



Master project 2021-2022

Personal Information

Supervisor	Ana I. Caño-Delgado
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Institution	CRAG (Centre for Research in Agricultural Genomics)
Website	https://www.cragenomica.es/research-groups/brassinosteroid-signaling-in-plant-development
Group	Brassinosteroid signaling in plant development

Project

Computational systems biology

Project Title:

Development and implementation of bioinformatic tools for the functional analysis of plant adaptation to climate change

Keywords:

Drought, brassinosteroids, multi-omic data, bioinformatics

Summary:

Drought and elevated temperatures consequence of climate change cause major losses in agriculture and threaten food security worldwide. The group of Ana I. Caño-Delgado at CRAG (Centre for Research in Agricultural Genomics, UAB Campus, Barcelona) has an international reputation in the study of hormone signalling pathways necessary for plant growth and adaptation to abiotic stresses. Her lab uses system biological approaches for investigating how BRI1-type of membrane receptors modulate plant growth under severe drought stress without affecting growth. By using bioinformatics, a wealth of multi-omic data has been generated in her lab that offers an excellent opportunity to design new functional genomics tools: 1) to unveil new *in silico* biotechnological approaches to improve the plant signalling under stress and 2) to shed light into the present understanding of the regulatory networks of brassinosteroid (BR) signalling with a bioinformatics point of view.

References:

1. Gupta A, Rico-Medina A, Caño-Delgado AI. The physiology of plant responses to drought. *Science*. 2020 Apr 17;368(6488):266-269. doi: 10.1126/science.aaz7614. PMID: 32299946.
2. Lozano-Elena F, Caño-Delgado AI. Emerging roles of vascular brassinosteroid receptors of the BRI1-like family. *Curr Opin Plant Biol*. 2019 Oct;51:105-113. doi: 10.1016/j.pbi.2019.06.006. PMID: 31349107.
3. Fàbregas N, Lozano-Elena F, Blasco-Escámez D, Tohge T, Martínez-Andújar C, Albacete A, Osorio S, Bustamante M, Riechmann JL, Nomura T, Yokota T, Conesa A, Alfocea FP, Fernie AR, Caño-Delgado AI. Overexpression of the vascular brassinosteroid receptor BRL3 confers drought resistance without penalizing plant growth. *Nat Commun*. 2018 Nov 8;9(1):4680. doi: 10.1038/s41467-018-06861-3. PMID: 30409967.

Expected skills::

Knowledge in bioinformatics analysis of omics data (RNAseq, proteomics, metabolomics); Coding experience in R or python; Knowledge in data analysis and statistics; Database managing and developing; Ability to report results in a clear and summarized manner working independently and within a collaborative research team; Knowledge in web tools is desirable

Possibility of funding::

To be discussed

Possible continuity with PhD: :

To be discussed

Comments:

The candidate will work with Veredas Coletto Alcudia, an expert Bioinformatician doing the PhD in the lab.
