

Optimisation de la qualité et de la composition de la graine de cameline : contribution des oléagineux à la diversification alimentaire

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En partenariat avec:



PROJECT DESCRIPTION

OLEOPROTID (2024-2029)

Interest of oilseeds in the diversification of food proteins -

The case of Camelina

ANR-23-DIVP-0004 (France2030)



Camelina sativa
(Brassicaceae)

GERMOLEOPRO (2025-2028)

Modulation of the nutritional value of camelina proteins through germination and identification of bioactive compounds of interest

Intercarnot Plant2Pro-Qualiment



UMR 1318 Institute Jean-Pierre Bourgin for Plant Sciences (IJPB)



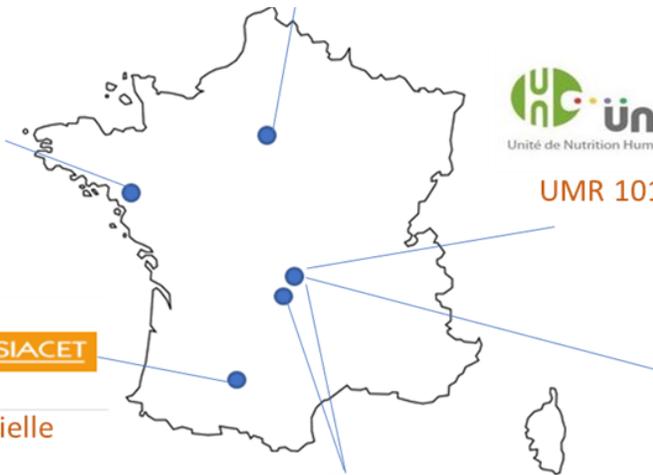
UR1268
Biopolymères Interactions Assemblages



UMR 1019 Unité de Nutrition Humaine



UMR Laboratoire de Chimie Agro-Industrielle



UMR545 Fromage

Label:



Structures académiques:

Privé

CONTEXT and OBJECTIVES

Addressing Global Seed Quality (composition) Challenges

Health Challenges

Diet quality impacts health

Environmental Challenges

Adapting to climate constraints

Economic Challenges

Financial barriers to access

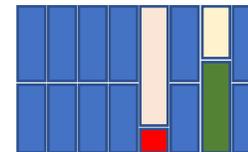


- **Animal vs. Plant Proteins:** Animal proteins have all essential amino acids; some plant proteins are limited and harder to digest
- **Nutrient Differences:** They come with very different matrices, vitamins, minerals, fats, bioactive compounds, and antinutritional factors

Diversification of protein sources:

