NEWSLETTER

May 2024

DARKWIN PROJECT

Pollinator-assisted plant natural selection and breeding under climate change pressure

DARkWIN Natural Selection

European Innovation Council

Funded by the European Union

DO YOU KNOW ABOUT THE DARKWIN PROJECT?

the plant journal SEB

Perspective | Open Access

Pollinator-assisted plant phenotyping, selection, and breeding for crop resilience to abiotic stresses

Francisco Pérez-Alfocea, Monica Borghi, Juan José Guerrero, Antonio R. Jiménez, José M. Jiménez-Gómez, Alisdair R. Fernie, Ignasi Bartomeus

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In 2024 the first perspective article of the DARkWIN Project was published in The Plant Journal, jointly produced by several of the collaborating researchers.

NEWS

NEW GREENHOUSE AS PHENOTYPING PLATFORM

RFID TECHNOLOGY TO TRACK BUMBLEBEES

CONNECTING YOUNG PEOPLE TO SCIENCE

Consortium

CSIC Consejo Superior de Investigaciones Científicas

CEBAS Centro de Edafología y Biología Aplicada del Segura

CAR Centre for Automation and Robotics

CBGP UPM-INIA

EBD CSIC

Max Planck Institute of Molecular Plant Physiology

doriane

UNIGENIA SEMILLAS

NOVAGRIC SMART AGRICULTURE

WORKSHOP

DARkWIN
Natural Selection

POLLINATOR-ASSISTED PLANT NATURAL SELECTION AND BREEDING UNDER CLIMATE CHANGE PRESSURE

PROGRAMA

7 JUNIO

8:30h Apertura y sesiones orales (Salón de actos del CEBAS-CSIC, Campus de Espinardo, Edificio 25, Murcia)

- Apertura (Juan José Alarcón Cabañero, director del CEBAS-CSIC)
- Introducción al proyecto DARkWIN Francisco Pérez Alfocea (CEBAS-CSIC)
- Monitorización de polinizadores por RFID Antonio R. Jiménez (CAR-CSIC)
- Herramientas genómicas en agricultura José M. Jiménez Gómez (CBGP-CSIC)
- Los abejorros toman decisiones complejas cada día. ¿Podemos aprender de ellos? Ignasi Bartomeus (EBD-CSIC)

9:30h Transporte en autobús a la Finca Experimental del CEBAS-CSIC (Santomera, Murcia)

10:00h Visita técnica a la plataforma de fenotipado de DARkWIN

11:30h Regreso en autobús al CEBAS-CSIC (Campus de Espinardo, Murcia)

12:00h Aperitivo y clausura

¡Inscríbete aquí!

Hasta el 31 de mayo.

darkwin.eu | @darkwin_eu | DARkWIN European Project | @darkwin_eu

Consortium

CSIC · CEBAS · CAR · CBGP UPM-INIA · EBD CSIC · Max Planck Institute of Molecular Plant Physiology · doriane · UNIGENIA SEMILLAS · NOVAGRIC SMART AGRICULTURE

European Innovation Council · Funded by the European Union

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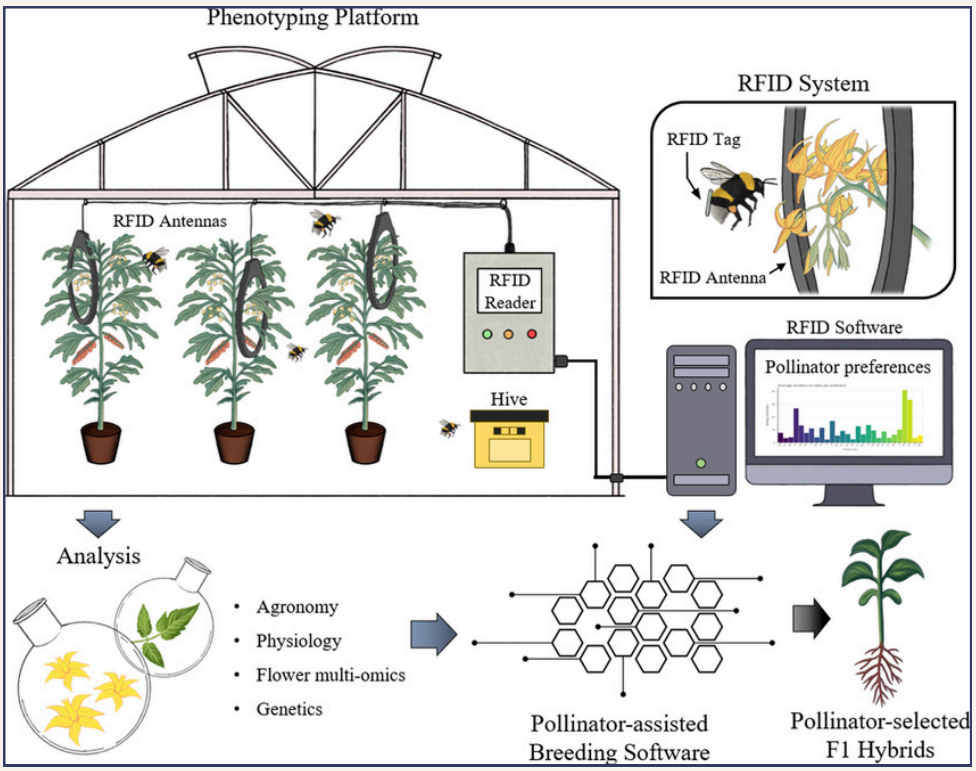


