

DARKWIN PROJECT

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



European
Innovation
Council



Funded by
the European Union

»» THREE YEARS OF NATURAL SELECTION

After the last trial, we will release the first pre-commercial hybrids selected based on foraging decisions of bumblebee pollinators, resilient to simulated climate change conditions that combine reduced fertigation and elevated temperatures.



»»
**LAST TRIAL IN THE
PHENOTYPING PLATFORM**



»»
**IN THE ROAD TO THE
MARKET**



»»
**GAMES FOR SOCIETAL
ENGAGEMENT**



Consortium



Max Planck Institute
of Molecular Plant Physiology



doriane

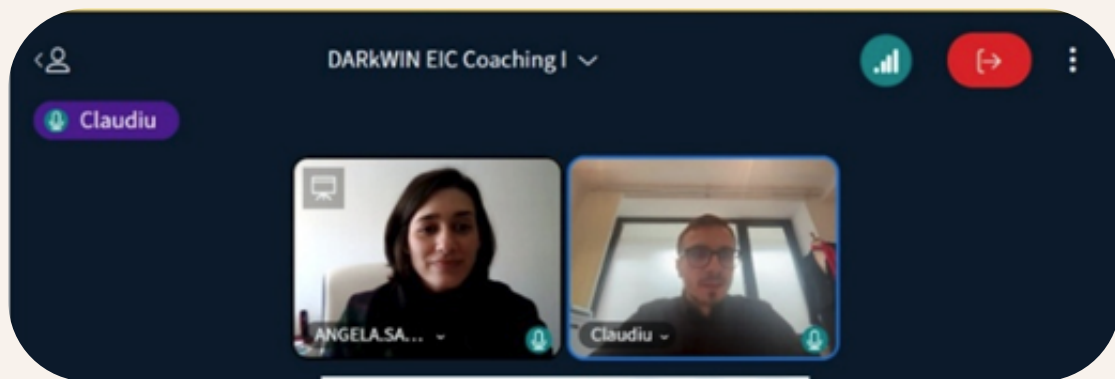


During the last trial of the project, we have received several technical visits to the phenotyping platform in **Santomera** (Murcia). Visitors came from companies (Riblanc), councils (Santomera and Ulea) and high school (ECA Catarroja). Such activities are organized by the manager team of the **CEBAS experimental orchard**. We are finalizing RFID monitoring and sampling, and after harvesting the trial will end at June 12th.



INDUSTRY ENGAGEMENT

Supported by **EIC Business Acceleration Services** coaching to align **Key Explotable Results (KERs)** with market needs and accelerate commercialization



To date, we have identified 9 new target companies (local producers) for 1:1 meetings. We have conducted three interview with potential end-users and received their feedback to refine market fit.



Organised under the EIC Communities initiative, these pitching sessions aim to foster collaboration between **EIC beneficiaries** and the broader innovation community (policymakers, investors, innovators and stakeholders).



Climate change affects crop physiology and plant-pollinator interactions, so identifying **genetic traits of resilience** is crucial. Thanks to the phenotyping platform for automated quantification of **genotype x pollinator x environment** interactions through a bumblebee geo positioning system, DARKWIN will deliver **tomato F1 pre-commercial varieties** based on the natural biological process of **pollinator-driven selection** under climate change.



2026 PUBLICATIONS

Three papers have been prepared for publication about the DARKWIN project:

Jiménez, A. R., Pilla, M., Serrano, J., Seco, F., Ruiz-Ruiz, L., Ormazabal, M., ... & Pérez-Alfocea, F. (2026). **Greenhouse-scale proximity-RFID system enabling flower-visit metrics for bumblebee pollination studies under climate change.** Computers and Electronics in Agriculture, 244, 111463.



Arroyo-Correa, *et al.* **Foraging decisions generate the network structure of plant–pollinator individual interactions** (under review)

Prudencio *et al.* **Salinity strengthens plant-pollinator mutualism through leaf physiological status in grafted tomatoes** (under review)



TRAINING & NETWORKING

»»» Hands-on experience in Bioinformatics

During his research stay at **Centro de Biotecnología y Genómica de Plantas (CBGP, Madrid)**, Juan José Guerrero is learning transcriptomic analysis, thanks to the **Genetics and Adaptive Genomics** research group, leaded by José Jiménez, our DARKWIN WP3 leader, with the special assistance of Vero, our new partner.



