensburg, Germany)  
Viviana Echenique (CONICET, National University of the South, Argentina)  
Francisco Espinoza (CONICET, National University of the North-East, Argentina)  
Ueli Grossniklaus (University of Zurich, Switzerland)  
Arp Schnittger (University of Hamburg, Germany)  
Tim Sharbel (University of Saskatchewan, Canada)  
Gianni Barcaccia (University of Padova)

### Administration:

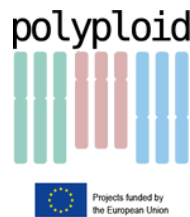
Fundación para la Promoción Científico-Tecnológica de Rosario y su Región (Fundación Roscytec), 27 de Febrero 210 bis (2000), Rosario, Santa Fe, CUIT: 30-70840604-6, IVA EXENTO.

Fundación Ciencias Agrarias, Campo Experimental Villarino, S2125ZAA Zavalla, Provincia de Santa Fe, Argentina, CUIT: 30-70956524-5.

### Local professional organizers

Marcela Clemente Congresses and Corporate Events

Sincere thanks to all our sponsors:




**Sunday 3th December 2023**

19:00 - 21:00

**Opening Cocktail - only for invited speakers and organizers -**

Opening talk by **Marco Bocchi**, Consul General of Italy in Rosario.

 Consulate General of Italy in Rosario (Address: Montevideo 2182, Rosario)

**Monday 4th December 2023**

08:00 - 09:00

**Registration at the Conference Venue**

 Rosario Board Trade Convention Center (Address: Paraguay 755, Rosario).


**Morning Session. Coordinators: Luciana Delgado, Carolina Colono**

09:00 - 10:00

**Opening Plenary Lecture: Prof. Dr. John Carman**, Utah State University, USA.

*Apomixis: origins, regulation and speciation implications.*

10:00 - 10:30

 Coffee break

10:30 - 11:00

**Recognition Award: the contribution of Camilo Quarin to apomixis research**

In charge of Dr. Fulvio Pupilli.

11:00 - 11:30

**Invited speaker: Arp Schnittger**, University of Hamburg, Germany.

*A cytological framework of female meiosis in Arabidopsis and maize*

11:30 - 12:00

**Invited Speaker: Viviana Echenique**, CERZOS-CONICET-UNS, Bahía Blanca, Argentina.

*New insights into the control of apomixis in Eragrostis curvula.*

12:00 - 13:50

 Lunch time

**Afternoon Session. Coordinators: Maricel Podio, Juan Manuel Vega**

13:50 - 14:10

**Oral presentation: Ramsankar Chandrasekar**, Institute of Biology III, Albert-Ludwigs-University of Freiburg, Germany.

*WINDHOSE-RAB GTPASE HOMOLOG A1-dependent membrane localization of the auxin transport protein PINFORMED1 promotes female germline entry in Arabidopsis*

14:10 - 14:30

**Oral presentation: José Carballo**, CERZOS-CONICET-UNS, Bahía Blanca, Argentina.

*Unveiling the apomictic allotetraploid genome of Eragrostis curvula.*

14:30 - 14:50

**Oral presentation: Andrés Bellido**, CERZOS-CONICET-UNS, Bahía Blanca, Argentina.

*Arabidopsis thaliana could provide new insights into the driving forces underlying the switch from sexual to apomictic development*

14:50 - 15:10

**Oral presentation: Xixi Zheng**, University of Regensburg, Germany.

*Understanding the Molecular Mechanism of Parthenogenesis in Cereals.*

15:10 - 15:30

**Oral presentation: Marta Mendes**, University of Milano, Italy.

*AUXIN RESPONSIVE FACTOR 10 insensitive to miR160 regulation induces apospory-like phenotypes in Arabidopsis.*

15:30 - 16:00


 Coffee break

16:00 - 18:00

**Flash presentation of the posters + Poster Session** (the posters will remain displayed throughout the course of the meeting)

20:00 - 01:00

**MAD Social gathering at the bar "Silos Davis" on the Paraná River.**

 Bar "Los Silos" (Address: Av. de la Costa Estanislao López 2550).