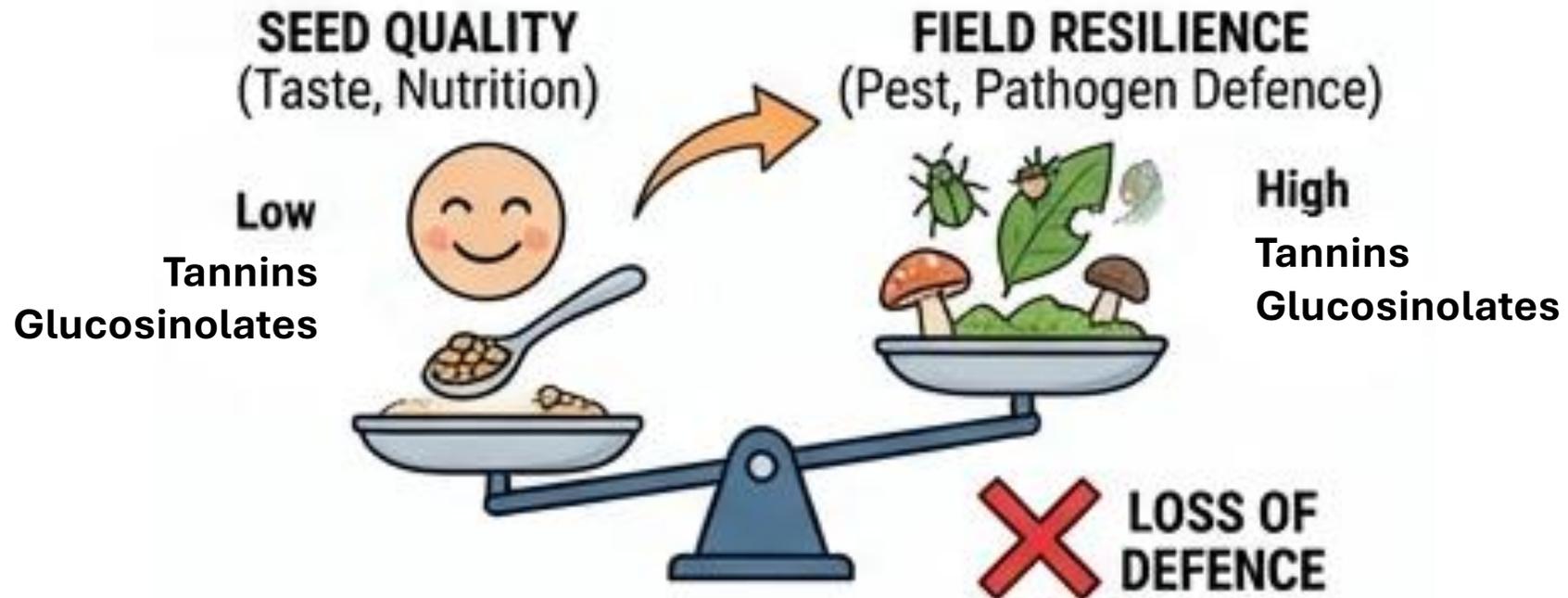
Prot A

Prot B



CONTEXT and OBJECTIVES

The breeding dilemma



**Part of genetic diversity lost during
Domestication and Human Selection**

CONTEXT and OBJECTIVES



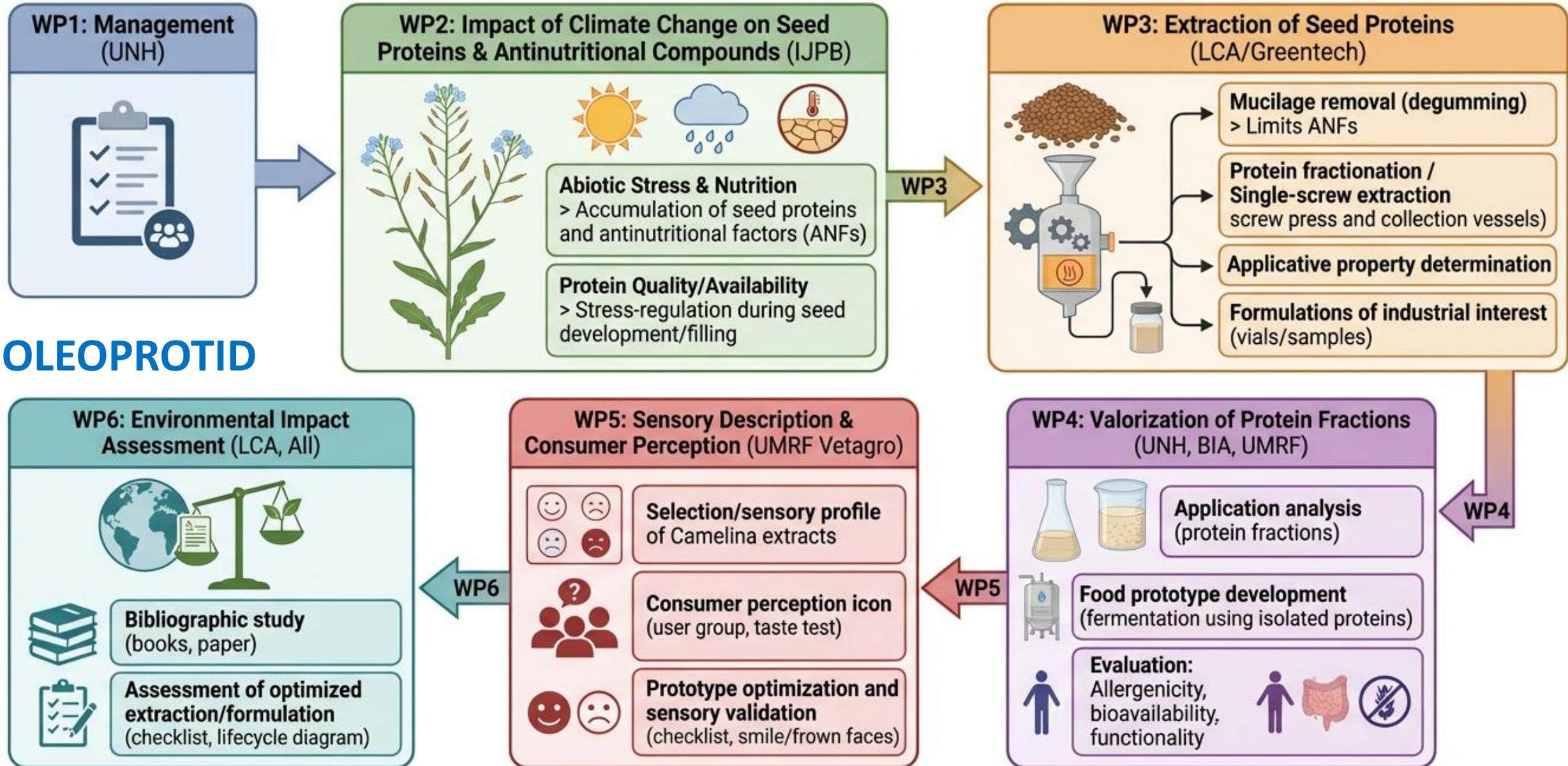
Camelina sativa



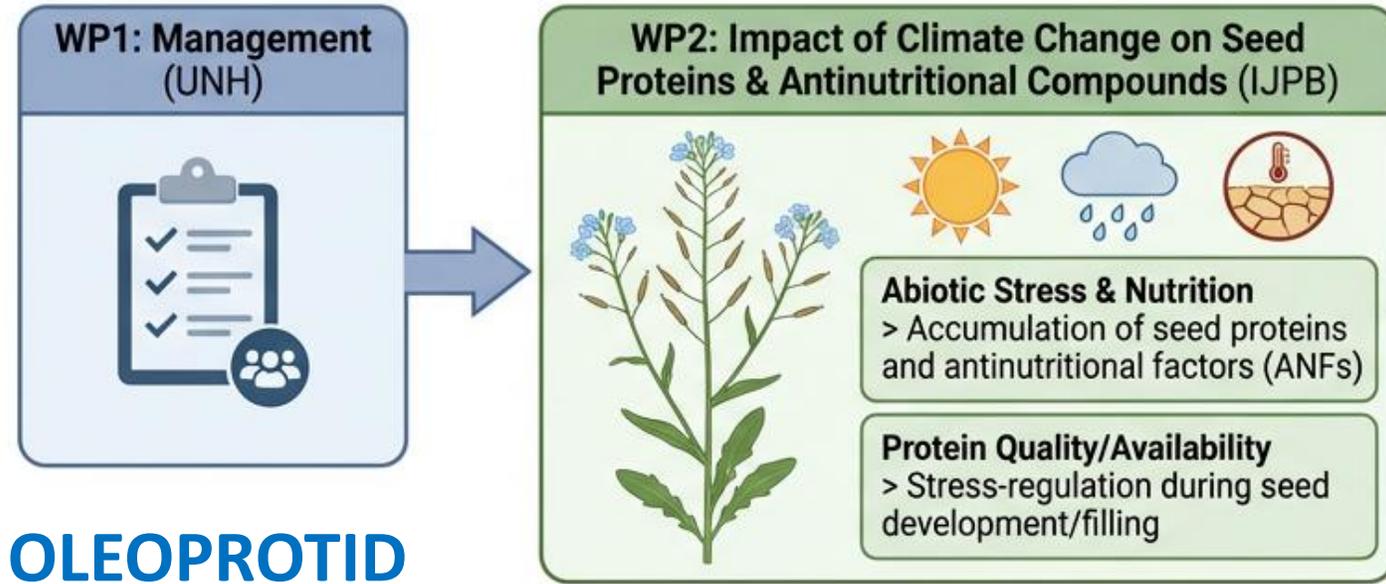
- **Brassicaceae high in omega-3 and furnishes valuable ecosystem services**
- **Versatile crop:** seeds, products, and compounds can be used and valorized for food/feed and non-food applications; can also serve as a **cover crop** in Europe to produce nutritionally rich oil
- **Short cycle and Intercropping potential** : plasticity, can grow alongside peas and lentils (e.g. ValoN project, coord. Claire Gaudichon PNCA)

