

# DARKWIN PROJECT

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



European Innovation Council



Funded by the European Union

## >>> WHAT'S NEW IN 2025?



### Future Tech Week 2025

The DARKWIN Project is taking part in Future Tech Week 2025, a European initiative highlighting disruptive technologies for a sustainable future. This year, we are excited to present an online workshop on Pollinator-Assisted Breeding, showcasing how the natural intelligence of pollinators can drive plant selection under climate change conditions. [Register now here.](#)

## NEWS



>>>  
SUCCESSFULLY COMPLETING  
OUR FIRST TRIAL



>>>  
BRINGING SCIENCE AND  
INDUSTRY TOGETHER!



>>>  
INSPIRING YOUNG MINDS  
THROUGH SCIENCE!



Consortium



doriane



### 🚀 Future Tech Week 2025

We are excited to announce that the DARKWIN Project will take part in Future Tech Week 2025 (FTW2025), now a satellite event of the EIC Summit 2025, organised by the European Innovation Council (EIC). Taking place from 7 to 11 April 2025, FTW2025 is a celebration of research and innovation across Europe, offering a collaborative space to share knowledge and inspire future technologies.

As part of this initiative, we will be hosting an online workshop on Pollinator-Assisted Breeding, where we explore how pollinator behaviour can support plant selection strategies for climate-resilient agriculture.

 [Watch the workshop here](#)



9<sup>TH</sup>  
APRIL

# REGISTER NOW HERE!



# WORKSHOP

## POLLINATOR-ASSISTED BREEDING

Looking ahead, we're excited about the upcoming online workshop on April 9th, where we'll dive deeper into the latest findings and foster collaboration across teams. It will be a great opportunity to exchange ideas, address questions, and keep building momentum for the DARKWIN project.



### Are we releasing new resilient and pollinator-friendly plant varieties?

The Plant Hormones group of CEBAS-CSIC in Murcia (South-East Spain) has developed a new phenotyping platform, as part of the EIC Pathfinder project DARKWIN. This platform integrates six different greenhouse modules where plants are monitored for pollinators' activity. Climatic-conditions as well as fertigation regime are eligible for each module where plants are grown, and more than 300 radiofrequency antennae are placed for tracking of bumblebees at individual level.

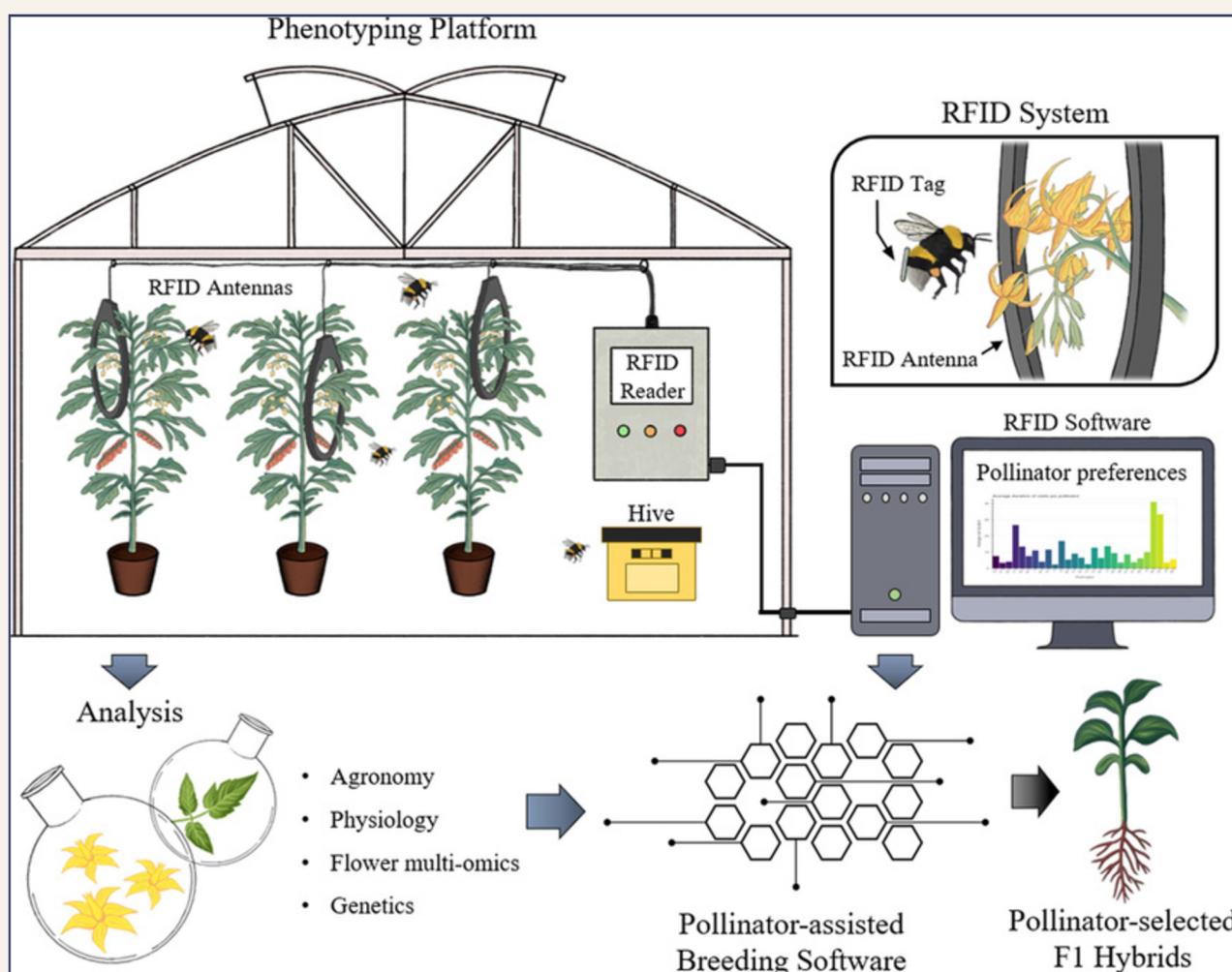
A fully-equipped team trained to capture and tag bumblebees and an automated pipeline designed by CAR-CSIC researchers are ready to work for interested users. Also, plant performance and fruit quality analysis are available. The platform is optimized for tomato plants but can be adapted to other vegetables that require or benefit from animal pollination as cucumber, strawberry, melon or watermelon. The project will be presented by the coordination team, and a virtual visit will take place from the greenhouse, so we will be able to solve the emerging doubts by a live demonstration.