Tuesday 5th December 2023

**Morning Session.** *Coordinators: Lorena Siena, Juan Pablo Selva*


09:00 - 09:30

**Invited Speaker: Abed Chaudhury**, Krishan Foundation, Australia.  
*Apomixis and heterotic perenniality in rice*

09:30 - 10:00

**Invited Speaker: Ueli Grossniklaus**, University of Zürich, Switzerland.  
*Towards the engineering of apomixis in maize.*

10:00 - 10:30

 Coffee break

10:30 - 11:00

**Invited Speaker: Stewart Gillmor**, Langebio, CINVESTAV, Mexico.  
*Hybrid effects on zygotic genome activation in Arabidopsis thaliana.*

11:00 - 11:20

**Oral presentation: Luciana Delgado**, IICAR-CONICET-UNR, Rosario, Argentina.  
*3D architecture of the ovule during MMC differentiation in Paspalum rufum.*

11:20 - 11:40

**Oral presentation: Maricel Podio**, IICAR-CONICET-UNR, Rosario, Argentina.  
*Resolving the gene content of the genomic region associated with apomixis in Paspalum notatum using a diploid genome assembly.*

11:40 - 12:00

 **Announcements**

12:00 - 14:00

 Lunch time

**Afternoon Session.** *Coordinators: Viviana Echenique, Juan Pablo Ortiz*

14:00 - 14:30

**Invited Speaker: Olivier Leblanc**, IRD-Montpellier, France.  
*Functional characterization of apomixis candidate genes in Arabidopsis.*

14:30 - 15:00

**Invited Speaker: Lucia Colombo**, University of Milan, Italy.  
*Unraveling complex mechanisms in plant reproduction for the crops of the future.*

15:00 - 15:30

**Invited Speaker: Gabriela Pagnussat**, Universidad Nacional de Mar del Plata, Argentina.  
*A mitochondrial electron shuttle essential for female gametophyte and early embryo development in Arabidopsis.*

15:30 - 16:00


 Coffee break

16:00 - 18:00

**Round Table on public scientific policies and strategies.** *Participants:*  
**Fernando Peirano**, President of the National Agency for the Promotion of Research, Technological Development and Innovation;  
**Marina Baima**, Secretary of Science and Technology of the Province of Santa Fe;  
**Roberto Rivarola**, Vice President of Technology Affairs, CONICET;  
**Sandra Fernández**, Director of CCT CONICET Rosario.

20:00 - 23:00

**Social gathering at Bar "El Cairo"**

 (Address: Santa Fe 1102)

## Wednesday 6th December 2023

**Morning Session.** Coordinators: *Diego Zappacosta, Andrés Bellido*


09:00 - 09:30

**Invited Speaker: Peggy Ozias-Akins**, University of Georgia, USA.  
*Insights on asexual reproduction through seeds from Pennisetum/Cenchrus apomictic species.*

09:30 - 10:00

**Invited speaker: Giovanni Gabelli**, DAFNAE, Agripolis, University of Padova, Italy.  
*Dissecting apomeiosis in alfalfa (Medicago sativa L.): Genomics applied to unreduced gamete mutants and sexually induced polyploids.*

10:00 - 10:30

 Coffee break

10:30 - 11:00

**Invited Speaker: Silvina Pessino**, IICAR-CONICET-UNR, Rosario, Argentina.  
*Integrative use of comparative omics for harnessing apomixis for plant breeding.*

11:00 - 11:30

**Invited Speaker: Thomas Dresselhaus**, University of Regensburg, Germany.  
*Understanding gene regulatory networks in the egg apparatus to trigger parthenogenesis.*


11:30 - 11:50

**Oral presentation: Tatyana Radoeva**, KeyGene, Wageningen, The Netherlands.  
*Apomixis: Plant Breeding Technology of the 2020s*

11:50 - 12:10

**Oral presentation: Petra Šarhanová**, Masaryk University, Department of Botany and Zoology, Czech Republic.  
*A novel method to detect automixis in flowering plants.*

12:10 - 14:00

 Lunch time

14:00 - 17:00

 Rosario sightseeing Tour | **MAD Project** coordination meeting

20:00 - 01:00

**Gala Dinner at restaurant "Mercurio"**  Rosario Board of Trade (Address: Corrientes 796)

## Thursday 7th December 2023

**Morning Session.** Coordinators: *Francisco Espinoza, José Carballo*

09:00 - 09:30

**Invited Speaker: Fulvio Pupilli**, Institute of Biosciences and Bioresources, CNR, Italy.  
*ORIGIN OF RECOGNITION COMPLEX 3 (PsORC3) is the genetic determinant for the development of unbalanced endosperm in the Paspalum simplex agamic complex (Poaceae).*

09:30 - 10:00

**Invited Speaker: Anna Koltunow**, The University of Queensland, Australia.  
*Hy-Gain: harnessing apomixis for self-reproducing sorghum and cowpea hybrids for smallholder farmers in sub-Saharan Africa.*

