

PERSONAL INFORMATION

Rubén Sancho Cohen

✉ ruben.sancho.cohen@gmail.com

EDUCATION AND TRAINING

January 2014 to
September 2018

PhD (FPI grant)

Escuela Politécnica Superior (University of Zaragoza) and Estación Experimental de Aula Dei-CSIC

PhD thesis on “Genome annotation, comparative genomics and evolution of the model grass genus *Brachypodium* (Poaceae)”.

Doctoral Program in Agrarian and Natural Environment Sciences (University of Zaragoza)

October 2012 to
December 2013

Postgraduate Degree in Agrobiotechnology

UPNA – Public University of Navarre (Spain)

Master project: “Análisis metagenómico de las comunidades microbianas presentes en un bosque Mediterráneo en Aspurz (Navarra-España)” (“Metagenomic analysis of microbial communities in a Mediterranean forest in Aspurz (Navarre-Spain)”).

UPNA (Public University of Navarre).

September 2007 to April
2011

Agronomy Engineering (Engineer’s Degree)

EPS – University of Zaragoza (Spain)

Degree project: “Estudio del comportamiento agronómico de las colecciones de albaricoquero, paraguayo y platerina ubicadas en los viveros Mariano Soria de La Almunia de Doña Godina” (“Study of agronomic behavior of the apricot-tree, paraguayan-tree and platerina-tree collections located in the “Mariano Soria nurseries” from La Almunia de Doña Godina”). EPS / EUPLA– University of Zaragoza.

September 2003 to
November 2007

Technical Agricultural Engineering (Bachelor’s Degree)

EUPLA - Escuela Universitaria Politécnica de La Almunia – University of Zaragoza (Spain)

Degree project: “Estudio del comportamiento de aplicaciones de fertilizantes vía foliar en melocotonero con fertirrigación” (“Study of performance fertilizers applied by foliar channel in peach-tree under fertigation conditions”). Compo – EUPLA (University of Zaragoza) agreement.

WORK EXPERIENCE

January 2014 to
December 2017

Researcher (PhD student; FPI contract)

Escuela Politécnica Superior – University of Zaragoza

PhD thesis on “Genome annotation, comparative genomics and evolution of the model grass genus *Brachypodium* (Poaceae)” within the research grant project

CGL2012-39953-C02-01 “Comparative genomics and floral and adaptive evolution of model grasses” funded by the Ministry of Economy and Competitiveness (MINECO, Spain).

September 2014 to 2017

EPS (Department of Agrarian and Environmental Sciences) – University of Zaragoza
Assistant lecturer in the subject of Biology (Degree in Environmental Sciences). 240 hours

November to December
2012

Researcher (Master student; Collaboration grant)

UPNA – Public University of Navarre

Collaboration with Genetic and Microbiology Research group (Agrarian Production Department)

June 2011 to July 2012

Product Quality technician

Cooperativa San Sebastián (Agricultural Cooperative, locality La Almunia de Doña Godina – Zaragoza - Spain)

Ensuring product quality (fruit), product classification and others.

September 2010 to
June 2011

Teaching

EUPLA (Department of Physics) – University of Zaragoza.

Assistant lecturer: Practicals in the subjects of the Engineering Mechatronics and Industrial Organization Engineering.

RESEACH EXPERIENCE

Participation in Research Projects

2014 - 2017: PhD grant associated with the MINECO Project “Comparative genomics and floral and adaptive evolution of model grasses” (“Genómica comparada, biogeografía y evolución floral y adaptativa de gramíneas modelo”). EPS (University of Zaragoza).

2012 – 2013: Collaboration in transcriptomic and identification of helitrons studies in fungi. UPNA (Public University of Navarre).

2012 – 2013: Collaboration in the research “Metatranscriptomics of Forest Soil Ecosystem”.

2012 – 2013: Postgraduate degree Project “Análisis metagenómico de las comunidades microbianas presentes en un bosque Mediterráneo en Aspuz (Navarre-España)” (“Metagenomic analysis of microbial communities in a Mediterranean forest in Aspuz (Navarre-Spain)”). UPNA (Public University of Navarre).

2010: “Estudio del comportamiento agronómico de las colecciones de albaricoquero, paraguayo y platerina ubicadas en los viveros Mariano Soria de La Almunia de Doña Godina” (“Study of agronomic performance of the apricot-tree, paraguay-tree and platerina-tree collections located in the Mariano Soria nurseries in La Almunia de Doña Godina”). EPS /EUPLA– University of Zaragoza.

