



Sunflower Biological Resource Center

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BRC staff

- Scientific management

Stéphane Muños



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- Operational responsibility

- Maintenance accessions

- Creation new accessions

- Institutional relations

- Diffusion accessions

- Phytosanitary agreements

Marie-Claude Boniface

&

Camille Tapy





What is the BRC

- Molecular characterization
- Phenotypic characterization
- Material development

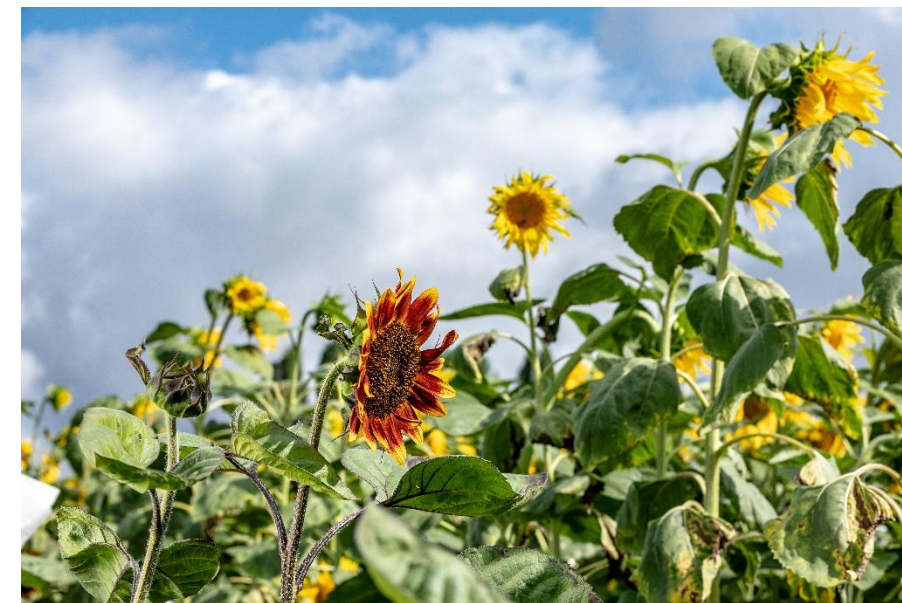




Historical perspective

Sunflower genetic resources at INRAE

- **INRAE Clermont-Ferrand (1960-2010)**
 - GMS Leclercq 1966
 - CMS PET1 Leclercq 1969, restoration gene 1971
 - Pathogen resistance 1970-2010 (Downy mildew, sclerotinia...)
- **INRAE Montpellier (1980-2010)**
 - Wild *H. annuus* and relative species
 - Interspecific crosses
- **INRAE Toulouse (since 2007)**
 - Drought tolerance, downy mildew and orobanche



GRC sunflower created in 2013



INRAE collections

Over 6600 accessions

| | Nature | # |
|----------------|--|------|
| Traditional GR | Cultivated lines | 2600 |
| | Cultivated population and genetic pools | 400 |
| | Wild ecotypes* | 760 |
| Scientific GR | RILs | 590 |
| | TILLING EMS mutant populations (M2 families) | 2100 |
| | Interspecific lines | 170 |



* Includes 137 *H. tuberosus* UE Diascope, INRA Montpellier



Helianthus network

- Public-private consortium to maintain strategic GR
 - Helianthus Network Started in 2017
- Corteva, MAS Seeds, RAGT2n, Soltis, Syngenta

| | Sterility status | Helianthus network | National collection |
|-------------------|------------------|--------------------|---------------------|
| Populations | | 115 | 5 |
| Lines | cmsPET1 A+B | 253 | 10 |
| | cmsPET1 B | 472 | |
| | cmsPET1 R | 259 | |
| GMS lines | GMS | 58 | |
| Alloplasmic lines | cms non-PET1 | 122 | 6 |
| RILs | | 638 | |
| TOTAL | | 1917 | 21 |





GR distribution

| | 2014 | 2015 | 2016 | 2017 |
|----------------------------|------------|-----------|------------|------------|
| INRAE laboratories | | 20 | | |
| Public research labs | 3 | | 96 | 95 |
| French (except INRAE) | | | | |
| European and international | 3 | | 96 | 95 |
| Private companies | 162 | 74 | 106 | 169 |
| French | 161 | 74 | 91 | 152 |
| European and interantional | | | 15 | 17 |
| TOTAL | 165 | 94 | 202 | 264 |





Characterization

- Passport data on Helianthus network collection
Height, branching, flowering time, oil content, TKW, seed color

- SIREGAL web portal (URGI, INRAE Versailles)
currently 2170 accession (201901)



<https://urgi.versailles.inra.fr/siregal/siregal/card.do?id=33&dbName=siregal&className=genres.administration.GrcImpl>

URGI GnpIS GENETIC AND GENOMIC INFORMATION SYSTEM

[Log in](#)

Preferences

All species

Select one...

