Germinate Thematic Hub Update

18th January 2022 DivSeek AGM

The James Hutton Institute, Scotland
The Core Challenge

From this...

To this...
From the Field to the Web…

2. Merge and Wrangle
(Historical and background data)

1. Collect

3. Store

4. Visualize
(and export)

Germinate Scan / GridScore

Humbug

Germinate Daim / Data templates / BrAPI

Helium

Flapjack
Germinate species

Barley
Berrybase
Demo
CPC
Grasses
CWR Cowpea
CWR Finger Millet
CWR Grass Pea
CWR Pigeon Pea
CWR Chickpea
CWR Alfalfa
CWR Lentil
CWR Pearl Millet
CWR Barley
CWR Wheat
CWR Sorghum
CWR Eggplant
CWR Rice
CWR Sunflower
CIMMYT Maize
CIMMYT Wheat
And others...
New Features

Crop wild relatives (CWR) represent a large reservoir of genes/varieties for resistance to abiotic and biotic stresses. The cross-compatible wild species, F. glabrum spp. violaceum (= F. monosperma) holds a great potential for pearl millet improvement. This species is found in Sahelian region where the phytogeographic diversity of pearl millet is the highest. It grows in even more and regions having very high temperature and drought conditions compared to the areas where cultivated pearl millet is grown.

Based on the screening of 20 F. glabrum spp. violaceum accesions conserved in the ICARDA genebank followed by the passport data; two F. glabrum spp. violaceum accesions were selected and used in this project to develop pre-breeding material.

A brief outline of the project conducted is provided below:

1. Developed four pre-breeding populations by using two wild Pennisetum violaceum accessions and four cultivated pearl millet genotypes following advanced backcross approach.
2. Evaluated the pre-breeding populations for flowering stage heat stress during summer seasons across locations to identify heat tolerant lines.
3. Evaluated the pre-breeding populations for terminal drought under varied conditions across location to identify drought tolerant lines.
4. Evaluated the pre-breeding populations under lysimeter for the canopy related parameters, as well as at Lasyield facility in summer and rainy seasons for the traits related to water use and water use efficiency under well watered and water stress conditions.
5.ommened the pre-breeding populations for their reaction to four disease pathogens, Pyr. In, Pyr. Inx, Pyr. Nv, Pyr. Nv x Pyr. Tn and Pyr. Tn to identify common and susceptible pathogen specific blast resistant lines.

Shared three pre-breeding populations with a breeder in Niger following SAWA, for screening against biotic stresses.

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Germinate contact details
Any germinate questions? Get in touch at germinate@jhs.uk

Publications relating to this work
Below is a list of publications referencing this Germinate database.

Crop Science special issue: Adapting agriculture to climate change: A walk on the wild side
Crop Science
2020

Use of wild Pennisetum species for improving biotic and abiotic stress tolerance in pearl millet
Crop Science
2020

Harnessing wild relatives of pearl millet for germplasm enhancement: Challenges and opportunities
Crop Science
2020
Sharma, S., Sharma, R., Govindanjee, M., Mahala, S. S., Sathyathri, K. C., Sekhar, K. K., Guemera, M. K., & Killeri, B. (2020). Harnessing wild relatives of pearl millet for germplasm...

Tapping Pennisetum violaceum, a Wild Relative of Pearl Millet (Pennisetum glaucum), for Resistance to Blast (caused by Magnaporthe grisea) and Rust (caused by Puccinia striformis var. indaca)
Plant Disease
2020
Sharma, S., Sharma, S., & Kata, Y. L. (2020). Tapping Pennisetum violaceum, a Wild Relative of Pearl Millet (Pennisetum glaucum), for Resistance to Blast caused by Magnaporthe grisea...

From bits to bites: Advancement of the Germinate platform to support prebreeding informatics for crop wild relatives
Crop Science
2019
New Projects using Germinate

- 2021-2025 H2020 BreedingValue [https://breedingvalue.eu](https://breedingvalue.eu)
- 2022-2031 The Crop Trust/Norwegian Government Biodiversity for Opportunities, Livelihoods and Development [https://www.croptrust.org/project/bold](https://www.croptrust.org/project/bold)
- International Center for Biosaline Agriculture, KAUST and OzBarley
Going forwards

- Improve interfaces for breeders, growers, researchers and farmers.
- Data analysis*
- Better links to tools like Genesys, GrinGlobal, EURISCO, Ensembl.
- UAV and environmental sensor data.
- We want to get feedback from the community. What tools should we focus on? Can we help you with your data? Can you help us develop tools? Can we collaborate on new tools and solutions?

- @germinatehub germinate@hutton.ac.uk
- https://germinateplatform.github.io/get-germinate