Working together at MPIMP <<<

Felix Martinez (**CBGP**) is doing a research stay at the Max Planck Institute of Molecular Plant Physiology. Felix and Guillaume are continuing our work on flower volatilome (or flower metabolomics). We are very exciting to see this new results soon!

»»» Floral color workshop in Sevilla

Curro Molina (**EBD**) and Angela Prudencio (**CEBAS**) will attend a workshop on **UV-photography**, spectral reflectance and absorbance of floral pigments at Universidad Pablo de Olavide (UPO) on May 12th. The objective is simulating **bee vision** in flower pictures.





NEWS

>>> New Thesis

Maialen Ormazabal will defend in June 2026 her thesis entitled: **Biochemical and metabolomic characterisation of fruits from grafted tomato (*Solanum Lycopersicum* L.) plants under selection by insect pollinators under abiotic stress conditions**



UNIVERSIDAD
DE MURCIA

>>> Biological control implementation

This year we have introduced Cryptobugs® and Nesibug® into our greenhouses, a natural predators of key pests such as the tomato leafminer (*Tuta absoluta*) and whitefly (*Bemisia tabaci*), in collaboration with Koppert Spain. With this measure, we promote biological control and more sustainable agriculture.

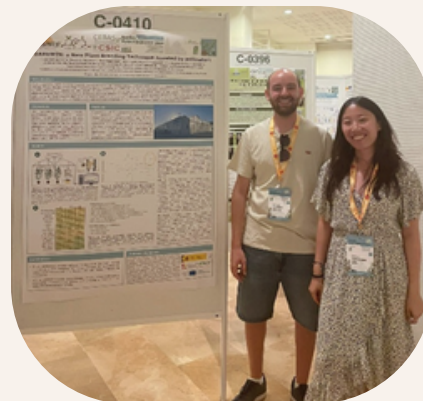




CONGRESSES & EVENTS

»»» Iberian Plant Biology 2025

The XXVI Meeting of the Spanish Society of Plant Biology together with the XIX Spanish-Portuguese Congress on Plant Biology was held from 1 to 4 July, in Murcia (Spain). The **CEBAS-CSIC** team participated with several communications: one oral (the PhD student Maialen Ormazabal) and two posters (the PhD student Juan José Guerrero as well as the postdoc José Ángel Martín-Rodríguez).



»»» Biometrics in Plant Breeding

In september 15-16 the coworker Angela Prudencio found herself at the **Roslin Institute in Edinburgh**, attending a workshop for *Designing Plant Breeding Programs with Complex Phenotypes*