# DO YOU KNOW ABOUT THE DARKWIN PROJECT?

Three papers have been published about the DARKWIN project:

- Ormazabal, M., Prudencio, Á.S., Martínez-Melgarejo. et al. (2024). Rootstock Effects on Tomato Fruit Composition and Pollinator Preferences in Tomato. *Horticulturae*, 10(9), 992. [Read more](#)
- Pérez-Alfocea, F., Borghi, M., Guerrero. et al. (2024). Pollinator-assisted Plant Phenotyping, Selection, and Breeding for Crop Resilience to Abiotic Stresses. *Plant J.*, April 6, 2024. [Read more](#)
- Martínez-Andújar, C., Youssef, R.B., Prudencio, Á.S. et al. (2023). Bumblebees Sense Rootstock-Mediated Nutrition and Fertilization Regime in Tomato. *Plant Soil*. [Read more](#)



*DARKWIN: a plant phenotyping platform under environmental pressure based on pollinator foraging decisions.*



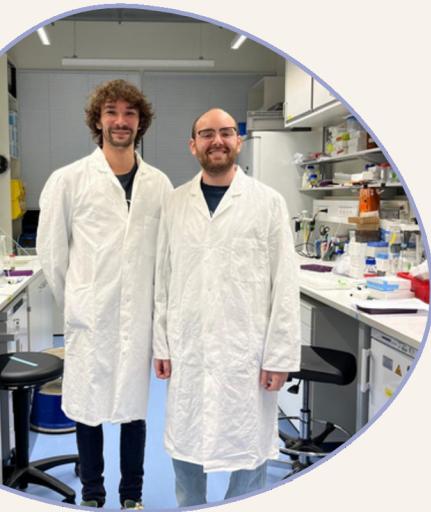
## MEETINGS & NETWORKING

### »»» Project Update: Official Meetings with All Partners

The third and fourth official project meetings were held with all partners. The third meeting took place in June 2024, where the progress of the project trial was discussed. The fourth meeting, held in November 2024, focused on interpreting the results and reviewing the advancements of each Work Package (WP).



### Knowledge transfer between partners: <<< Spain and Germany



The collaboration between the Centro de Edafología y Biología Aplicada del Segura (CEBAS-CSIC) and the Max Planck Institute of Molecular Plant Physiology within the framework of the European Project DARKWIN was highly valued.

