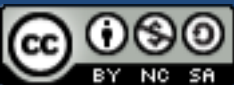


Wheatis and Elixir Plant Data Discovery



Plant Data Repositories Federation and how to
join them



From Repository to Federation

**National
Networks**



**European
Networks**



**Global
Networks**



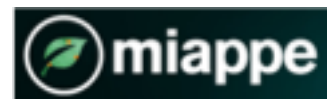
International data standards



Web services



Controlled vocabularies
Trait dictionaries



Minimal information



MCPD



I/ SINGLE REPOSITORY : GNPIS



INRA information system for crops, forest trees and pathogens



GnplS

**URGI DBs
« GnplS »**



From INRA archive...

Phenotypes

- GxE
- QTL maps
- GWAS, GS

Genetics

- Genetic maps
- Genetic markers
- Genetic resources

Genome

- Annotation
- Transcriptome
- SNP / Structural variants

Phenotyping data in GnplS

- GnplS portal, ie Data discovery
 - ♦ <https://urgi.versailles.inra.fr/gnois/>
- GnplS phenotype specific portal, ie Dataset builder
 - ♦ <https://urgi.versailles.inra.fr/ephegis>
- Phenotype and environment Experimental data
 - ♦ Whole Trials
 - ♦ Generic : Ontology driven
 - Levels: Whole trial, plot, plant data in experimentation
 - Observation variables : traits, environment, ...
 - ♦ Multiple factors
 - Genotype factor is mandatory
 - 0 to n other factors : treatments, stress, etc...
 - ♦ Punctual observation or temporal series/kinetic
- Raw or elaborated data
 - ♦ Alphanumeric or complex
 - ♦ Images or binary files
- Phenotyping data Repository

- Phenotyping Networks
- Multi local, Multi year
- Evolving Varietal List
- Data publication, usable for Data paper
 - ◆ DOI Citation

GENETIC AND GENOMIC INFORMATION SYSTEM

Phenotypes

Winter wheat (*Triticum aestivum* L.) phenotypic data from the multiannual, multilocal field trials of the INRA Small Grain Cereals Network.

François-Xavier Oury, Emmanuel Heumez, Bernard Rolland, Jérôme Auzanneau, Pierre Bérard, Maryse Brancourt-Huime, Xavier Charrier, Hubert Chiron, Camille Depatureaux, Laurent Faichetto, Olivier Gardet, Stéphane Gilles, Alex Giraud, Christophe Lecomte, Jean-Yves Morlais, Pierre Pluchard, Didier Tropée, Maxime Trottet, Patrice Walczak, Gérard Doussinault, Michel Rousset, Gilles Charmet

[Query dataset as a semantic graph.](#)
[Or download the dataset as RDF archive.](#)

Abstract
 Published 2015 by INRA

[Back to Form](#)

Search parameter(s):

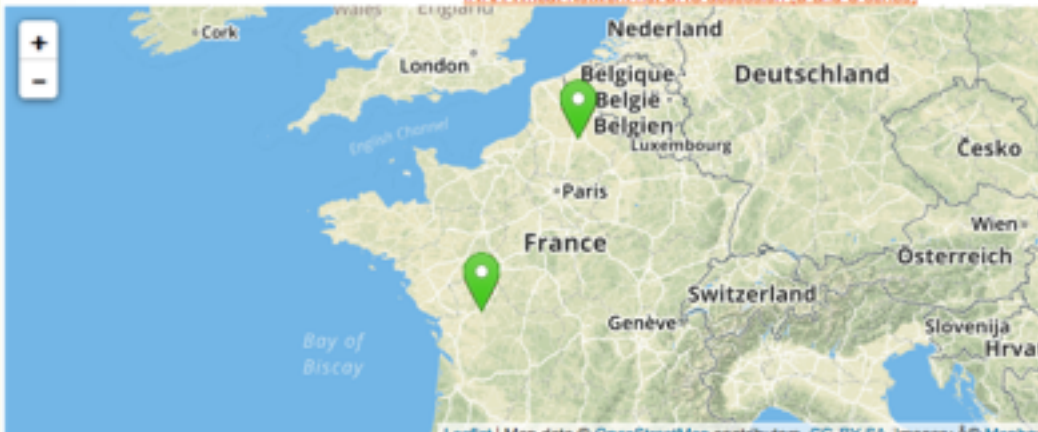
[Geolocation](#)

DATA SETS: 4

Network Data Set :
[INRA Wheat Network BRC accession \(A series\)](#)

Network Data Set :
[INRA Small Grain Cereals Network](#)
 DOI: <http://dx.doi.org/10.15454/1.4489666216568333E12>

Network Data Set :
[INRA Wheat Network not BRC accession \(B and C series\)](#)



Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

Origin site Collecting site Evaluation site

Phenotyping campaign(s)

2000	2001	2002	2003	2004	2005	2006	2007	2008
2009	2010	2011	2012	2013	2014	2015		

Accessibility, Interoperability, Reusability

- Access Study/trial list

Phenotypes

Winter wheat (*Triticum aestivum* L) phenotypic data from the multiannual, multilocal field trial of the INRA Small Grain Cereals Network.

François-Xavier Oury, Emmanuel Heumez, Bernard Rolland, Jérôme Auzanneau, Pierre Bérard, Maryse Brancourt-Huimeil, Xavier Charrier, Hubert Chiron, Camille Depatureaux, Laurent Falchetto, Olivier Gardet, Stéphane Gilles, Alex Giraud, Christophe Lecomte, Jean-Yves Morlais, Pierre Pluchard, Didier Tropée, Maxime Trottet, Patrice Walczak, Gérard Doussina Michel Rousset, Gilles Charmet

[Query dataset as a semantic graph.](#)

[Or download the dataset as RDF archive.](#)

[Abstract](#)

Published 2015 by INRA

[Back to Form](#)

[Search parameter\(s\):](#)

[Geolocation](#)

DATA SETS: 4

Network Data Set :

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Network Data Set :

[INRA Wheat Network not BRC accession \(B and C series\)](#)

Phenotyping campaign(s)

2001 x 2003 x 2005 x 2006 x 2007 x 2008 x 2009 x 2010 x 2011 x
2012 x 2013 x 2014 x 2015 x

[remove all](#) [add all](#)

[Trial list](#) [Phenotypic data](#)

[Zurigo](#) [GnplS](#) 661 trials

Name	Campaign	Site	Direct downloads
BTH_Champagne-céréales_2005_SetA1	2005	Champagne-céréales	
BTH_Champagne-céréales_2006_SetA1	2006	Champagne-céréales	
BTH_Champagne-céréales_2007_SetA1	2007	Champagne-céréales	
BTH_Champagne-céréales_2008_SetA1	2008	Champagne-céréales	
BTH_Champagne-céréales_2009_SetA1	2009	Champagne-céréales	

Accessibility, Interoperability, Reusability

- Access Study/trial list
- Access Data

Trial list

Phenotypic data

LEVEL: TRIAL

1-10 of 43,097
| Display 10 results per page

Lot Number	Accession Number	Accession Name	Isk	Trial Name
AO13047	39291	AO13047	t: traite	BTH_Champagne-céréales_2015_SetA1
AO14001	AQ14001	AO14001	t: traite	BTH_Champagne-céréales_2015_SetA1
Bermude	TX9	Bermude	f: faible intrans	BTH_Clermont-Ferrand_2015_SetA1
AO13030	39286	AO13030	t: traite	BTH_Clermont-Ferrand_2015_SetA1
AO13031	AQ13031	AO13031	f: faible intrans	BTH_Clermont-Ferrand_2015_SetA1
ARKEOS	36693	ARKEOS	t: traite	BTH_Clermont-Ferrand_2015_SetA1
DI13002-2	39307	DI13002-2	f: faible intrans	BTH_Dijon_2015_SetA1
ARKEOS	36693	ARKEOS	t: traite	BTH_Dijon_2015_SetA1
Bermude	TX9	Bermude	t: traite	BTH_Epi-centre_2015_SetA1
AO13022	AQ13022	AO13022	nt: non traite fongicides	BTH_Epi-centre_2015_SetA1