How do seeds reshape, mobilize, and modify their specialized metabolites to withstand and adapt to environmental stresses?

PROJECT STRUCTURE



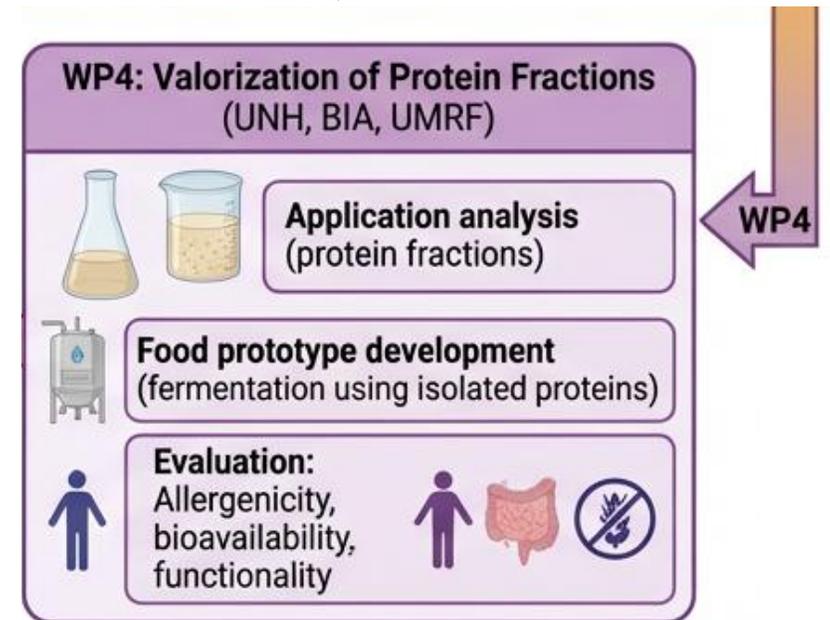
PROJECT STRUCTURE



OLEOPROTID

GERMOLEOPRO

Modulation of the nutritional value of camelina proteins through germination and identification of bioactive compounds of interest