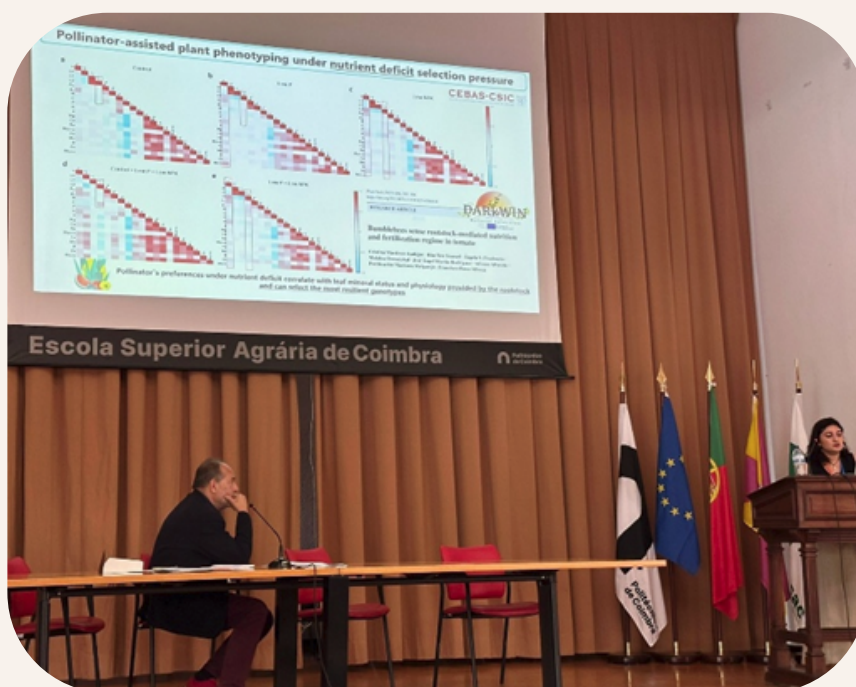


CONGRESSES & EVENTS

Later on, Angela and the Project Coordinator Francisco Pérez Alfocea had the opportunity to showcase the DARKWIN project in the **XIX Eucarpia Conference of Biometrics in Plant Breeding**. It was an excellent occasion to gain insights from biometrics experts, and gather valuable feedback from the plant breeding community.

»»» VI Eucarpia Conference on Breeding to meet environmental & societal changes

Dr. Purificacion Andrea Martinez Melgarejo presented an oral communication at Escola Superior Agrária de Coimbra about **"Promising tomato rootstock ideotypes for sustainable fertilizer user efficiency"**. Muito obrigado Puri!





CONGRESSES & EVENTS

>>> Fruit Attraction 2025

We've returned to the most important trade fair in the fruit and vegetable sector, together with **BIOVEGEN** – Plant Biotechnology Technology Platform, to highlight the role of **pollinators in sustainable production**:

- **Current EU policies are insufficient** to prevent the disappearance of pollinators
- Our small bumblebees can act as natural **phenotyping drones in challenging environments** affected by drought and high temperatures

Our talk entitled: “Inteligencia natural para adaptación de cultivos a entornos desafiantes” joined José (**CBGP**), Antonio (**CAR**), Paco and Angela (**CEBAS**) from the CSIC consortium.

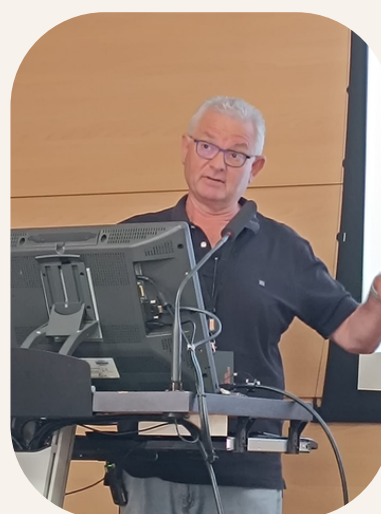




CONGRESSES & EVENTS

>>> XVIII Congreso nacional de Ciencias Hortícolas

Fantastic organization of the 2025 Spanish Horticultural Science Society in Valencia (9-12 June) where we shared the most recent findings of the DARKWIN and other projects led by the CEBAS-CSIC group! Moltes gràcies Valencia



>>> AGROALNEXT2025 Final Meeting

The AGROALNEXT project integrated research and innovation in the agri-food sector within a collaborative effort supported by European, national, and regional institutions. The final meeting took place in Pamplona during the month of November.

COMING SOON

INTERNATIONAL

PLANT GRAFTING SOCIETY

(WUHAN, CHINA, MAY 2026)

INTERNATIONAL

HORTICULTURAL CONGRESS

(KYOTO, JAPAN, AUGUST 2026)



DISSEMINATION ACTIVITIES

Science and Technology Week of Murcia 2025

The DARKWIN project participated in the Science and Technology Week organized by **Fundación Séneca**, which took place in Murcia (Spain) from October 24 to 26, 2025. This year, we introduced our little fellas—the bumblebees—highlighting their differences and similarities with honeybees and learning in a super fun way: a Pasapalabra-style challenge where everyone won a prize and, more importantly, left with a deeper **respect for pollinators**.



International Day of Women and Girls in Science

We visited two different schools and record three sessions with high school students in which they explored their vocations for their professional future and also get closer to Science.





FOLLOW US!



@darkwin_eu



DARkWIN
European Project



@darkwin_eu