Ephesis data export

Ephesis MIAPPE ISA-Tab export

LEVEL: REPLICATION

1-10 of 67,356
| Display 10 results per page

Lot Number	Accession Number	Accession Name	Isk	Trial Name	Trial
RE12080	RE12080	RE12080	f: faible intrans	BTH_Clermont-Ferrand_2015_SetA1	Cler
EM11537	37829	EM11537	f: faible intrans	BTH_Dijon_2015_SetA1	Dijon
DI13003	39308	DI13003	t: traite	BTH_Dijon_2015_SetA1	Dijon
AO13015	AQ13015	AO13015	t: traite	BTH_Dijon_2015_SetA1	Dijon
AO13031	AQ13031	AO13031	t: traite	BTH_Dijon_2015_SetA1	Dijon
AO13100	AQ13100	AO13100	nt: non traite fongicides	BTH_Epi-centre_2015_SetA1	Epi-
RUBISKO	36680	RUBISKO	nt: non traite fongicides	BTH_Epi-centre_2015_SetA1	Epi-
AO11011	37247	AO11011	f: faible intrans	BTH_Estrées-Mons_2015_SetA1	Estr
DI13003	39308	DI13003	f: faible intrans	BTH_Estrées-Mons_2015_SetA1	Estr
EM12096	39321	EM12096	f: faible intrans	BTH_Le_Moulon_2015_SetA1	Le M

Ephesis data export

Ephesis MIAPPE ISA-Tab export

Accessibility, Interoperability, Reusability

- Access Study/trial list
- Access Data
- Interoperability, Provenance
 - ◆ Biological Material
 - ◆ Observation Variables



Leaflet | Map data © OpenStreetMap contributors, CC-BY

Origin site Collecting site Evaluation site

Trial name	clonal test of mapping pedigree 0504B in nursery		
Trial code	POPYOMICS-POP2-F		
Site name	Ardon		
Trial date	2003/05/13		
Phenotyping campaign	2004, 2005		
Project	POPYOMICS		
Goal	QTL mapping of a list of phenotypic traits		
Design	Randomized complete block		
Phenotyping data	Go to trial's phenotyping data		

Lot number	Accession number	Accession name	Taxon
661300224	661300224	661300224	Populus
661300227	661300227	661300227	Populus
661300228	661300228	661300228	Populus
Genotypes	661300230	661300230	Populus

Name	Notator
REP: Number of repetitions	
SLA: Specific leaf area	INRA
CM: Leaf carbon content	INRA
Svleed1: Number of svleptic shoots at 1 year	INRA

Type	Name	Email	Institution
Scientifique	Catherine BASTIEN	catherine.bastien at orleans.inra.fr	UMR0588-BioForA (Biologie Intégrée de la diversité des arbres et de la Forêt)
Contact			
			Svleed1: Number of svleptic shoots at 1 year
			INRA

Accessibility, Interoperability, Reusability

- Access Study/trial list
- Access Data
- Interoperability, Provenance
 - ◆ Biological Material
 - ◆ Observation Variables
- Create Analysis data set, filter by
 - ◆ Year

INRA Wheat Network not BRC accession (B and C series)

Phenotyping campaign(s) 2001 x 2003 x 2005 x 2012 x 2013 x 2014 x

[remove all](#) [add all](#)

Trial list **Phenotypic data**

LEVEL: TRIAL

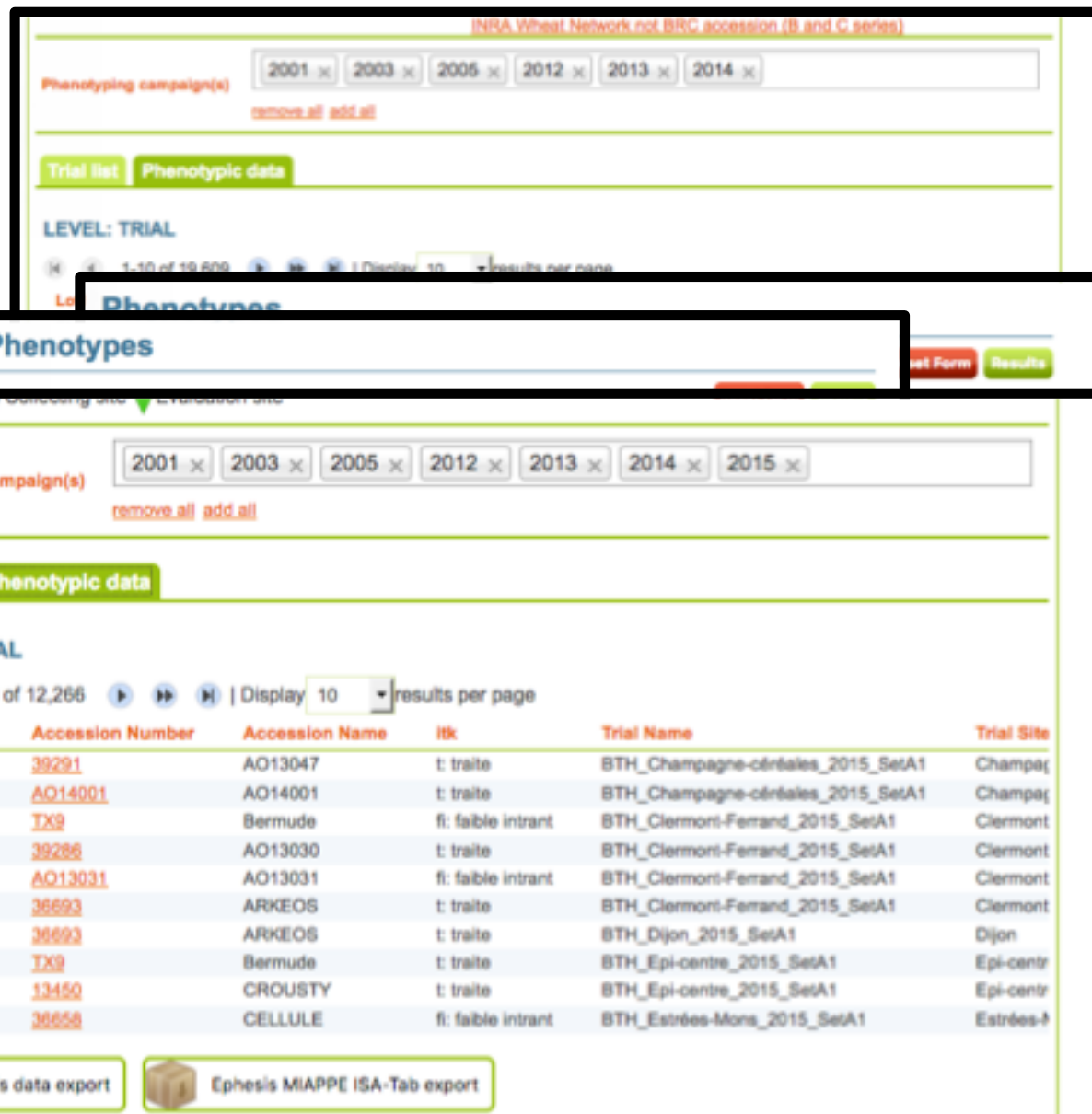
1-10 of 19,609 | Display 10 results per page

Lot Number	Accession Number	Accession Name	Itk	Trial Name	T
EM11389	37820	EM11389	t: treated	BTH_Clermont-Ferrand_2013_SetA2	C
AO13012	AO13012	AO13012	fi: low inputs	BTH_Clermont-Ferrand_2013_SetA2	C
Grapeli	38821	GRAPELI	nt: untreated, no fungicide	BTH_Le_Moulon_2013_SetA2	L
CF11291	37810	CF11291	t: treated	BTH_Le_Moulon_2013_SetA2	L
Atlass	28926	ATTLASS	fi: low inputs	BTH_Lusignan_2013_SetA2	L
EM11441	37820	EM11441	t: treated	BTH_Orgeval_2013_SetA2	C
Atlass	28926	ATTLASS	t: treated	BTH_Clermont-Ferrand_2013_SetB1	C
EM12096	39321	EM12096	t: treated	BTH_Chauv-des-Prés_2013_SetB1	C
Atlass	28926	ATTLASS	t: treated	BTH_Dijon_2013_SetB1	D
AO13002	AO13002	AO13002	fi: low inputs	BTH_Estrées-Mons_2013_SetB1	E

 Ephesis data export  Ephesis MIAPPE ISA-Tab export

Accessibility, Interoperability, Reusability

- Access Study/trial list
- Access Data
- Interoperability, Provenance
 - ◆ Biological Material
 - ◆ Observation Variables
- Create Analysis set, filter by
 - ◆ Year
 - ◆ Variable
 - ◆ Panel



INRA Wheat Network not BRC accession (B and C series)

Phenotyping campaign(s): 2001 x 2003 x 2005 x 2012 x 2013 x 2014 x
remove all add all

Trial list Phenotypic data

LEVEL: TRIAL

1-10 of 10,600 | Display 10 results per page

Phenotypes

Phenotyping campaign(s): 2001 x 2003 x 2005 x 2012 x 2013 x 2014 x 2015 x
remove all add all