2009: “Estudio de la influencia de reguladores del crecimiento sobre la inducción foliar, fertilidad de las flores y producción final de la variedad de pera “Blanquilla” y del cultivo de la cereza” (“Study of influence of growth regulators on the floral induction, fertility and yields in “Blanquilla” pear variety and cherry tree”). EUPLA – University of Zaragoza.

2007 & 2010: “Estudio de la fertirrigación nitrogenada en frutales de hueso utilizando fertilizantes con el inhibidor de la nitrificación 3,4 dimetilpirazolfosfato DMPP. Efectos de la producción y desarrollo vegetativo en la zona del Jalón Medio” (“Study of nitrogen fertigation in stone fruit trees using fertilizer with 3,4-Dimethylpyrazole phosphate (DMPP) nitrification inhibitor. Effects on yield and shoot growth in the “Jalón Medio” area”). Compo – EUPLA (University of Zaragoza) agreement.

2007: “Estudio del comportamiento de aplicaciones de fertilizantes vía foliar en melocotonero con fertirrigación” (“Study of performance fertilizers applied by foliar channel in peach-tree under fertigation conditions”). Compo – EUPLA (University of Zaragoza) agreement.

2007 (March/October): “Determinación de la efectividad de la aplicación de quelatos de hierro en melocotonero en la zona del Jalón Medio” (“Evaluation of effectiveness of synthetic iron-chelates application in peach-tree located in “Jalón Medio” area”). Nufarm España S.A – EUPLA (University of Zaragoza) agreement.

2006 – 2007: “Estudio de la utilización de abonos recubiertos de liberación lenta (BASACOTE®) en plantación de árboles frutales en el área frutícola de Zaragoza” (“Study of slow-release nitrogen fertilizers (BASACOTE®) application in orchards in Zaragoza”). Compo – EUPLA (University of Zaragoza) agreement.

Funding Projects

Project ID: 139-2016

Title: Desentrañando el origen y los mecanismos de la poliploidía en un género de

gramíneas modelo (*Brachypodium*) ampliamente representado en el Altoaragón

01/01/2017-12/15/2017

PI: Rubén Sancho Cohen

Funding: Instituto de Estudios Altoaragoneses (3,592 euros)

Publications

Antonio Díaz-Pérez, Diana López-Álvarez, **Rubén Sancho**, Pilar Catalán. 2018. Reconstructing the origins and the biogeography of species' genomes in the highly reticulate allopolyploid-rich model grass genus *Brachypodium* using minimum evolution, coalescence and maximum likelihood approaches. *Molecular Phylogenetics and Evolution*, 127:256-271. doi: 10.1016/j.ympev.2018.06.003. IF=4.419 (2016), *Biochemistry and Molecular Biology* (64/286), *Evolutionary Biology* (10/48), *Genetics and Heredity* (32/166), Q1.

Sancho R, Cantalapiedra CP, López-Álvarez D, Gordon SP, Vogel JP, Catalan P, Contreras-Moreira B. 2018. Comparative plastome genomics and phylogenomics of *Brachypodium*: flowering time signatures, introgression and recombination in recently diverged ecotypes. *New Phytologist* 218(4):1631-1644 (doi: 10.1111/nph.14926. Epub 2017 Dec 5.). IF=7.33, *Plant Sciences*, 9/212, Q1, D1.

Catalán P, López-Álvarez D, Díaz-Pérez A, **Sancho R**, López-Herránz ML (2016) Phylogeny and Evolution of the Genus *Brachypodium*, In: Vogel J (ed). *Genetics and genomics of Brachypodium*. Springer International Publishing Switzerland. Book Chapter.

Raúl Castanera, Gúmer Pérez, Leticia López, **Rubén Sancho**, Francisco Santoyo, Manuel Alfaro, Toni Gabaldón, Antonio G Pisabarro, José A Oguiza and Lucía Ramírez. 2014. Highly expressed captured genes and cross-kingdom domains present in Helitrons create novel diversity in *Pleurotus ostreatus* and other fungi. *BMC Genomics*, 15:1071 (doi: 10.1186/1471-2164-15-1071). IF=3.986.

Participation in Conferences

Authors: Pilar Catalán, Bruno Contreras, **Rubén Sancho**, Daniel Woods, Richard Amasino, Sean Gordon and John Vogel

Title: Evolution of nuclear and plastid pangenome: divergence vs introgression in the model grass *Brachypodium distachyon*.