10:00 - 10:30

 Coffee break


10:30 - 11:00

**Invited Speaker: Emidio Albertini**, University of Perugia, Italy.  
*Does APOSTART play a role in apospory?*


11:00 - 12:00

**Discussion session on perspectives. Closing ceremony**

12:00 - 14:00

 Lunch time

14:00 - 17:00

**Open session to the public:** Mendel's laws, ADN of humans and plants, Sexual and asexual reproduction, Sexuality and Apomixis in breeding, Women in Science  
 ECU, National University of Rosario (Address: Av. San Martín 750)

20:00 - 01:00

**Barbecue (Asado) at "El Viejo Balcón Puerto Norte" restaurant**  (Address: Av. Carballo 198)



Poster	Title	Presenting Author	Co-Authors
01	<i>Incidence of isoforms of the splicing controller BUD13 in apomictic and sexual species</i>	Draga, S.	Colono, C.; Siena, L.; Gabelli, G.; Podio, M.; Palumbo, F.; Ortiz, J.P.; Barcaccia, G.; Pessino, S.
02	<i>Developing a Pan-Genome of the diplosporous grass Eragrostis curvula</i>	Bongiorno, G.; Carballo, J.	Gallo, C.A.; Albertini, E.; Zappacosta, D.; Echenique, V.
03	<i>Generation of auxin and cytokinin marker lines in Paspalum notatum</i>	Colono, C.M.	Ortiz, J.P.; Perrone, D.; Permingeat, H.; Orozco, G.; Colombo, L.; Kater, M.; Mendes, M.A.; Pessino, S.C.
04	<i>Construction of a consensus genetic map of Eragrostis curvula</i>	Gallardo, J.	Gallo, C.; Sansot Puleston, M.; Echenique, V.; Zappacosta, D.
05	<i>Studies tending to functionally characterize putative genes to be involved in apomictic pathway/s in Eragrostis curvula</i>	Díaz, A.R.	Selva, J.P.; Carballo, J.; Garbus, I.; Echenique, V.
06	<i>Correlation between apomixis potential in ovules and fertility in tetraploid individuals of Paspalum alnum Chase</i>	Schneider, J.S.	Hojsgaard, D.; Daviña, J.R.; Honfi A.I.
07	<i>Embryo sac and fertility analyses in a BIII synthetic Paspalum alnum hybrid</i>	Schneider, J.S.	Escobar, L.M.; Daviña, J.R.; Hojsgaard, D.; Honfi A.I.
08	<i>Development of KASP markers linked to apomixis in Eragrostis curvula</i>	Gallardo, J.	Gallo, C.; Rodrigo, J.M.; Echenique, V.; Zappacosta, D.
09	<i>New assembly and annotation of diploid Bahiagrass (Paspalum notatum Flüge var. sauræ) based on ONT long reads.</i>	Vega, J.M.	Podio, M.; Orjuela, J.; Siena, L.A.; Mariac, C.; Pupilli, F.; Albertini, E.; Pessino, S.C.; Leblanc, O.; Ortiz, J.P.A.
10	<i>Auxin response repressor IAA16 defective mutants show developmental alterations in female gametophytes and embryos in Arabidopsis thaliana</i>	Vega, M. Sol	Leblanc, O.; Pessino, S.C.; Ortiz, J.P.A.; Siena, L.A.
11	<i>Formation of BIII hybrids and effect of ploidy raises on the reproduction of aposporous sunflower (Helianthus annuus L.)</i>	Ochogavía, A.	Katzaroff, I.; Riviera, L.; Aguilar, G.; Bianchi, M.B.; Bocchini, M.; Marconi, G.; Albertini, E.; Pessino, S.; Nestares, G.
12	<i>Embryo sac composition and fertility assessment in Paspalum ovale Nees 8x: insights into reproductive mechanisms</i>	Escobar, L.M.	Schneider, J.S.; Daviña, J.R.; Martínez, E.J.; Honfi A.I.
13	<i>Unveil the molecular mechanisms regulating Apomixis in Dandelion</i>	Cavalleri, A.	Banfi, C.; Cucinotta, M.; Cornaro, L.; Petrella, R.; Van Dijk, P.J.; Rigola, D.; Op den Camp, R.; Colombo, L.
14	<i>Morphogenetic determinants of plant female germ cell precursors specification and plasticity</i>	Autran, D.	Ouedraogo, I.; Mosca, G.; Delgado, L.; Leblanc, O.; Lartaud, M.; Conéjéro, G.; Baroux, C.
15	<i>Functional characterization of AUXIN RESPONSE FACTOR 8 and 18 during ovule development in Oryza sativa</i>	Perrone, D.	Orozco Arroyo, G.; Colono, C.; Pessino, S.; Kater, M.; Colombo, L.; Mendes, M.
16	<i>In silico characterization of gene families involved in epigenetic reprogramming associated with the reproductive mode in Paspalum notatum</i>	Podio, M.	Pessino, S.C.; Ortiz, J.P.A.
17	<i>Functional characterisation of QGJ, a YODA family member associated with apospory</i>	Siena, L.A.	Michaud, C.; Ortiz, J.P.A.; Pessino, S.C.; Leblanc, O.
18	<i>Exploring PLT gene family for insights into parthenogenesis regulation in Eragrostis curvula</i>	Quevedo, MR.	Suarez, U.; Quevedo, M.R.; Selva, J.P.; Carballo, J.; Zappacosta, D.; Echenique, V.
19	<i>Expression atlas of Eragrostis curvula reproductive tissues</i>	Selva, J.P.	Carballo, J.; Percival-Alwyn, L.; Šurbanovski, N.; Zappacosta, D.C.; Cáccamo, M.; Echenique, V.
20	<i>Genetic systems in new polyploids generated by chromosomal duplication in Paspalum indecorum.</i>	Novo, P.E.	Villalba, A.I.; Carrizo, J.M.; Espinoza, F.
21	<i>A 3D analysis of the reproductive development of Eragrostis curvula (Schrud.) Ness</i>	Pasten, M.C.	Carballo, J.; Díaz, A.R.; Mizzoti, C.; Cucinotta, M.; Colombo, L.; Echenique, V.; Mendes M.A.
22	<i>Resolving the gene content of the genomic region associated with apomixis in Paspalum notatum using a diploid genome assembly.</i>	Ortiz, J.P.	Vega, J.M.; Podio, M.; Orjuela, J.; Siena, L.A.; Mariac, C.; Pessino, S.C.; Leblanc, O.