Trial list Phenotypic data

LEVEL: TRIAL

1-10 of 12,266 | Display 10 results per page

Lot Number	Accession Number	Accession Name	Itk	Trial Name	Trial Site
AO13047	39291	AO13047	t: traite	BTH_Champagne-côntales_2015_SetA1	Champa
AO14001	AO14001	AO14001	t: traite	BTH_Champagne-côntales_2015_SetA1	Champa
Bermude	TX9	Bermude	fi: faible intrans	BTH_Clermont-Ferrand_2015_SetA1	Clermont
AO13030	39286	AO13030	t: traite	BTH_Clermont-Ferrand_2015_SetA1	Clermont
AO13031	AO13031	AO13031	fi: faible intrans	BTH_Clermont-Ferrand_2015_SetA1	Clermont
ARKEOS	36693	ARKEOS	t: traite	BTH_Clermont-Ferrand_2015_SetA1	Clermont
ARKEOS	36693	ARKEOS	t: traite	BTH_Dijon_2015_SetA1	Dijon
Bermude	TX9	Bermude	t: traite	BTH_Epi-centre_2015_SetA1	Epi-centr
CROUSTY	13450	CROUSTY	t: traite	BTH_Epi-centre_2015_SetA1	Epi-centr
CELLULE	36658	CELLULE	fi: faible intrans	BTH_Estrées-Mons_2015_SetA1	Estrées-M

Ephesis data export Ephesis MIAPPE ISA-Tab export

EXAMPLE 1 : VITIS PHENOLOGY



Incremental publication

Vitis Dataset

- 50 Years
- 2 locations
- Phenology
- Muti level

Map showing the location of the Vitis dataset in France (Espace). The map includes labels for Bay of Biscay, Hrvatska, Bosna i Hercegovina, Crna Gora, Kosovo, Per, Italia, and Roma. A green pin marks the location of the Vitis dataset.

Legend: Origin site (red pin), Collecting site (blue pin), Evaluation site (green pin).

Phenotyping campaign(s):

1956 x	1957 x	1958 x	1959 x	1960 x	1961 x	1962 x	1963 x	1964 x
1965 x	1966 x	1967 x	1968 x	1969 x	1970 x	1971 x	1972 x	1973 x
1974 x	1975 x	1976 x	1977 x	1978 x	1979 x	1980 x	1981 x	1982 x
1983 x	1984 x	1985 x	1986 x	1987 x	1988 x	1989 x	1990 x	1991 x
1992 x	1993 x	1994 x	1995 x	1996 x	1997 x	1998 x	1999 x	2000 x
2001 x	2002 x	2003 x	2004 x	2005 x	2006 x	2007 x	2008 x	2009 x
2010 x	2011 x	2012 x						

remove all add all

Trial list Phenotypic data

LEVEL: TRIAL

Display 10 results per page

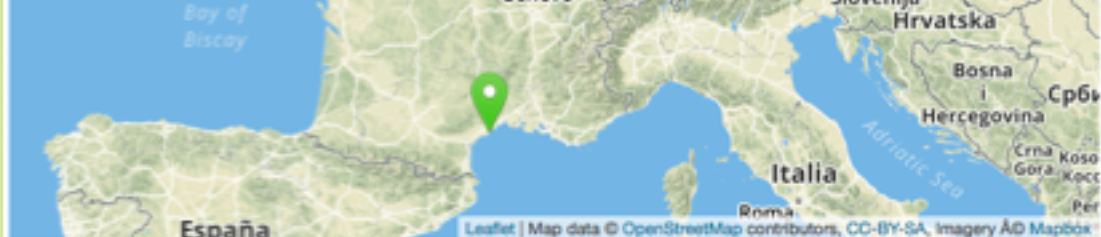
on Number	Accession Name	Trial Name	Trial Site	Campaign	Budbreak dat
	Inconnu = Carignan	Données phénologiques brutes Vassal témoins	Vassal-UE	1957	1957-03-15
	Inconnu = Carignan	Données phénologiques brutes Vassal témoins	Vassal-UE	1958	1958-04-03
5	Pinot Renevey amélioré	Données phénologiques brutes Vassal témoins	Vassal-UE	1956	1956-03-28
5	Pinot Renevey amélioré	Données phénologiques brutes Vassal témoins	Vassal-UE	1958	1958-03-29
2	Pinot Crépet	Données phénologiques brutes Vassal témoins	Vassal-UE	1956	1956-03-26
2	Pinot Crépet	Données phénologiques brutes Vassal témoins	Vassal-UE	1960	1960-03-18
3	Vert noir = Pinot noir	Données phénologiques brutes Vassal témoins	Vassal-UE	1956	1956-03-26
	Cabernet Sauvignon	Données phénologiques brutes Vassal témoins	Vassal-UE	1956	1956-04-03
	Cabernet Sauvignon	Données phénologiques brutes Vassal témoins	Vassal-UE	1957	1957-03-23
	Cabernet Sauvignon	Données phénologiques brutes Vassal témoins	Vassal-UE	1958	1958-04-04

Ephesis data export Ephesis MIAPPE ISA-Tab export

LEVEL: BLOCK > PLOT

Display 10 results per page

- Data layer addition
 - ◆ New years
 - ◆ New Elaborated Data
- Vitis Dataset
 - ◆ Phenology



Origin site Collecting site Evaluation site

1956 x	1957 x	1958 x	1959 x	1960 x	1961 x	1962 x	1963 x	1964 x
1965 x	1966 x	1967 x	1968 x	1969 x	1970 x	1971 x	1972 x	1973 x
1974 x	1975 x	1976 x	1977 x	1978 x	1979 x	1980 x	1981 x	1982 x



Origin site Collecting site Evaluation site

Phenotyping campaign(s)

1956 x	1956-2012 x	1964 x
--------	-------------	--------

[remove all](#) [add all](#)

Trial list **Phenotypic data**

LEVEL: TRIAL

Trial Site	Campaign	Budbreak date (50%) (BUD_DATE)	Budbreak date (50%) relative to Chasselas (MI-BUD-relativ)
Vassal-UE	1956	1956-03-29	
Vassal-UE	1956	1956-03-28	
Vassal-UE	1956	1956-03-26	
Vassal-UE	1956	1956-03-26	
Vassal-UE	1956	1956-04-03	
Vassal-UE	1956	1956-04-03	
Vassal-UE	1956	1956-04-02	
Vassal-UE	1964	1964-03-26	
Vassal-UE	1964	1964-03-26	
Vassal-UE	1956-2012		3

[Ephes's data export](#) [Ephes's MAPPE \(SA-Tab export\)](#)

collection (ex. INRA Vassal)

Class Computation

Day/ chasselas **SCALE**

Identifier CO_356:4000004

Name day/Chasselas

1583Col1	1583Col1	Affenhaler1	Collection Ampelographique Bergheim Section I	Bergheim Burenberg
1583Col1	1583Col1	Affenhaler1	Collection Ampelographique Bergheim Section I	Bergheim Burenberg

EXAMPLE 2: WHEAT YIELD EVOLUTION



Get All Yield Wheat data from 2003 to 2010, with reference variable normalisation and decease notation

Example : Data set building with GnpIS-Ephesis

- François-Xavier Oury, Emmanuel Heumez, Bernard Rolland, Jérôme Auzanneau, Pierre Bérard, Maryse Brancourt-Hulmel, Xavier Charrier, Hubert Chiron, Camille Depatureaux, Laurent Falchetto, et al (2015) Winter wheat (*Triticum aestivum* L) phenotypic data from the multiannual, multilocal field trials of the INRA Small Grain Cereals Network. *doi: 10.15454/1.4489666216568333E12*
 - ◆ DOI : <http://dx.doi.org/10.15454/1.4489666216568333E12>
 - ◆ Winter wheat phenotypic French experimental network.
 - ◆ Observations : agronomic, quality, disease, phenology,...
 - ◆ Integration of 10 experimental locations, 15 years, 1700 genotypes.
→ 813 trials/study, 81 000 replications

Wheat datasets publications

- Example of multiple datasets integration
 - ◆ Shared locations
 - ◆ Some common varieties

DATA SETS: 4

Network Data Set :

[INRA Wheat Network BRC accession \(A series\)](#)

Network Data Set :

[INRA Small Grain Cereals Network](#)

DOI:<http://dx.doi.org/10.15454/1.4489666216568333E12>

Network Data Set :

[INRA Wheat Network not BRC accession \(B and C series\)](#)

Network Data Set :