Thanks to an FPI of Fundación Séneca 2024 scholarship, PhD student Juan José Guerrero spent three months conducting metabolomic and VOC studies on plant tissues using GC-MS and XXX. His work was carried out under the supervision of Dr. Guillaume Decros in the group of Prof. Dr. Alisdair Fernie.

### »»» Pollinating Behaviour Meeting

DARKWIN team has attended a meeting to discuss some aspects of pollinators. The researchers delved into the behaviour and preferences of bumblebees in their pollinator interaction and laid the groundwork for defining the next experimental campaign in 2025.





# NEWS

## »»» Successfully Completing Our First Trial!

The research team completed its first trial after six months of hard work with over 1,200 plants and more than 30 different lines. In this experiment, they simulated two environments: controlled conditions and the effects of climate change. The study was conducted at the experimental farm of CEBAS-CSIC in Murcia, Spain.



## »»» Bringing Science and Industry Together!

A workshop for plant breeders was held at the facilities in Santomera, bringing together 29 participants - 13 from plant breeding companies and 8 from research centres or universities. The organizers were very satisfied with the outcome, as it allowed them to establish connections with four companies after the event.



## »»» Inspiring Young Minds Through Science!

Scientists from CEBAS-CSIC visited three different schools to celebrate the International Day of Women and Girls in Science and International Women's Day. Through interactive games and workshops, they introduced students to the research conducted at the institute, fostering curiosity and enthusiasm for science among young learners.





# NEWS

## >>> New Thesis: Insights from plant-pollinator assemblages

Blanca Arroyo defended her thesis entitled: Linking, individual niches to the structure, functioning and stability of mutualistic communities: Insights from plant-pollinator assemblages.

Blanca Arroyo Correa is a researcher at the Doñana Biological Station (EBD-CSIC) Dr.Ignasi Bartomeus supervisor. She is very interested in understanding the ecological and evolutionary processes that generate and shape biodiversity.

She participated in the Darkwin project, advising and analysing the flowers together with the PhD candidate Curro Molina last summer.

Congrats to the new Dra.Blanca Arroyo!



## >>> New conservation plant structure

Francisco Sandoval López, the DARKWIN agricultural technician, is already implementing a conservation plant structure on the DARKWIN phenotyping platform.





# CONGRESSES & EVENTS

## >>> Vth European Horticulture Congress 2024

V<sup>th</sup> European Horticulture Congress was 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>.



## >>> 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 “Climate-proof Crop Reproduction: From Lab to Farm” will be held 22-24<sup>th</sup> May in Murcia (Spain). DARKWIN Team attended to present the Project and some previous related results. For more information, please visit <https://www.recrop-cost.com>.





# CONGRESSES & EVENTS

## »»» Joint Meeting of INSAS & SUSTAIN 2024

The Salt-affected soils: threats and potentials  
Joint Meeting of the International Network os Salt-Affected Soils (INSAS) and the COST Action on Sustainable Use of Salt-affected Lands (SUSTAIN) was held in Valencia (Spain) on 27-31 May 2024. Prof. Dr. Francisco Pérez Alfocea presented results on salt stress and phosphorus deficiency, two abiotic factors aggravated by climate change. 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 10-12<sup>th</sup> June 2024. This conference is aimed at PhD students from UM and UPCT, as well as other Spanish or foreign universities. Our PhD Students presented their work within the framework of DARkWIN Project. For more information, please visit:

<https://www.um.es/web/eidum/actividades/jornadas-doctorales/2024>

**IX Jornadas Doctorales EIDUM-EINDOC-CMN 2024**  
10 AL 12 DE JUNIO

**IX Jornadas Doctorales EIDUM-EINDOC-CMN**  
UMU – UPCT

**XI jornadas doctorales y VI jornadas de divulgación científica**

**9**  
Grupo UNIVERSIDADES



# CONGRESSES & EVENTS

## »»» GREENTECH Amsterdam 2024

WP Leader Juan Pardo, NOVAGRIC R&D manager, attended to AgriTech fair in Amsterdam. GreenTech was held from 11th to 13th June at RAI Amsterdam. This fair was focus on food security, safety and the role of technology in making horticulture more sustainable. Despite the challenges facing the industry, innovation continues to thrive, with numerous high-tech examples. In this context, Juan Pardo showed DARKWIN innovative vision and its impact in the agriculture technology. For more information, please visit <https://www.greentech.nl/>



## »»» SECH Conference Mediterranean crops in the face of climate change 2024



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 Martíánez Lake in Puerto de la Cruz (Tenerife, Spain) during 25-27<sup>th</sup> 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.