Presentation: Oral communication

Congress: XIX International Botanical Congress

Place: ShenZhen, China

Date: 23-29 July 2017

Authors: Pilar Catalán, Bruno Contreras, **Rubén Sancho**, Sean Gordon and John Vogel
Title: The allotetraploid grass *Brachypodium hybridum* and evolutionary death-en or a newly emerging lineage?
Presentation: Oral communication
Congress: XIX International Botanical Congress
Place: ShenZhen, China
Date: 23-29 July 2017

Authors: Pilar Catalán, Bruno Contreras, **Rubén Sancho**, Daniel Woods, Richard Amasino, Sean Gordon and John Vogel
Title: Comparative plastome genomics and phylogenomics of *Brachypodium*: flowering time signatures, introgression and recombination in recently diverged ecotypes
Presentation: Oral communication
Congress: XIX International Botanical Congress
Place: ShenZhen, China
Date: 23-29 July 2017

Authors: **Rubén Sancho**, Bruno Contreras-Moreira, David Des Marais, Sean Gordon, John Vogel, Pilar Catalan
Title: Phylogenomics and gene evolution in annual and perennial *Brachypodium* species
Presentation: Poster
Congress: 3rd International *Brachypodium* Conference 2017
Place: Beijing, China
Date: July 29-31, 2017

Authors: **R. SANCHO**, C. P. CANTALAPIEDRA, D. LÓPEZ-ÁLVAREZ, J. P. VOGEL, S. P. GORDON, D.P. WOODS, P. CATALÁN AND B. CONTRERAS-MOREIRA.
Title: Chloroplast genome assembly, annotation and phylogenomics of 56 *Brachypodium distachyon* complex accessions
Presentation: Poster
Congress: International *Brachypodium* Conference 2015
Place: UMass (Amherst – Massachusetts)
Date: June 16-19th, 2015

Authors: CATALAN P, LOPEZ-ALVAREZ D, **SANCHO R**, LOPEZ-HERRANZ ML, DIAZ-PEREZ A.
Title: Phylogeny and biogeography of *Brachypodium*: perennial/annual evolutionary switches

Presentation: Oral communication

Congress: International Brachypodium Conference 2015

Place: UMass (Amherst – Massachusetts)

Date: June 16-19th, 2015

Authors: RAÚL CASTANERA, GÚMER PÉREZ, **RUBÉN SANCHO**, FRANCISCO SANTOYO, JOSÉ ANTONIO OGUIZA, ANTONIO GERARDO PISABARRO, LUCÍA RAMÍREZ

Title: Rolling-circle transposons in fungi: diversity, structure and transcriptional activity

Congress: 12th European Conference on Fungal Genetics

Place: Sevilla (España)

Date: March 23 – 27th, 2014

Authors: CASTANERA R., PÉREZ G., SANTOYO F., ALFARO M., PARENTI A., MUGUERZA E., MEIJUEIRO M.L., BORGOGNONE A., VARAS L., **SANCHO R.**, OGUIZA J., PISABARRO A.G., Y RAMÍREZ L.

Title: Helitrons, active tools shaping Basidiomycete genomes. The Pleurotus ostreatus case

Congress: 9th Genomics of Energy and Environment

Place: Walnut Creek, California (USA)

Date: March 18 -20th, 2014

Authors: CONTRERAS-MOREIRA B, CANTALAPIEDRA C., LÓPEZ-ALVAREZ D, **SANCHO R**, GORDON S, VOGEL J, CATALÁN P

Title: Phylogenetic analysis of resequenced organelle genomes: the case of the Brachypodium distachyon complex chloroplasts

Presentation: Oral communication

Congress: VI National Conference BIFI.

Place: Zaragoza

Date: January 22-24th, 2014

Authors: CASTANERA R, PÉREZ G, **SANCHO R**, SANTOYO F, OGUIZA J, PISABARRO AG, RAMÍREZ L.

Title: Unravelling the impact of helitrons in basidiomycetes' genomes

Congress: Comparative Genomics of Eukaryotic Microorganisms

Place: Sant Feliu de Guixols (España)

Date: October 19 – 24th, 2013

Organizing Committee Member: VII Congreso SEAE de Agricultura y Alimentación Ecológica (VII Congress of Organic Food and Agriculture). Sociedad Española de

Agricultura Ecológica, Zaragoza (Spain), September, 20 – 23, 2006.

Seminars teaching

Rubén Sancho. Genome annotation, comparative genomics and evolution of the model grass genus *Brachypodium* (Poaceae). Universidad de Zaragoza. March 8th, 2017

Rubén Sancho. Genome annotation, comparative genomics and evolution of the model grass genus *Brachypodium* (Poaceae). Universidad de Zaragoza. March 17th, 2016

Pilar Catalán & **Rubén Sancho**. Introduction to NGS II. Bioinformatic Pipelines. Data Processing and Data Analyses. Tomsk State University (Tomsk – Russia). October 16th, 2015.