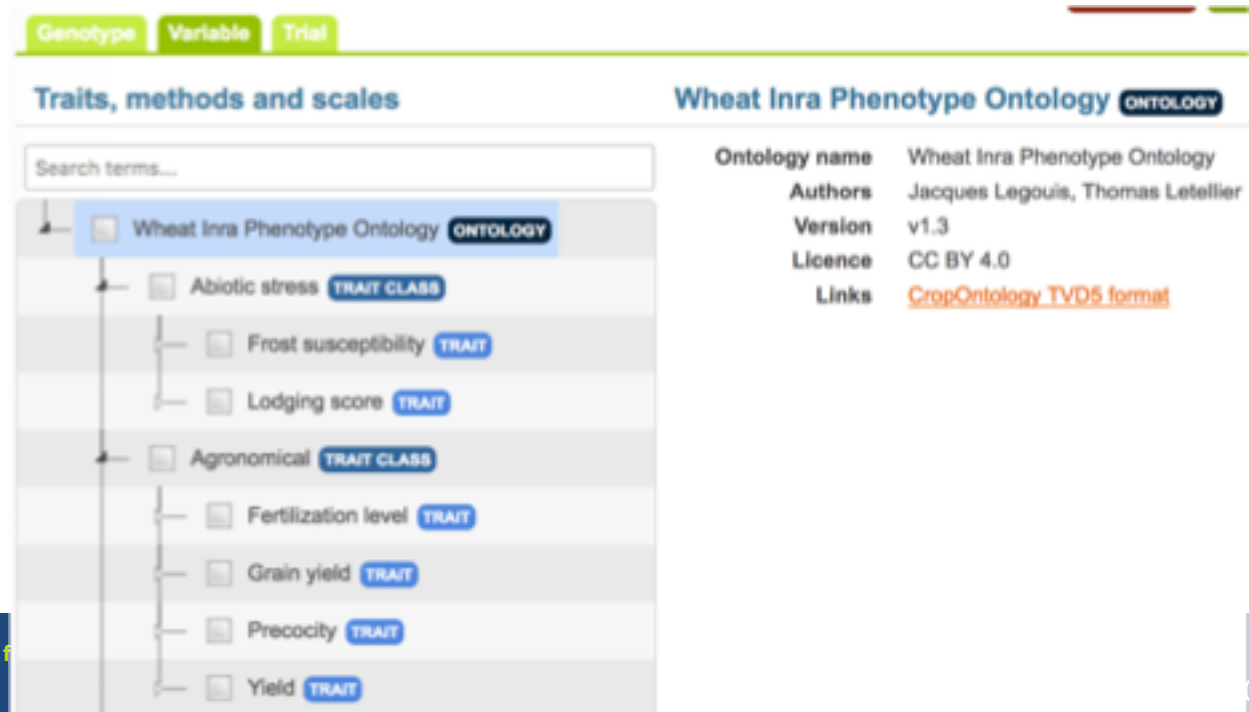
[INRA Wheat Network technological variables](#)

DETAILS ON DOI: 10.15454/1.4489666216568333E12

URL	
Title	Winter wheat (<i>Triticum aestivum</i> L.) phenotypic data multiannual, multilocal field trials of the INRA Small Grain Cereals Network.
Authors	François-Xavier Oury, Emmanuel Heumez, Bernard Jérôme Auzanneau, Pierre Bérard, Maryse Brancou, Xavier Charrier, Hubert Chiron, Camille Depatureau, Falchetto, Olivier Gardet, Stéphane Gilles, Alex Girard, Christophe Lecomte, Jean-Yves Morlais, Pierre Pluc, Tropicée, Maxime Trottet, Patrice Walczak, Gérard De Michel Rousset, Gilles Charmet
Publisher	INRA
Issue date	2015
Type	dataset

Wheat datasets publications

- Example of multiple datasets integration
 - ◆ Shared locations
 - ◆ Some common varieties
- Successive publications
 - ◆ Initial publication: Agronomic and breeding

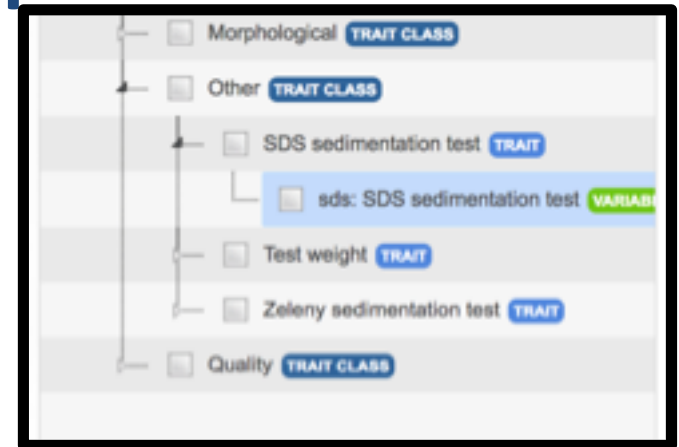


The screenshot displays the 'Wheat Intra Phenotype Ontology' interface. At the top, there are tabs for 'Genotype', 'Variable', and 'Trait'. Below these, the title 'Traits, methods and scales' is visible. A search bar labeled 'Search terms...' is present. The main content area shows a hierarchical tree structure of the ontology. The root node is 'Wheat Intra Phenotype Ontology' (labeled 'ONTOLOGY'). It branches into 'Abiotic stress' (labeled 'TRAIT CLASS') and 'Agronomical' (labeled 'TRAIT CLASS'). Under 'Abiotic stress', there are 'Frost susceptibility' (labeled 'TRAIT') and 'Lodging score' (labeled 'TRAIT'). Under 'Agronomical', there are 'Fertilization level' (labeled 'TRAIT'), 'Grain yield' (labeled 'TRAIT'), 'Precocity' (labeled 'TRAIT'), and 'Yield' (labeled 'TRAIT'). To the right of the tree, a table provides metadata for the ontology.

Wheat Intra Phenotype Ontology ONTOLOGY	
Ontology name	Wheat Intra Phenotype Ontology
Authors	Jacques Legouis, Thomas Letellier
Version	v1.3
Licence	CC BY 4.0
Links	CropOntology TVD5 format

Wheat datasets publications

- Example of multiple datasets integration
 - ◆ Shared locations
 - ◆ Some common varieties
- Successive publications
 - ◆ Initial publication: Ag breeding
 - ◆ Quality
 - Breadmaking
 - Technological
 - ◆ Additional Year: 2015



Traits, methods and scales

Search terms...

- ☐ Wheat Inra Phenotype Ontology (ONTOLOGY)
 - ☐ Abiotic stress (TRAIT CLASS)
 - ☐ Agronomical (TRAIT CLASS)
 - ☐ Biotic stress (TRAIT CLASS)
 - ☐ Morphological (TRAIT CLASS)
 - ☐ Other (TRAIT CLASS)
 - ☐ Quality (TRAIT CLASS)
 - ☐ Alveograph Chopin (TRAIT)
 - ☐ Breadmaking test BIPEA (G) (TRAIT)
 - ☐ NmieG: Breadmaking test BIPEA: crumb score (VARIABLE)
 - ☐ NpainG: Breadmaking test BIPEA: b...
 - ☐ NpateG: Breadmaking test BIPEA: d...

NmieG: Breadmaking test BIPEA: crumb score (VARIABLE)

Ontology name	Wheat Inra Phenotype Ontology
Identifier	WIPO:0000238
Name	NmieG
Synonyms	Breadmaking test BIPEA: crumb s
Institution	INRA
Scientist	Arnaud Gauffretau, François-Xavi
Date	21/09/2017
Crop	Wheat

Breadmaking test bipea (g) (TRAIT)

Identifier	WIPO:0010134
Name	Breadmaking test BIPEA (G)
Class	Quality

% (SCALE)

Identifier	UO:0000187
Name	%
Data type	Numerical

Wheat datasets publications

- Example of multiple datasets integration
 - ◆ Shared locations
 - ◆ Some common varieties
- Successive publications
 - ◆ Initial publication: Agronomic and breeding
 - ◆ Quality
 - Breadmaking
 - Technological
 - ◆ Additional Year: 2015

DATA SETS: 4

Network Data Set :

[INRA Wheat Network BRC accession \(A series\)](#)

Network Data Set :

[INRA Small Grain Cereals Network](#)

DOI:<http://dx.doi.org/10.15454/1.4489666216568333E12>

Network Data Set :

[INRA Wheat Network not BRC accession \(B and C series\)](#)

Network Data Set :

[INRA Wheat Network technological variables](#)

DETAILS ON DOI: [10.15454/1.4489666216568333E12](http://dx.doi.org/10.15454/1.4489666216568333E12)

URL

Title

Winter wheat (*Triticum aestivum* L.) phenotypic data multiannual, multilocal field trials of the INRA Small Grain Cereals Network.