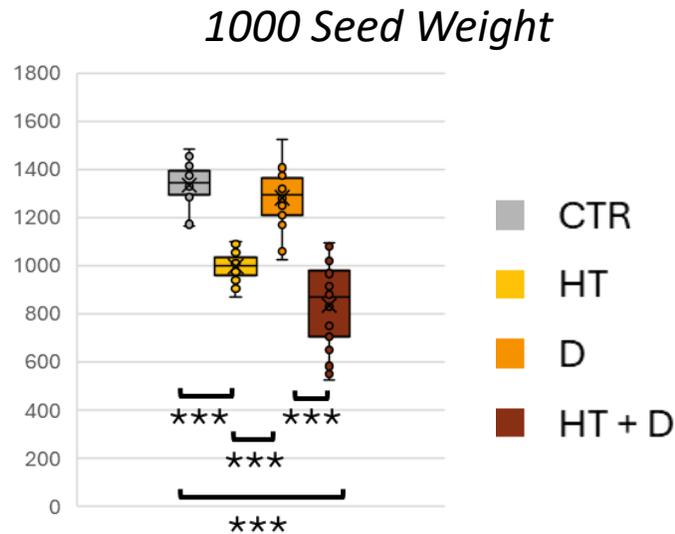
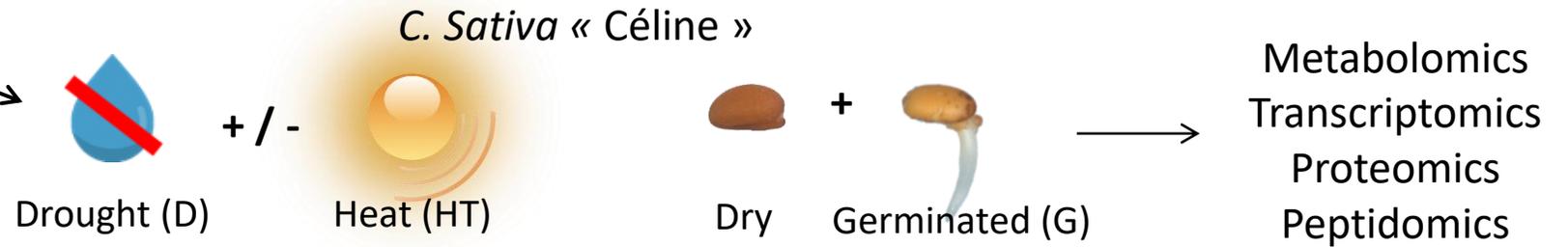


RESULTS

How environment and germination shape seed composition in Camelina and other Brassicaceae species?

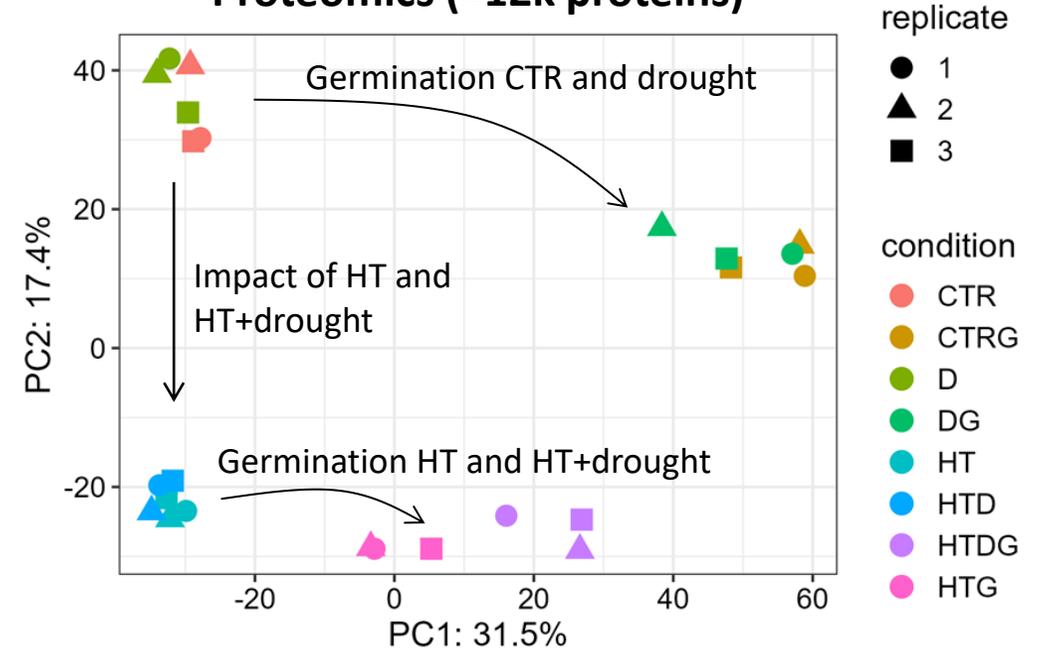
- 6 Genotypes
- 4 Abiotic Stress Conditions