Figure 1. *DARkWIN: a plant phenotyping platform under environmental pressure based on pollinator foraging decisions.*

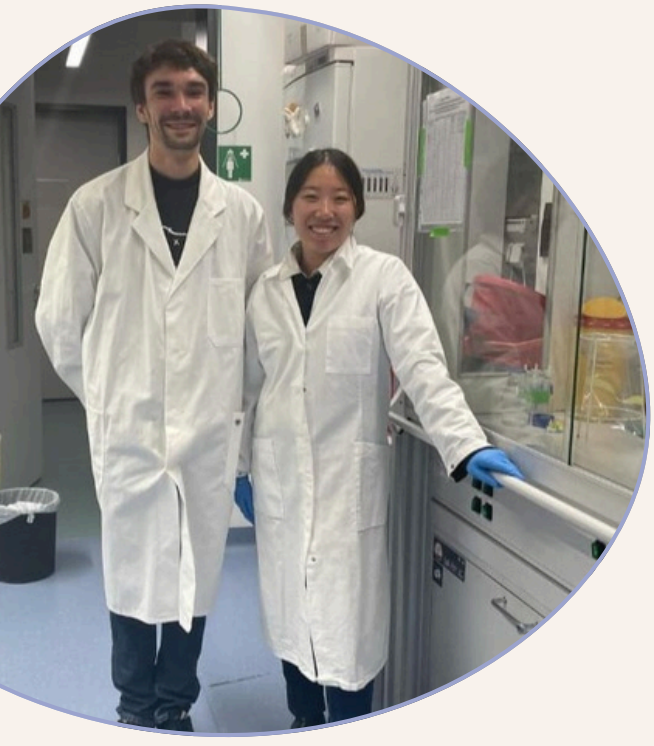
The article discusses the importance of selecting suitable tracking systems and pollinators to ensure agricultural production in the face of climate change. It explores the suitability of using commercial bumblebees, such as *Bombus terrestris*, in greenhouse environments due to their social behavior and ability to pollinate a wide variety of crops. Additionally, it delves into the correlation between floral traits and agronomic success, as well as the role of pollinators in enhancing pollination efficiency and fruit quality. The DARkWIN approach is presented as an innovation that utilizes pollinator foraging decisions as a tool to select plant genotypes more resilient to abiotic stress. This approach integrates radio-frequency identification (RFID) technology and the Internet of Things (IoT) to capture data on plant-pollinator interactions and improve the selection of resilient and sustainable crops in a climate change context.

MEETINGS & NETWORKING

Steering Committee Meeting

The second official meeting of the DARkWIN Project took place at the CSIC general facilities in Madrid (Spain), on November 14-15. In this meeting the progress in the implementation of the different WPs was discussed, starting with the project overview and detailing the progress of WP1, WP2, and WP5, as well as the start of WP3 and WP4.

Knowledge transfer between partners: Spain and Germany



We are very grateful for the collaboration between Centro de Edafología y Biología Aplicada del Segura (CEBAS-CSIC) and Max Planck Institute of Molecular Plant Physiology with the European Project DARkWIN. Our PhD student Maialen Ormazabal Oria spent 3 months carrying out metabolomic studies of tomatoes with GC-MS, under the supervision of Dr. Guillaume Decros, in the group of Prof. Dr. Alisdair Fernie thanks to an iMOVE2023 scholarship.

NEWS

We have a new home!

In 2024 a greenhouse with more than 1,000 ha of land was built on the Santomera experimental field in Murcia (Spain). As designed in WP2, six different modules have been created to host more than 1200 plants for the proposed trial. This task was carried out by the company NOVAGRIC.