Authors

François-Xavier Oury, Emmanuel Heumez, Bernard Jérôme Auzanneau, Pierre Bérard, Maryse Brancou, Xavier Charrier, Hubert Chiron, Camille Depatureau, Falchetto, Olivier Gardet, Stéphane Gilles, Alex Girard, Christophe Lecomte, Jean-Yves Morlais, Pierre Pluc, Tropicée, Maxime Trottet, Patrice Walczak, Gérard D., Michel Rousset, Gilles Charmet

INRA

2015

dataset

Collecting site  Evaluation site

ampaign(s)

2000 x

2001 x

2002 x

2003 x

2004 x

2005 x

2006 x

2009 x

2010 x

2011 x

2012 x

2013 x

2014 x

2015 x

[remove all](#) [add all](#)

Scientific Question

- Evolution of wheat mean yield for genebank accessions from 2003 to 2007, including disease interaction.

Wheat Yield dataset building

- MIAPPE Plant Material Selection

Phenotypes

Genotype Variable Trial

Reset Form Results

Add accession by Genus

Triticum L. x

Reset Tab

Choose a species

Triticum aestivum aestivum

Add accession by Panel

Genotype Variable Trial

Reset Tab

Add accession by Genus

Triticum L. x

Choose a species

Select your taxon names

Add accession by Panel

Add accession by Collection

Add accession by Name

Paste your Accession Name list

BW_PANEL
WP2_CC
SMALL_GRAIN_CEREALS_NETWORK_COL
TaBW420K_V2_BW_WP1_Discovery_plate
TaBW420K_V2_BW_WP3_Genetic_Resources
BREEDWHEAT_COL
DH1
HD2
RIL

Accession

1-10 of 2,556

Accession Number	Accession Name	Taxon Name
TX816	02438-6HD-106-1	Triticum aestivum aestivum
TX817	02438-6HD-132-1	Triticum aestivum aestivum
TX818	02438-6HD-141-1	Triticum aestivum aestivum

Wheat Yield dataset building

- Genebank/BRC accessions dataset selection

Phenotypes

[Reset Form](#)

Genotype Variable Trial

[Reset Tab](#)

Add trial by Name

Select your trial names

Add trial by Number

Select your trial numbers

Add trial by Campaign

Select your trial campaigns

Add trial by Site

Select your trial sites

Add trial by Data Set

INRA Wheat Network BRC accession (A series) x |

Add trial by Project

INRA Small Grain Cereals Network

INRA Wheat Network not BRC accession (B and C series)

Selected Trials



1-10 of 258



Trial Number

Trial Name

Trial Site

BTH_Champagne-
céréales_2004_SetA1

BTH_Champagne-
céréales_2004_SetA1

Champagne-
céréales

BTH_Champagne-
céréales_2005_SetA1

BTH_Champagne-
céréales_2005_SetA1

Champagne-
céréales

[Reset Form](#)
[Results](#)
[Genotype](#)
[Variable](#)
[Trial](#)
[Reset Tab](#)

Add accession by Genus

→ Choose a species

Add accession by Panel

Add accession by Collection

Add accession by Name

Paste your Accession Name list

Accession

1-6 of 6		
Accession Number	Accession Name	Taxon Name
13431	CHARGER	Triticum aestivum aestivum
35310	FOLKLOR	Triticum aestivum aestivum
36801	GRAPELI	Triticum aestivum aestivum
6027	RECITAL	Triticum aestivum aestivum
6607	SOISSONS	Triticum aestivum aestivum
7043	TREMIE	Triticum aestivum aestivum



Plant Material Export

Variable selection: Ontology Widget/BrAPPS

<https://www.brapi.org/brapps.php>

- Yield

Genotype
Variable
Trial

Reset Form
Results

Genotype
Variable
Trial

Reset Form
Results

GY_q/ha: Grain yield at 0% humidity
VARIABLE

Wheat Inra Phenotype Ontology
ONTOLOGY

Agronomical
TRAIT CLASS

Grain yield
TRAIT

GY_q/ha: Grain yield at 0% humidity

Yield
TRAIT

r: Yield
VARIABLE

Ontology name
Wheat Inra Phenotype Ontology

Identifier
WIPO:0000074

Name
GY_q/ha

Synonyms
Grain yield at 0% humidity
rdt

Growth stage
Z92 (Grain hard, not dented by thumbnail)

Institution
INRA

Scientist
Jacques Le Gouis

Crop
Wheat

Grain yield
TRAIT

Identifier
WIPO:0010019

Name
Grain yield

Class
Agronomical

Direct measure
METHOD

Identifier
WIPO:0020013

Name
Direct measure

Description
Mesure directe # ModeOp Arvalis =

Variable selection: Ontology Widget/BrAPPS

<https://www.brapi.org/brapps.php>

- Biotic stress

Traits, methods and scales

yield

☐ Fertilization level TRAIT

☒ **Grain yield** TRAIT

☒ **GY_q/ha: Grain yield at 0% humidity**

☐ Precocity TRAIT

☒ **Yield** TRAIT

☒ **r: Yield** VARIABLE

☒ Biotic stress TRAIT CLASS

☒ Disease score Yellow Rust TRAIT

☒ **YR-Score_score: Yellow rust score**

YR-Score_score: Yellow rust score VARIABLE

Ontology name	Wheat Inra Phenotype Ontology
Identifier	WIPO:0000162
Name	YR-Score_score
Synonyms	Yellow rust score Susceptibility to stripe rust
Institution	INRA
Scientist	Jacques Le Gouis
Crop	Wheat

Disease score yellow rust TRAIT

Identifier	WIPO:0010065
Name	Disease score Yellow Rust
Class	Biotic stress

1 to 9 note SCALE

Identifier	WIPO:0030006
Name	1 to 9 note
Data type	Ordinal
Min	1
Max	9



SCIENCE & IMPACT

Wheat Yield dataset building

Phenotypes

[Reset Form](#)[Results](#)[Genotype](#)[Variable](#)[Trial](#)[Reset Tab](#)

Add trial by Name

Add trial by Number

Add trial by Campaign

Add trial by Site

Add trial by Data Set

Add trial by Project

Phenotyping campaign(s)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 ×
2009 × 2010 × 2011 × 2012 × 2013 × 2014 × 2015 ×

[remove all](#) [add all](#)

LEVEL: TRIAL

1-10 of 1,423 | Display 10 results per page

Lot Number	Accession Number	Accession Name	Itk	Trial Name	Trial Site
Folklor	35310	FOLKLOR	fi: low inputs	BTH_Dijon_2011_SetA1	Dijon
Folklor	35310	FOLKLOR	t: treated	BTH_Dijon_2011_SetA1	Dijon
Grapeli	36801	GRAPELI	fi: low inputs	BTH_Dijon_2011_SetA1	Dijon
SOISSONS	6607	SOISSONS	t: treated	BTH_Dijon_2011_SetA1	Dijon
Folklor	35310	FOLKLOR	t: treated	BTH_Lusignan_2011_SetA1	Lusignan
Grapeli	36801	GRAPELI	t: treated	BTH_Lusignan_2011_SetA1	Lusignan
SOISSONS	6607	SOISSONS	fi: low inputs	BTH_Lusignan_2011_SetA1	Lusignan
SOISSONS	6607	SOISSONS	t: treated	BTH_Lusignan_2011_SetA1	Lusignan

LEVEL: TRIAL

| Display 20 results per page

Accession Name	Itk	Trial Name	Trial Site	Campaign	Campaign
FOLKLOR	fi: low inputs	BTH_Dijon_2011_SetA1	Dijon	2011	
FOLKLOR	t: treated	BTH_Dijon_2011_SetA1	Dijon	2011	
GRAPELI	fi: low inputs	BTH_Dijon_2011_SetA1	Dijon	2011	
SOISSONS	t: treated	BTH_Dijon_2011_SetA1	Dijon	2011	
FOLKLOR	t: treated	BTH_Lusignan_2011_SetA1	Lusignan	2011	
GRAPELI	t: treated	BTH_Lusignan_2011_SetA1	Lusignan	2011	
SOISSONS	fi: low inputs	BTH_Lusignan_2011_SetA1	Lusignan	2011	
SOISSONS	t: treated	BTH_Lusignan_2011_SetA1	Lusignan	2011	
FOLKLOR	nt: untreated, no fungicide	BTH_Orgeval_2011_SetB3	Orgeval	2011	
FOLKLOR	nt: untreated, no fungicide	BTH_Clermont-Ferrand_2012_SetA1	Clermont-Ferrand	2012	
FOLKLOR	t: treated	BTH_Clermont-Ferrand_2012_SetA1	Clermont-Ferrand	2012	
GRAPELI	nt: untreated, no fungicide	BTH_Clermont-Ferrand_2012_SetA1	Clermont-Ferrand	2012	
SOISSONS	nt: untreated, no fungicide	BTH_Clermont-Ferrand_2012_SetA1	Clermont-Ferrand	2012	
SOISSONS	t: treated	BTH_Clermont-Ferrand_2012_SetA1	Clermont-Ferrand	2012	
FOLKLOR	t: treated	BTH_Orgeval_2012_SetA1	Orgeval	2012	
GRAPELI	nt: untreated, no fungicide	BTH_Orgeval_2012_SetA1	Orgeval	2012	
GRAPELI	t: treated	BTH_Orgeval_2012_SetA1	Orgeval	2012	
SOISSONS	t: treated	BTH_Orgeval_2012_SetA1	Orgeval	2012	
FOLKLOR	t: treated	BTH_Champagne-céréales_2013_SetA1	Champagne-céréales	2013	
FOLKLOR	t: treated	BTH_Orgeval_2013_SetA1	Orgeval	2013	