Main

- HOME

Documentation

- USER GUIDE
- HOW TO ORDER
- DATA SUBMISSION
- FAQ
- GENETIC RESOURCES
- MODULE NEWS
- RELEASE NOTES

Other GnpIS data

- DATA SUBMISSION
- GNPIS PORTAL
- GENOMES
- SEQUENCES
- GENETIC MAPS
- POLYMORPHISMS
- PHENOTYPES
- ASSOCIATION
- GENETIC RESOURCES
- PLANT SYNTENY
- TRANSCRIPTOMIC

Miscellaneous

- EXTERNAL LINKS

Siregal Genetic resources

Siregal, the Plant Genetic Resources Information System of the National Institut for Agronomical Research (INRA), France presents accessions managed by INRA Biological Resource Centers (BRC) and some of the French networks for crop genetic resources. Some of these accessions can be ordered.

The BRC are not commercial suppliers of plant material. They distribute in general small amounts of plant materials mainly for research, development and biodiversity preservation activities.

The main data associated to accessions are of two types:

1. multicrop passport descriptors (common to all plant species): taxonomy, country of origin, biological status (wild, mutant, hybrid...), pedigree...
2. specific data (may be different for each species group) : morphology (size, shape, colour, ...), agronomy (yield, quality, ...), resistance to diseases, ...

You can access the [project web page](#) and the [GnpIS module](#) displaying all GnpIS genetic resources.

| Fruit species | Model species | Vegetable species | Crop species |
|--|---|---|--|
|  Citrus fruits BRC |  Arabidopsis Arabidopsis BRC |  Yam BRC |  Maize BRC |
|  Cherry BRC |  Medicago truncatula BRC |  Allium BRC |  Grain legumes BRC |
|  | |  |  |



Use in research programs

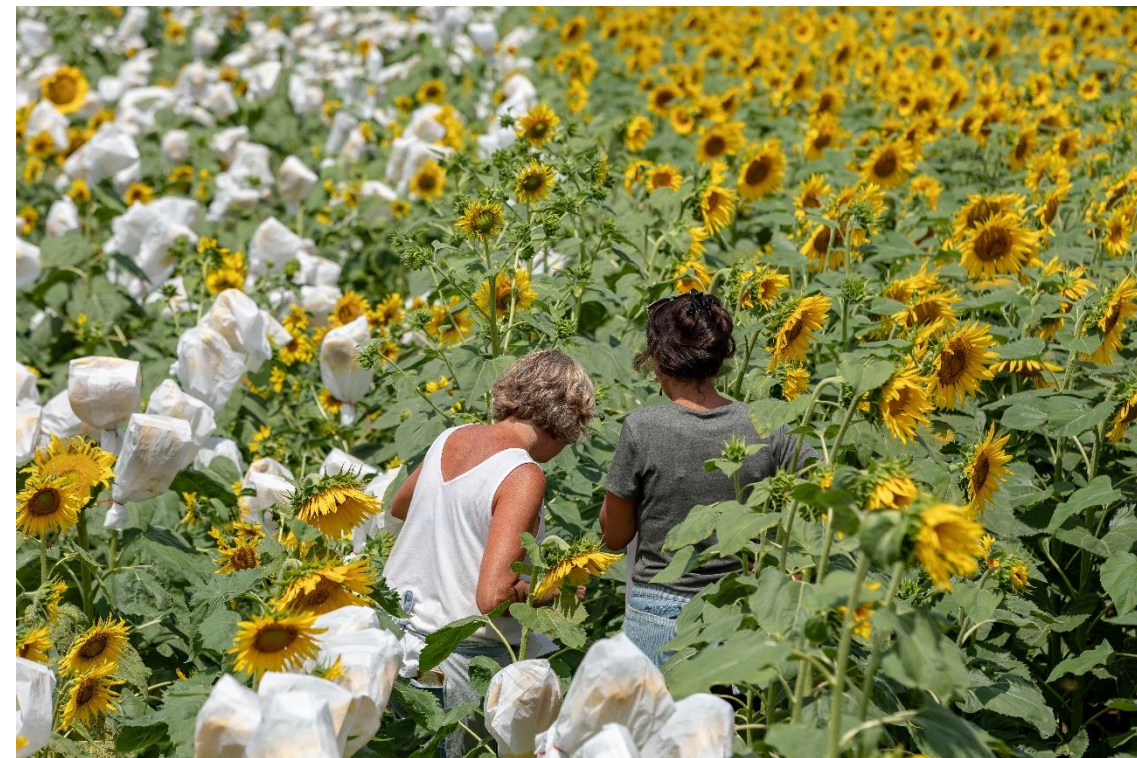
- Molecular characterization
 - HQ genome : 8 lines (Sunrise + Helior + ICSG)
 - Re-Seq 57 public lines (Sunrise) + ~1000 lines (ICSG)
 - AXIOM 50k SNP (5 populations + ~2500 lines HeliaDiv + Sunrise)
 - 384 SNP 115 pop 1000 lines
- Phenotypic characterization
 - Drought tolerance 57 public lines (Sunrise)
 - Disease resistance (ResODiv, MilVarSunRes)
- Material development
 - ~500 wild *H. annuus* IL (Oleosol, Sunrise)
 - 18x100 NAM RIL (Sunrise)
 - Branching studies
 - Mutant EMS production (300 M2 families)





Perspectives

- Maintenance
 - Duplicate the collection at -20°C on another site (Montpellier)
- Diffusion
 - Cost estimation (with LIPME Gestion)
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- Characterization
 - Consolidation of historical data in Siregal
 - Development of phenotyping archiving





Thank for your attention



Thanks to sunflower INRAE teams ; ASTR and SPI
Thanks to all national and international partners