- 3 Seed Tissues
- 6 Replicates



Heat stress reduced seed weight and delayed germination

Proteomics (≈12k proteins)



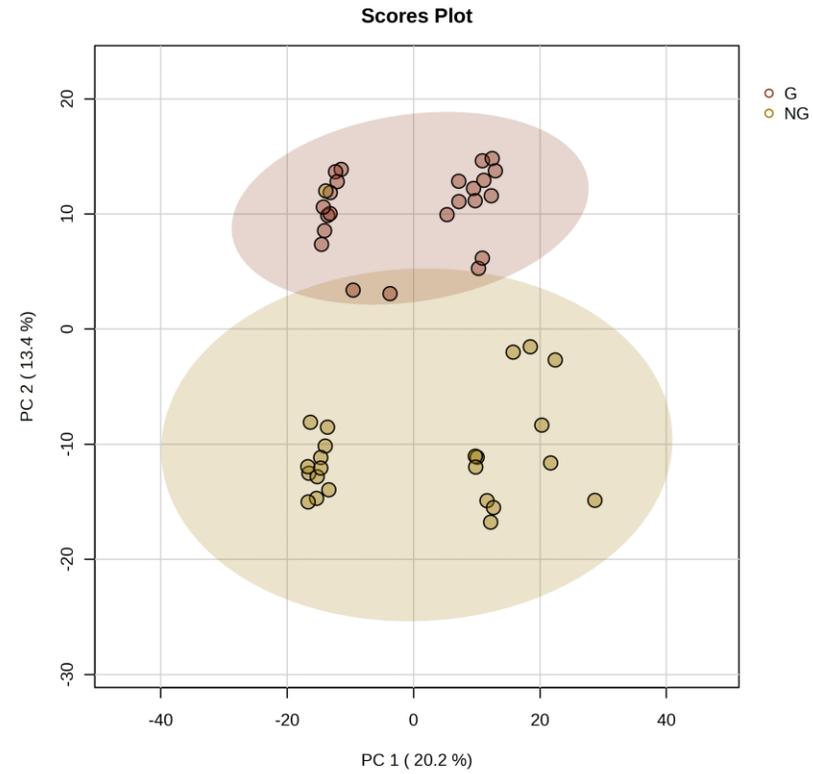
The new version of Camelina genome has been used, thanks to UNTWIST!



RESULTS

Seed composition: metabolomic analyses

PCA Metabolomic data
Germinated vs Non-Germinated seeds



CONCLUSIONS and PERSPECTIVES

- Camelina seeds composition is shaped by the environmental conditions
- Camelina seed physiology and composition (proteins, metabolites) are modulated by abiotic stresses, particularly temperature, as well as by germination.

Perspectives

- Elucidate the **evolution and ecological roles of glucosinolates** in *Camelina* and other Brassicaceae species
- Investigate the **impact of germination on *Camelina* seed composition**, including bioactive peptides (link with UNTWIST)
- Study the ecosystem service furnished by camelina and other Brassicaceae plants: new opportunities from the Grand Défi Biocontrôle et Biostimulation pour l'Agroécologie



Saclay Plant'Innov'

Le Rendez-vous de l'innovation végétale 

Diversification des productions végétales et nouveaux défis pour l'alimentation

12 mars 2025

Merci pour votre attention



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SEED-DREAM

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