Data preview

LEVEL: TRIAL

1-10 of 33,406 | Display 10 results per page

GENOTYPE ID				VARIABLE	VARIABLE	VARIABLE	VARIABLE
Lot Number	Accession Number	Accession Name	Campaign	rdt: Grain yield at 0% humidity	r: Yield	rb: Susceptibility to leaf rust	rj: Yellow rust score
AO12035	39275	AO12035	2013	60,5		2,5	
Gotik	37251	GOTIK	2013	108,4			1
EM09222	37290	EM09222	2013	105,4			
CF11215	37809	CF11215	2013			4	1
EM11441	37828	EM11441	2013			1	2
EM11389	37826	EM11389	2013			2	1
Bermude	29852	BERMUDE	2013	85,7			
AO13019	AO13019	AO13019	2013	64	87,5		
EM12231	39323	EM12231	2013				
EM12252	EM12252	EM12252	2013				

Wheat Yield dataset building

- Easy Subsetting
~ Third of 81 000 replications
- Reuse through
MIAPPE ISA Tab File
export

Back to Form

Search parameter(s):

Genus:
Number of Variable(s): 34

Geolocation

DATA SETS: 7

Network Data Set :
[INRA Wheat Network BRC accession \(A series\)](#)

Network Data Set :
[INRA Small Grain Cereals Network](#)
DOI:<http://dx.doi.org/10.15454/1.4489666216568333E12>

Network Data Set :
[INRA Wheat Network not BRC accession \(B and C series\)](#)

Phenotyping campaign(s):

[remove all](#) [add all](#)

Trial list Phenotypic data

Data table view :

LEVEL: REPLICATION

1-10 of 26,030 replication | Display 10 results per page

GENOTYPE ID			TREATMENT		Trial Name	Trial Site
Lot Number	Accession Number	Accession Name	Itk			
CF99105	20364	CF99105	untreated, no fungicide		BTH_Estrées-Mons_2003_SetA1	Estrées-Mons
Recital	6027	RECITAL	low inputs		BTH_Le Moulon_2003_SetA1	Le Moulon
Koreli	29814	KORELI	untreated, no fungicide		BTH_Orgeval_2003_SetA1	Orgeval
CF00108	23825	CF00108	untreated, no fungicide		BTH_Rennes_2003_SetA1	Rennes
Isengrain	13433	ISENGRAIN	treated		BTH_Dijon_2003_SetA2	Dijon
RE02101	23821	RE02101	treated		BTH_Le Moulon_2003_SetA2	Le Moulon
EM01288	EM01288	EM01288	treated		BTH_Lusignan_2003_SetA2	Lusignan
DI03006	DI03006	DI03006	treated		BTH_Clermont-Ferrand_2003_SetB1	Clermont-Ferrand
DI03001	DI03001	DI03001	treated		BTH_Dijon_2003_SetB1	Dijon
Caphorn	20443	CAPHORN	untreated, no fungicide		BTH_Orgeval_2003_SetB1	Orgeval

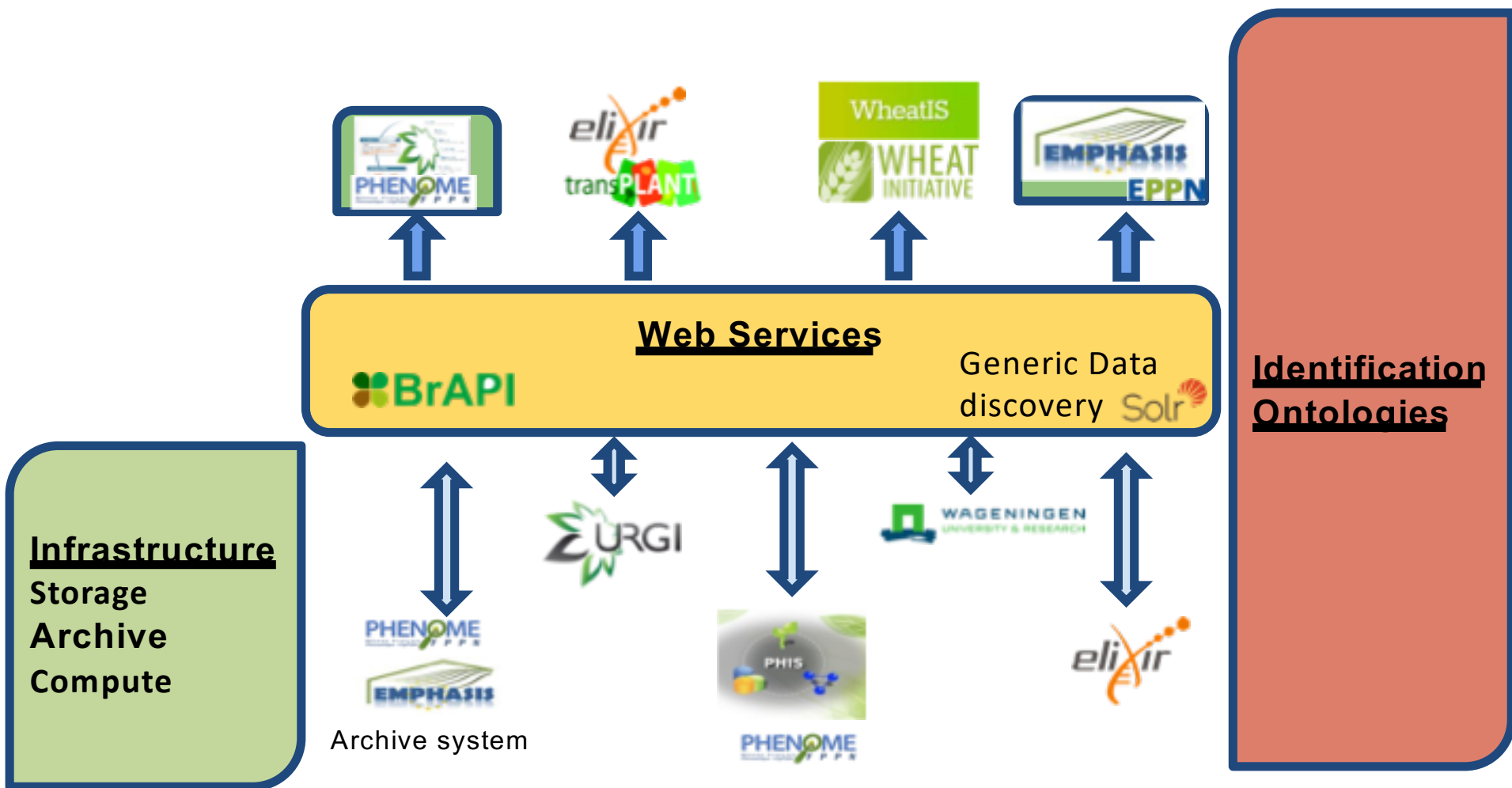
Ephesis data export Ephesis MIAPPE ISA-Tab export

II/ REPOSITORIES FEDERATION



FINDABILITY

Distributed Information System



GENERIC DATADISCOVERY



wheatis.org, Elixir-Fr, Transplant

- Full text
- Facets

WheatIS

Filters

Database

☐ TRITICEAE TOOLBOX (54)
 ☐ CR-EST (7)
 ☐ GNPIs (3)
 ☐ ENSEMBL PLANTS (1)
 ☐ GNPIs JBROWSE (1)
 ☐ PLANTPHENODS (1)

Type

☐ ACCESSION (42)
 ☐ PHENOTYPE (14)
 ☐ EXPERIMENT (9)
 ☐ EXPRESSED SEQUENCE TAGS (7)
 ☐ SEQUENCE FEATURE (2)
 ☐ PHENOTYPE (1)
 ☐ QTL (1)
 ☐ SEQUENCE FEATURE (1)

Species

☐ TRITICUM AESTIVUM (69)
 ☐ HORDEUM VULGARE (6)
 ☐ TRITICUM AESTIVUM L. (1)
 ☐ TRITICUM DURUM (1)

Search

About

WheatIS nodes:

transPlant-MPS (UP):

- CrowsNest: 13324

transPlant-IPK (UP):