For more information, please visit <https://www.sech.info/tenerife2024>



## CONGRESSES & EVENTS

### »»» XXXI Annual seminar on automatics, industrial electronics and instrumentation (SAAEI 24)

SAAEI 2024 was held in Granada (Spain) on 3-5 July 2024. The annual congress is aimed at researchers and companies to describe work in the fields of automation, electronics and instrumentation. Prof. Dr. Antonio Ramón Jiménez Ruiz attended to share his work on the geolocation of pollinating bumblebees in crop breeding studies.

For more information, please visit  
<https://saaei.org/saaei2024>



### »»» Fruit Attraction 2024

This year, DARKWIN team has participated in Fruit Attraction 2024, presenting the European Project DARKWIN. The event took place in IFEMA, Madrid (Spain), from October 8th to 10th, and featured a special talk at the Biotech Forum with the speech of four Work Package Leaders of the project: Prof. Dr. Francisco Pérez-Alfocea from CEBAS-CSIC, Dr. Antonio Jiménez from CAR-CSIC, Juan Pardo from NOVAGRIC and Tristan Duminil from DORIANE. For more information, please visit  
<https://www.ifema.es/fruit-attraction>





## CONGRESSES & EVENTS

### »»» Science and Technology Week of Murcia 2024

Once again, the DARkWIN project participated in the Science and Technology Week, which took place in Murcia (Spain) from October 25 to 27, 2023. During this event, a hands-on workshop allowed attendees to experience the project's innovative approach firsthand. The activity featured a small-scale representation of the bumblebee monitoring system in an elevated urban orchard, where the public could closely observe bumblebees in action and explore the inner workings of a hive through a transparent wall. For more information, please visit <https://fseneca.es/secyt24/>



### »»» 5th International Conference on Plant Metabolism

Dr. Felix Martinez from CBGP-CSIC has attended the 5<sup>th</sup> International Conference on Plant Metabolism ICPM 2024 held in Sanya, China, from November 22<sup>nd</sup> to 25<sup>th</sup>, with the European Project DARkWIN. The conference concentrated on the theme of "Plant Metabolism and Design Breeding". We are proud to participate in this international congress and to be able to show the science we do in this project.

For more information, please visit <https://icpm2024.casconf.cn/>





## CONGRESSES & EVENTS

### »» 12th European Union Framework Programme for Research and Innovation

Prof. Dr. Francisco Pérez-Alfocea has been invited to the Horizon Europe conference organising by the Center for Technological Development and Innovation (CDTI), in collaboration with the Ministry of Science and Innovation, the European Commission and the City Council of Oviedo under the slogan "Beyond Horizon", which was held on 28<sup>th</sup> November in Oviedo, Spain. For more information, please visit <https://12conferenciapm.cdti.es>.



### »» Beekeeping Machinery and Nutrition Fair 2025

On February 25th, the First Beekeeping Machinery and Nutrition Fair was held in Yecla, Murcia. Dra. Angela Sánchez Prudencio and PhD student Juan José Guerrero had the opportunity to listen to fascinating talks about Bee Nutrition and Pollen Quality, as well as discussions highlighting the significant threat posed by the *Vespa orientalis* hornet, which is spreading through Andalusia and has already reached Murcia. For more information, please visit: <https://avespa.es/>.





## CONGRESSES & EVENTS

### »»» European EIC Pathfinder Project talk at the University of Murcia 2025

It was an honor that Professor Francisco Pérez-Alfocea gave a talk at the University of Murcia on how he secured the European EIC Pathfinder project and his journey from the inception of the idea to its successful realization.



### »»» AGROALNEXT2025: Innovation and transfer in the Spanish Agri-food sector 2025

The AGROALNEXT project integrated research and innovation in the agri-food sector within a collaborative effort supported by European, national, and regional institutions.

The AGROALNEXT25: Innovation and Transfer in the Spanish Agri-Food Sector congress was held on February 26, 27, and 28, 2025, at the Miguel Hernández University in its Orihuela campus. The event showcased the progress of the AGROALNEXT project, including tangible transfer advancements and specific coordination sessions for transfer and innovation.