RFID technology to track bumblebees is now ready

Within the framework of the DARkWIN Project, the deployment of the bumblebee RFID geo-localisation system developed by the LOPSI Group of the CAR-CSIC is now ready. We want to find out what are the pollination preferences of bumblebees on flowering tomato plants under climate change conditions.

Connecting young people to science

As students, we all went through the uncertainty of not knowing what you want to do when you “grow up”. DARkWIN staff held a workshop in four different schools in Murcia (Spain) for students between 8 and 16 years of age. They were able to communicate the aim of the project, and showed the small greenhouse prototype. The youngsters had a lot of fun!

CONGRESSES & EVENTS

4th Asian Horticultural Congress (AHC2023)

AHC2023 held in Tokyo (Japan) in August 2023. The innovative DARkWIN Project concept and some preliminary results will be communicated to a international audience in the Pacific area, mostly focused on applied aspects of horticulture. For more information, please visit https://ahc2023.org/.

XI National Beekeeping Congress

XI National Beekeeping Congress was held from 29th September to 2nd October 2023 in Málaga (Spain), a symposium where scientists joint beekeepers to deal with topics related to pollination services, honey origin identification and fraud, and bees health, threatened by varroosis and the Asian hornet invasion. For more information, please visit https://congresoapicultura.es/.

Fruit Attraction

Fruit Attraction 2023 took place in Madrid (Spain) from 3th to 5th October. This event has once again become the world's epicentre for the commercialisation of fresh produce, where innovation, quality and diversity are key factors influencing operators and retailers from all over the world to plan their campaigns at just the right time. For more information, please visit https://www.ifema.es/en/fruit-attraction.

CONGRESSES & EVENTS

Science and Technology Week 2023

The aim of Science and Technology week is to show the public in an attractive way the reality of science and the people who make it possible. In the Region of Murcia, it is organized by the Séneca Foundation and was held from 20th to 22nd October. CEBAS-CSIC group has participated to show the work being done in the DARkWIN Project. For more information, please visit https://fseneca.es/secyt23/.

2nd Joint Workshop CEBAS-CBBC 2023

On 25 October, the second joint workshop between CEBAS and the Borj Cedria Biotechnology Center (CBBC, Tunisia) on “Current perspectives of Mediterranean agriculture in a context of climate change” was held within the framework of the Halofarm Project (PRIMA Program) and the ICOOP project (CSIC). The workshop focused on the effects of salinity on higher plants in the context of climate change, with particular emphasis on the Mediterranean basin, a sensitive area to the negative effects of climate change. Prof. Dr. Francisco Pérez Alfocea (CEBAS-CSIC) talked about temperature, salinity, and nutrient deficiencies effects on the reduction of crop productivity, presenting the new radical vision of the DARkWIN Project. For more information, please visit https://cienciacebas.wordpress.com/2023/11/17/2nd-joint-workshop-cebas-cbbc-current-prospects-for-mediterranean-agriculture-in-a-changing-climate/.

CONGRESSES & EVENTS

AGROALNEXT Congress 2024

AGROALNEXT 2024: Innovation and transfer in the Spanish agri-food sector, took place from 6 to 8 March 2024 in Gandía, Spain. Prof. Dr. Francisco Pérez Alfocea attended to the congress to present the European project, outline the objectives and report on the project's progress to date. For more information about AGROALNEXT, please visit https://agroalnextgva.umh.es/.

Horticultural Science Conference 2024

The Horticultural Science Conference was held from 20 to 22 March in Cartagena, Spain. Its aim is to present the most innovative scientific contributions in the field of Horticultural Sciences and the experiences and developments of companies in the sector. Members of the DARkWIN Project shared the preliminary results analysing pollination choices together with source to sink rellationships under environmental pressure. Any other end could be better, as a PhD student Maialen Ormazabal was awarded for her Acta Horticulturae communication. For more information, please visit https://jornadassech2024.org/.

Roots for the future Workshop

First scientific meeting of the thematic network, organised by the Institute of Bioengineering (IB-UMH) took place in Elche (Spain) on 21-22 March 2024. At the meeting, the research carried out by the network's laboratories was presented and the active participation of research trainees was encouraged. Plant Hormones Group (CEBAS-CSIC) participated with three communications, including the intervention of Prof. Dr. Francisco Pérez Alfocea.

CONGRESSES & EVENTS

FUTURE EVENTS

Vth European Horticulture Congress

V European Horticulture Congress will be held from 12 to 16 May, in Bucharest (Romania). Founded in April 1959 as a global network of horticulturists and horticultural scientists seeking international cooperation, today the International Society for Horticultural Science (ISHS), is a truly global network comprising over 60,000 individuals, universities, governments, institutions, libraries, and commercial companies. For more information, please visit https://ehc.usamv.ro/.