- CR-EST: 199220

- GEBIS: 52878

- MetaCrop: 355

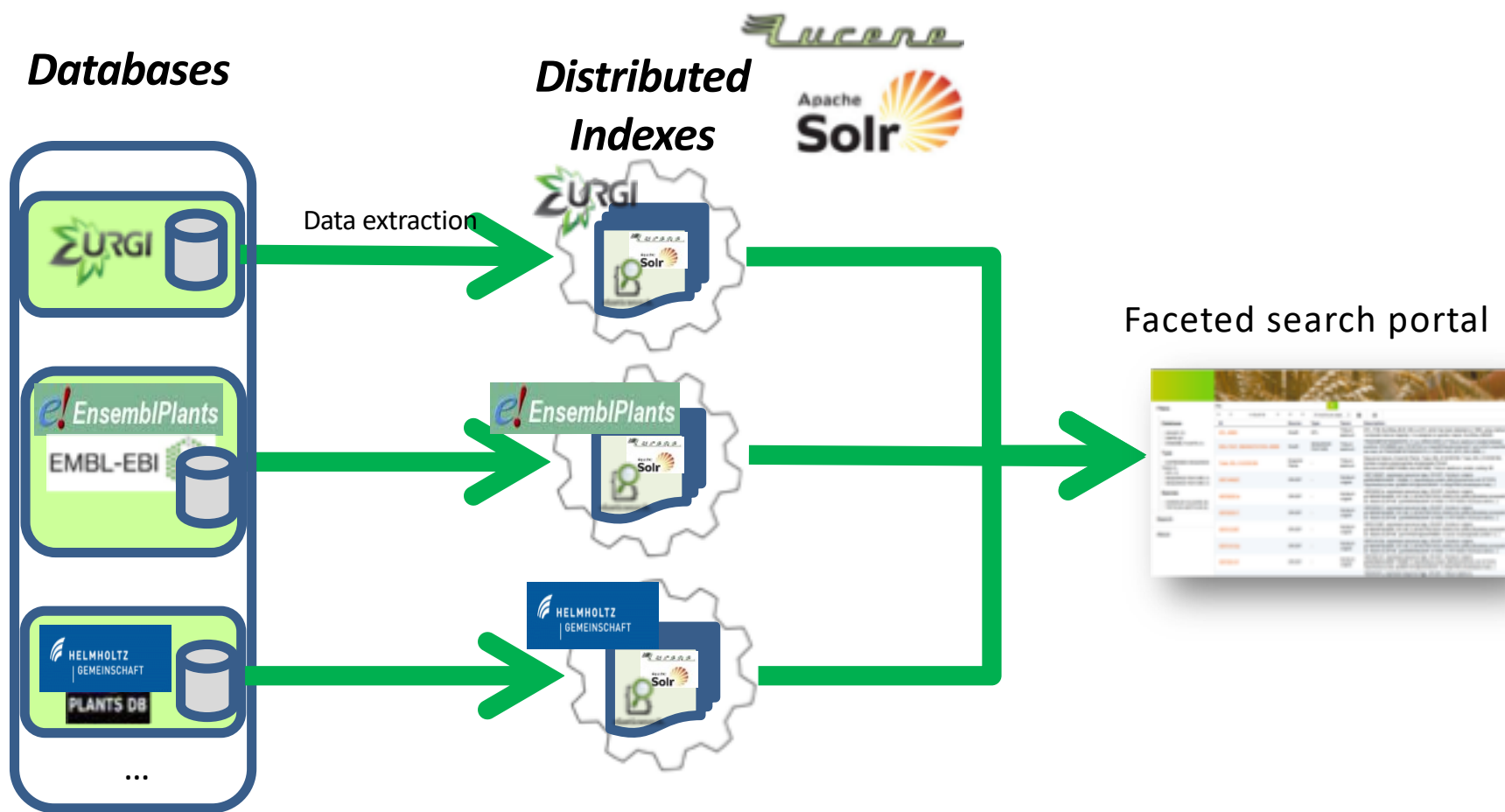
fhb

1-10 of 77

10 results per page

ID	Source	Type	Taxon	Description
Traes_5DL_E12C501B4	Ensembl Plants	-	Triticum aestivum	Sequence feature, Ensembl Plants, Traes_5DL_E12C501B4, Traes_5DL_E12C501B4, Phylla1 [Source:UniProtKB/TrEMBL:Acc:A0FHB0], Triticum aestivum, prot
HDP14M22T	CR-EST	-	Hordeum vulgare	HDP14M22T, expressed sequence tags, CR-EST, Hordeum vulgare, gi 261047 gb AAO63447.1 A12g37930
HDP20D01w	CR-EST	-	Hordeum vulgare	HDP20D01w, expressed sequence tags, CR-EST, Hordeum vulgare, gi 15115550 ref NP_914550.1 [Rickettsia prowazekii str. Madrid E] SFHB ; gi 34906406 ref NP_914550.1
HDP20D01T	CR-EST	-	Hordeum vulgare	HDP20D01T, expressed sequence tags, CR-EST, Hordeum vulgare, gi 15115550 ref NP_914550.1 [Rickettsia prowazekii str. Madrid E] SFHB ; gi 34906406 ref NP_914550.1
HDP21C08T	CR-EST	-	Hordeum vulgare	HDP21C08T, expressed sequence tags, CR-EST, Hordeum vulgare, gi 15115550 ref NP_914550.1 [Rickettsia prowazekii str. Madrid E] SFHB ; gi 31979237 gb AAP68831.1
HDP31N10w	CR-EST	-	Hordeum vulgare	HDP31N10w, expressed sequence tags, CR-EST, Hordeum vulgare, gi 15115550 ref NP_914550.1 [Rickettsia prowazekii str. Madrid E] SFHB ; gi 34906406 ref NP_914550.1
HDP35A10T	CR-EST	-	Hordeum vulgare	HDP35A10T, expressed sequence tags, CR-EST, Hordeum vulgare, gi 261047 gb AAO63447.1 A12g37930
TS034O07u	CR-EST	-	Triticum aestivum	TS034O07u, expressed sequence tags, CR-EST, Triticum aestivum, Gi 15115550 ref NP_914550.1 [Rickettsia prowazekii str. Madrid E] SFHB ; gi 34906406 ref NP_914550.1
HWW FHB	Triticeae Toolbox	Experiment	Triticum aestivum	Experiment, Triticeae Toolbox, HWW FHB, phenotype experiment, Include HWWFHB_2014_Fargo, Triticum aestivum, phenotype
URSN_2012_BrookingsSD	Triticeae Toolbox	Experiment	Triticum aestivum	Experiment, Triticeae Toolbox, URSN_2012_BrookingsSD, phenotype trial severity, Fusarium head blight disease index, visually scabby kernels URS

Data discovery in distributed databases



Generic discoverable data



Data types

Phenotypes
Markers,
accessions,
GWAS,
Experiments
Journal articles
Seeds of
discovery data
Genomic
Features

Generic Search Growth

Indexing Package

- Community Building
- Indexing node deployment support
- <http://wheat-urgi.versailles.inra.fr/Projects/Wheat-Information-System/SolR-tool-package>

To ease the WheatlS nodes to expose their data to the [WheatlS search](#) , we developed a package to help the installation and configuration of the SolR tool.