For more information, please visit:  
<https://congresoagroalnext.umh.es/>





## CONGRESSES & EVENTS

### »»» Connecting Root: Innovation and collaboration in agrobiotechnology 2025

The Connecting roots Workshop concluded on March 11th at the Center for Biotechnology and Genomics of Plants (CBGP), providing a unique space where science and industry met to drive innovation in the study of roots and their application in Agrobio technology.

For more information, please visit: [https://www.cbgp.upm.es/archivos/cartel\\_empresas\\_final.pdf](https://www.cbgp.upm.es/archivos/cartel_empresas_final.pdf)



### »»» First Santomera Science Fair 2025

The event took place for the first time in the Region of Murcia, with the first edition held in Santomera on Friday, March 28th, and Saturday, March 29th. During this event, research on rootstocks and the bumblebee DARkWIN European Project was showcased 🍎🐝 by Dñ. Maialen Ormazabal Oriá, Dra. Purificación Andrea Martínez Melgarejo, Dra. Cristina Martínez-Andújar, and Dr. José Ángel Martín Rodríguez. This event provided another opportunity to connect with the public and share our work.





# CONGRESSES & EVENTS

## >>> FUTURE EVENTS

### VI Eucarpia Section Meeting on Organic and Low Input Agriculture 2025

EUCARPIA aims to promote scientific and technical co-operation in the field of plant breeding in order to foster its further development. VI EUCARPIA Section Meeting on Organic and Low Input Agriculture. The event will take place in Coimbra, Portugal, at the School of Agriculture of the Polytechnic of Coimbra, from May 26th to 28th, 2025. For more information, visit their website: <https://www.eucarpia.eu/>.

### 18th National Congress of Horticultural Congress 2025

The National SECH Congress  was first held in Valencia in 1983. After 40 years, the 18th National Congress of Horticultural Sciences will return to Valencia , organized in collaboration with the Universitat Politècnica de València (UPV) and the Instituto Valenciano de Investigaciones Agrarias (IVIA). The event will take place from June 9th to June 12th, 2025. For more information, visit their website: <https://sech-vlc2025.webs.upv.es/>.

### Iberian Plant Biology 2025

The Iberian Plant Biology-2025 Congress (IPB-25) which, on behalf of the Spanish and Portuguese Plant Biology Societies, will be held in Murcia (Spain) from 1 to 4 July 2025. Researchers and those interested in understanding how plants function at all levels of integration—molecular, cellular, organ, and plant—will be convened, with the goal of providing solutions for the relationship between plants and the environment, leading to a greener and more sustainable world to address climate change. The motto that will unite the event will be "Plants for a Sustainable World." For more information, visit their website: <https://iberianplantbiology2025.org>



## FURTHER READING

### »» Celebrating 10 years of pollinator sampling in the Doñana Natural Space!

Virginia Domínguez-Garcia, Francisco P. Molina, Oscar Godoy & Ignasi Bartomeus. *Interaction network structure explains species' temporal persistence in empirical plant-pollinator communities.* *Nature Ecology and Evolution.*



[LINK](#)

### »» Science and innovation advance in the region with the support of european funds

Francisco Pérez-Alfocea and his research group are trying to identify which varieties of tomato plants will be better able to withstand climate change. To do this, they are subjecting these plants to water and heat stress conditions (low watering and high temperatures), and monitoring the interaction between these tomato plants and pollinating insects (bumblebees).

#### La ciencia y la innovación avanzan en la Región a lomos de los fondos europeos

Los hallazgos en biomedicina o la investigación sobre cambio climático se sostienen sobre millones de euros de la UE



Doce científicos revisan tomatera en la finca experimental del Cebas en Santomera, donde se investigan los efectos del cambio climático. Vídeo Vicem/AGM

[LINK](#)

### »» Daily Field Program

The coordinator of DARkWIN was featured on “Diario del Campo” (7RM), the regional TV channel of Murcia. In this interview, they presented the Project platform and shared insights into its goals and impact on agriculture.



[LINK](#)

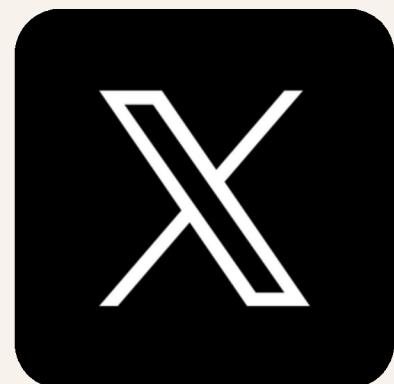
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