P02

**Developing a Pan-Genome of the diplosporous grass *Eragrostis curvula*****Bongiorno, G.** (1); **Carballo, J.** (2); Gallo, C.A. (2); Albertini, E. (1), Zappacosta, D. (2), Echenique, V. (2)

(1) Dipartimento di Scienze Agrarie, Alimentari e Ambientali, Università degli Studi di Perugia, Perugia, Italy.

(2) Centro de Recursos Naturales Renovables de la Zona Semiárida (CERZOS) Universidad Nacional del Sur - Consejo Nacional de Investigaciones Científicas y Técnicas (UNS-CONICET) and Dpto. de Agronomía (Universidad Nacional del SUR), Bahía Blanca, Argentina.

giacomo.bongiorno@studenti.unipg.it

As large-scale genomic studies have progressed, it has been revealed that a single reference genome pattern cannot represent the genetic diversity present at the species level. The pangenome can complement the missing genetic information based on the analysis of a single reference genome, exhibit hidden genetic variations, and demonstrate the true genetic diversity at the species level. The progress of pangenome research in different species has allowed the identification of large structural variants related to important agronomic traits. Weeping lovegrass (*Eragrostis curvula* [Schrad.] Nees) is a forage grass that reproduces by sexuality and by facultative and obligate apomixis. It presents distinctive variants with different ploidy levels (2x – 8x) and a basic chromosome number of 10. The recent availability of the genome assembly of cv. Victoria has provided a valuable resource for identifying specific genomic regions linked to significant traits, for instance, forage quality. However, it is worth noting that the regions that control apomixis and others related with ploidy are typically hosted by genotypes with higher ploidy levels.

In this work, we focused on constructing a pan-genome of *Eragrostis curvula* to detect genomic variation, establish phylogenetic relationships, and analyze the effects of ploidy in genome evolution and reproductive mode. To do that, we used the genome assembly of cv. Victoria and genomic data, obtained by Illumina reads, of nine genetically diverse accessions of *E. curvula*. The construction of the pan-genome employed an iterative mapping and assembly approach involving the mapping of reads from different genotypes to the reference genome assembly. The mapped reads were used for variant calling, while the unmapped reads were assembled into new genomic fragments to annotate genes absent in the reference genome. These newly assembled sequences were subsequently integrated into the reference genome, and the process was repeated iteratively for other genotypes. When all the accessions were processed, the final pan-genome comprised the reference genome and the newly assembled sequences. This approach proved to be highly efficient for constructing a pan-genome exploiting the reference genome and the assembly of genetically distant genotypes of *E. curvula*. Ultimately, the genomic resources generated were employed to gain a comprehensive understanding of the genetic mechanisms underlying apomixis and related processes.

**Keywords:** *Eragrostis curvula*, ploidy, apomixis, pan-genome.