IV International Congress on APOMIXIS

December 3 - 7, 2023 • Rosario, Argentina

Book of Abstracts

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Introduction

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 Nederlands, 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

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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. *Arabidospis 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)

List of Posters

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

P04
Construction of a consensus genetic map of Eragrostis curvula

Gallardo, J. (1,2); Gallo, C. (1); Sansot Puleston, M. (1); Echenique, V. (1,2); Zappacosta, D. (1,2)
(1) Centro de Recursos Naturales Renovables de la Zona Semiárida, CONICET, Bahía Blanca, Argentina.
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Eragrostis curvula is a forage grass used by our group as a model for the study of displosporous apomixis. It includes genotypes with different ploidy levels (from 2X to 8X, with X = 10) and reproductive modes (sexual and facultative or obligate apomixis). Previously, our group built the first highly saturated genetic linkage map of *E. curvula* using a mapping population generated from the cross between two tetraploid genotypes, OTA-S and Don Walter. At that time, the small size of the mapping population (61 individuals) did not allow the generation of a consensus map between the maternal and paternal maps. However, a map was constructed for each parental genotype and the apomeiosis-linked locus (APO-locus) was located in the paternal map. The objective of this work was to expand the mapping population using the same parental lines in order to build a high-density consensus genetic map where to position the APO-locus and to make syntenic analysis. The new mapping population consisted of 109 hybrid individuals coming from the previous population and new ones coming from the new crosses. This population was phenotyped by cytoembryology and through the use of a dominant molecular marker linked to apomeiosis, resulting in 48 sexual offprings and 61 apomictic ones. The genotyping was performed with SNPs using the DArT-Seq technology (SAGA-CIMMYT, Mexico). For the map construction single dose allele markers and biparental SNPs markers were used. Linkage maps for each parent and a consensus map were built. The consensus genetic map contains a total of 1,132 markers, of which 587 were paternal, 514 maternal and 31 biparental. The total length of the linkage map was 4,605 cM and it was made up of 20 linkage group (LG). Synteny analysis was performed using the genome assembly of *E. curvula* (cv. Victoria). In the paternal map, a region delimited by three markers was found that cosegregates with apomeiosis (APO-locus). The APO-locus delimited a region of 11,322,729 bp in the reference genome of cv. Victoria. The construction of this mapping population, added to the of *E. curvula* consensus map are valuable elements for future studies of apomixis.

Keywords: Consensus genetic map, Apo-locus, Mapping population.