First RECROP Annual Meeting 2024

RECROP, an initiative supported by the European Cooperation in Science and Technology (COST.eu), stands at the forefront of combatting the increasing threat of climate change on global food security. The first meeting will be held 22-24th May in Murcia (Spain). For more information, please visit https://www.recrop-cost.com/.

First SUSTAIN Meeting

SUSTAIN (Sustainable use of salt-affected lands) is a COST Action which aims to build a global transdisciplinary network of scientific experts and engaged stakeholders in the field of salinity research in the context of food security, sustainability and the intensifying climate crisis. The meeting will be held 27-29th May in Valencia (Spain). For more information, please visit https://sustaincostaction.eu/.

IX UMU-UPCT-CMN Doctoral Conferences 2024

The International Doctoral School of the University of Murcia (EIDUM), together with the International Doctoral School of the UPCT (EINDOC) and the Mare Nostrum Campus (CMN), organize the IX International Doctoral Conference 2024 on 10-12th June 2024. This conference is aimed at PhD students from UM and UPCT, as well as other Spanish or foreign universities. For more information, please visit https://www.um.es/web/eidum/actividades/jornadas-doctorales/2024.

CONGRESSES & EVENTS

FUTURE EVENTS

SECH Conference Mediterranean Crops in the face of Climate Change

The Spanish Society of Horticultural Sciences (SECH) holds the II Conference of Citriculture, XII Conference of the Fruit Growing Group and VII National Conference of the Olive Growing Group. The place chosen is the Martiánez Lake in Puerto de la Cruz (Tenerife, Spain) during 25-27th June 2024. DARkWIN group attends in order to present the project and its implication in facing climate change. The aim is to promote discussion and cooperation between researchers, technicians, farmers, students, exporters, and other agents in the sector for an exchange of experiences that contribute to increasing the profitability and sustainability of these sectors. This will help research centres to concentrate efforts and leverage existing resources to develop joint projects to find solutions to common problems and to improve scientific knowledge in response to current challenges in this sector, especially in the face of climate change. For more information, please visit https://www.sech.info/tenerife2024/.

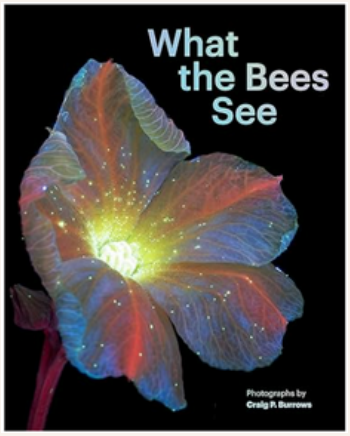
FURTHER READING

How bumblebees support sustainable agriculture?

Romain Royer presents on DORIANE website blog all the information you need to know about the innovative DARkWIN phenotyping project with the help of bumblebees.

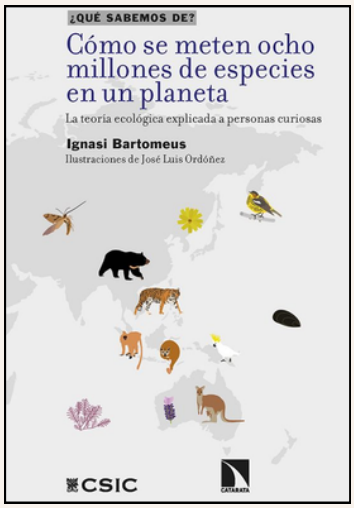
Let's check: https://www.doriane.com/blog/bumblebees-sustainable-agriculture.

Books



What the Bees See (Craig P. Burrows)

A comprehensive look into the amazing science of bees, this book collects mesmerizing ultraviolet-induced visible fluorescence (UVIVF) photography of flowers and nature and offers fascinating research that explores every aspect of our relationship with honeybees. Learn about the history of beekeeping, current environmental impacts affecting bees, and the rise of bee products in medical and wellness spaces.



How eight million species fit on one planet. Ecological Theory explained to curious people (Ignasi Bartomeus)

Do you want to know why it is calculated that there are eight million different species on the planet and not just a hundred or a hundred million? Why are there more species at the equator than at the poles? Why are there monkeys in South America? Or why doesn't the most competitive species beat all the others and live alone, dominating the world? To answer these questions, this book takes a journey through the history of ecology to introduce the main laws that regulate ecological communities and the four basic mechanisms that determine ecosystems: evolution, dispersal, biotic and abiotic regulations and, finally, luck.

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