Rubén Sancho. Ensamblaje y análisis de genomas cloroplásticos de *Brachypodium* (Poaceae) (Assembly and analyses of chloroplastic genomes of *Brachypodium* (Poaceae)". Universidade Da Coruña (A Coruña – Spain). September 5th, 2014

Attendance to research courses and workshops

ERA Career Day: Oportunidades profesionales en la carrera investigadora del siglo XXI. Universidad de Zaragoza. November 23-24th, 2017.

Doctoral Conference of Doctoral Program in Agriculture and Environmental Sciences. Centro de investigación y tecnología Agroalimentaria (CITA). March 10th, 2017. 5.5 hours.

Seminar titled "Dissecting grass genome organisation at the cytomolecular level using the model genus *Brachypodium*" conducted by Robert Hasterok (University of Silesia). March 8th, 2017

Workshop: Training course of CyFlow Ploidy Analyzer (Sysmex), Universidad de Zaragoza. June 14th, 2016. 8 hours.

Doctoral Conference of Doctoral Program in Agriculture and Environmental Sciences. Insituto Pirenaico de Ecología (IPE). March 17th, 2015. 5.5 hours

Workshop: Data Carpentry Genomics Workshop at Harvard". Harvard University. August 19 – 20th, 2015. 12 horas.

Workshop: Callus initiation in *Brachypodium*. University of Massachusetts (UMass – Amherst). June 29th, 2015.

Seminar titled “The evolution of pollen-pistil incompatibilities in Texas wildflowers” conducted by Federico Roda (Harvard University). June 22nd, 2015

“Plant in New England” seminars conferences:

“The molecular basis of genotype by environment interaction in Arabidopsis” David L. Des Marais (Harvard University), “The evolutionary origin of ethylene biosynthesis in plants: A simple pathway with a complex history” Matthew Booker (Brown University) and “Methylation sensitive expression of a DNA demethylase gene serves as an epigenetic rheostat” Ben Williams (Whitehead Institute). June 1st, 2015

Workshop: Introduction to Odyssey & RC Services. Harvard University. May 29th, 2015.

Seminar titled “Survival of the Roundest: Why Evolving Populations Reside on Fitness Domes and not Volcanoes” conducted by Danniell Weinreich (Brown University) in Boston in May 8th, 2015.

Course: Phylogenies and genealogies of DNA: Reconstruction and Applications (July 8-18th, 2014. Universitat de Barcelona – UB).

Course: Flora and vegetation of the Pyrenees (XIX edition). (July 21-25th, 2014. IPE – Jaca – Huesca).

Seminar titled “Selección a escala genómica de marcadores moleculares óptimos para estudios de microbiología ambiental y evolutiva” conducted by Pablo Vinuesa (Estación Experimental de Aula Dei – CSIC). June 26th, 2014.

Research stay

Place: Arnold Arboretum (University of Harvard)

Date: 4 months (May 4th, 2015 – August 31st, 2015)

Research Group: David Des Marais Group

Topic: Transcriptomic of *Brachypodium* genus

Place: Arnold Arboretum (University of Harvard)

Date: 3 months (July 1st, 2016 – September 28st, 2016)

Research Group: David Des Marais Group

Topic: Transcriptomic of *Brachypodium* genus

AWARDS

Best oral communication “Genome annotation, comparative genomics and evolution of the model grass genus *Brachypodium* (Poaceae)” in Doctoral Conference of Doctoral Program in Agriculture and Environmental Sciences (2016)

First award of Technical Agricultural Engineering - Project title: “Estudio de la aplicación foliar de nuevos productos nutricionales de aplicación foliar en melocotonero” (“Study of new nutritional products applied foliar channel in peach tree”).

PERSONAL SKILLS

Mother tongue(s)

Spanish

Other language(s)

UNDERSTANDING

SPEAKING

WRITING

Listening

Reading

Spoken
interaction

Spoken
production

Intermediate

Intermediate

Intermediate

Intermediate

Intermediate

Computer skills

Genomic and transcriptomic analysis tools: Artemis, ACT (Artemis Comparison Tool), MEGA, BLAST, Clustal X, MAFFT, Vevet, Trinity, Trimmomatic, FastQC, SSPACE, Trinity.

Co-expression analysis tools: Kallisto, Sleuth, WGCNA (R package)

Phylogenomics tools: Mr Bayes, RAxML, Beast, DnaSP, IQTREE

Statistical software (StatGraphics, XLSTAT, R)

OS: Windows and Linux