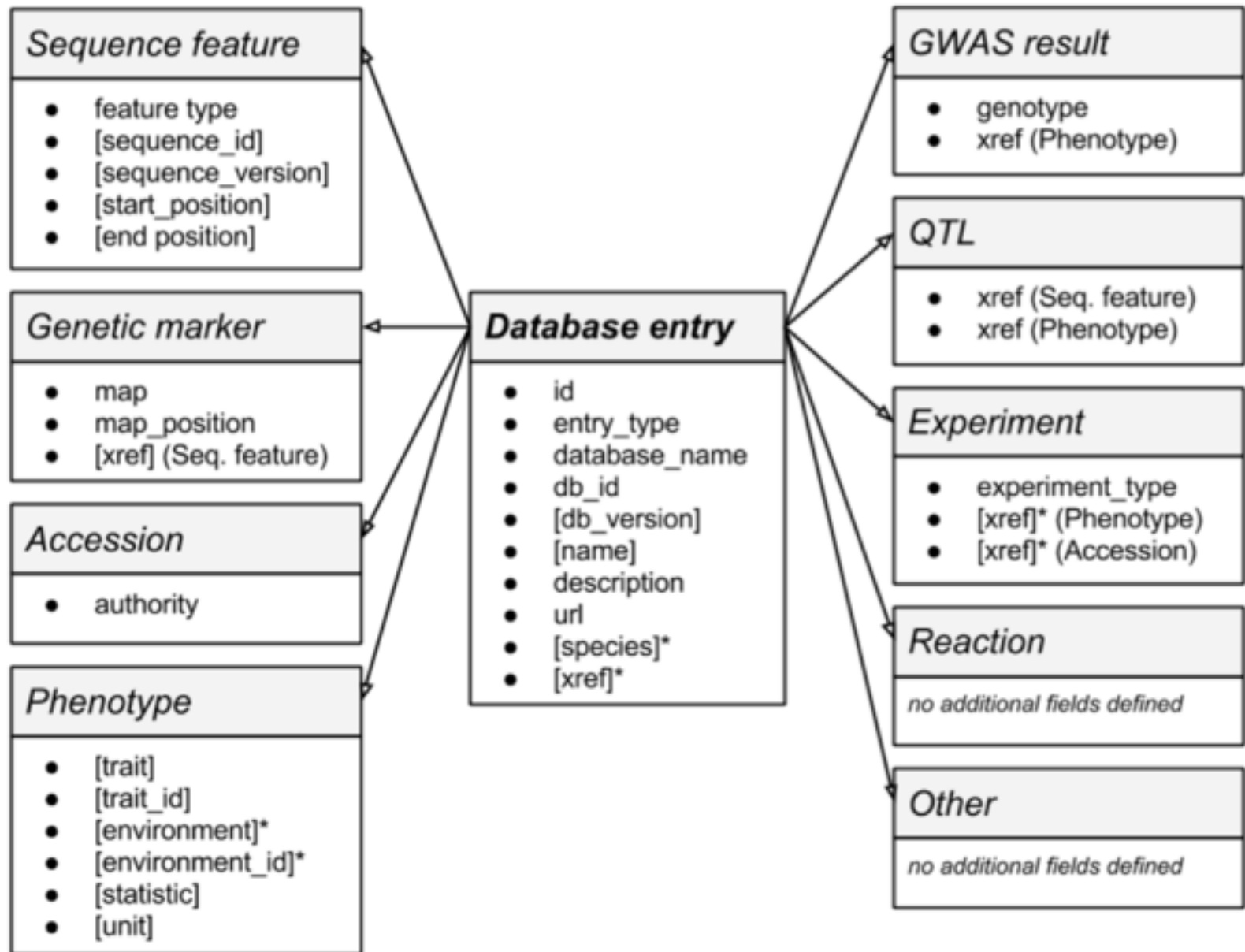
Download the package: [SolR-tool-package-WheatlS.tar.gz](#) (157.33 kB)

Please [contact us](#) to have support and to add your SolR indexes to the WheatlS search.



Generic datamodel

Figure 1, overview of the WheatIS/transPLANT integrated search schema.

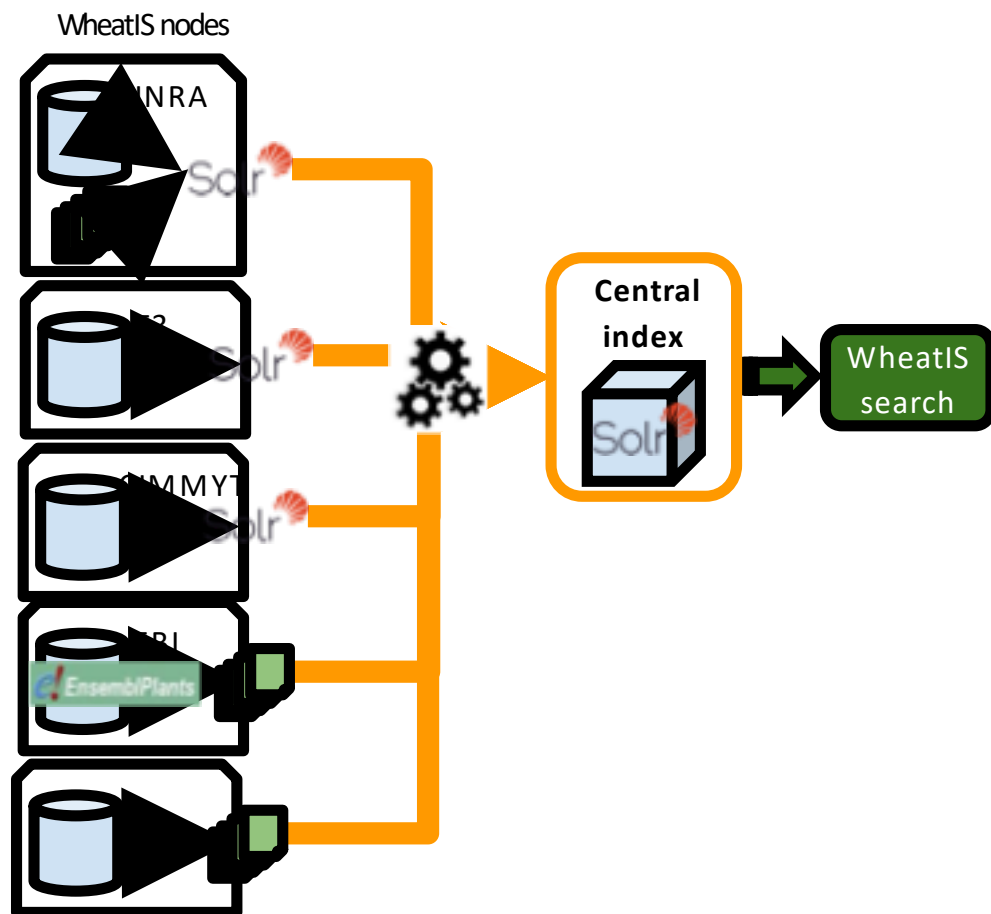


the core type that all sub-types inherit from. A database entry is defined as any accessioned record describing a biological entity. Fields in **bold italic** are used for display and search by [facets/categories](#) in the WheatIS search tool.

Field	Description	Type	Optional?
id	A universally unique identifier for the entry.	string	Auto generated
entry_type	The type of database entry. Should be one of the sub-types defined below.	string	no
<i>database_name</i>	The name of the source database for the entry.	string	no
db_id	The entry identifier. May be unique for a given source database, at least when concatenated with db_version.	string	no
db_version	Version of the entry in the database, if any.	string	yes
<i>description</i>	Free text description to be indexed for searching. All relevant text related to the entry should be concatenated into this field.	text	no
url	The URL for the entry in the source database.	string	no
species	The scientific name (or names) of the species or other taxonomic classification associated with the entry.	string, multi	yes
xref	A generic cross-reference defined between different documents in the schema. An xref is one or more db_ids prefixed by the sub-type, i.e. "Accession:db_id1" or "Sequence feature:db_id1, Genetic marker:db_id2, ...".	string, multi	yes

Data discovery perspectives

- Central index approach
 - ◆ FTP/Web repo on each node
 - Trackhub like
 - ◆ Metadata harvested / indexed
 - CSV Files
 - ◆ Export from existing solr
 - /select → enable stored properties
 - Old Solr nodes
 - /export request → Open this solr endpoint
- Pros
 - ◆ Lighter implementation for new nodes
 - ◆ Easy update of Solr engine
 - ◆ Easy addition of new functionalities



Generic vs Specific

- Generic search
 - ◆ Any data type
 - ◆ Full text search
 - ◆ Fuzzy search
 - ◆ No specific search : « Trial on Wheat Yield with Decease notation »
- Specific Search
 - ◆ Phenotyping
 - Variety/ Germplasm search
 - Phenotyping Variable search
 - ◆ Breeding API

Elixir Plant Data Lookup Service for Genotype – Phenotype

- Minimal Objectives
- Distributed model
 - Building lightweight services integrating over independently established archives
- A common API to distribute data
 - Allows community specific web interfaces over the services
- Data discovery not data mining
 - Plant Phenotype and Phenotype x Genotype analysis are very complex and diverse
 - Dataset building and consolidation

Common API, MIAPPE Web Service

- Breeding API
 - ♦ <http://brapi.org/>
- International collaboration
 - ♦ Excellence in Breeding platform (CGIAR)
 - ♦ Coordinator : Peter Selby
 - ♦ Lead: Lukas Mueller, Jan Erik Backlund, Kelly Robbins
- Vision :
 - ♦ Standard Open API
 - ♦ Information Exchange
 - ♦ Breeding is the main target
- Servers implementations
 - ♦ CGIARs international network
 - ♦ Elixir Excelerate
 - ♦ Emphasis
 - ♦ Germinate
- Clients implementations
 - ♦ Flapjack : genotyping data visualization
 - ♦ Phenome-fppn portal, GnpIS, Elixir Plant Data Lookup Service
 - ♦ R analysis pipelines



Bill & Melinda Gates Foundation

CassavaBase

T3

IBP

JHI

Bioversity

CIRAD

INRA

IRRI

GOBII

Wageningen

CIP

DaRT

Cornell

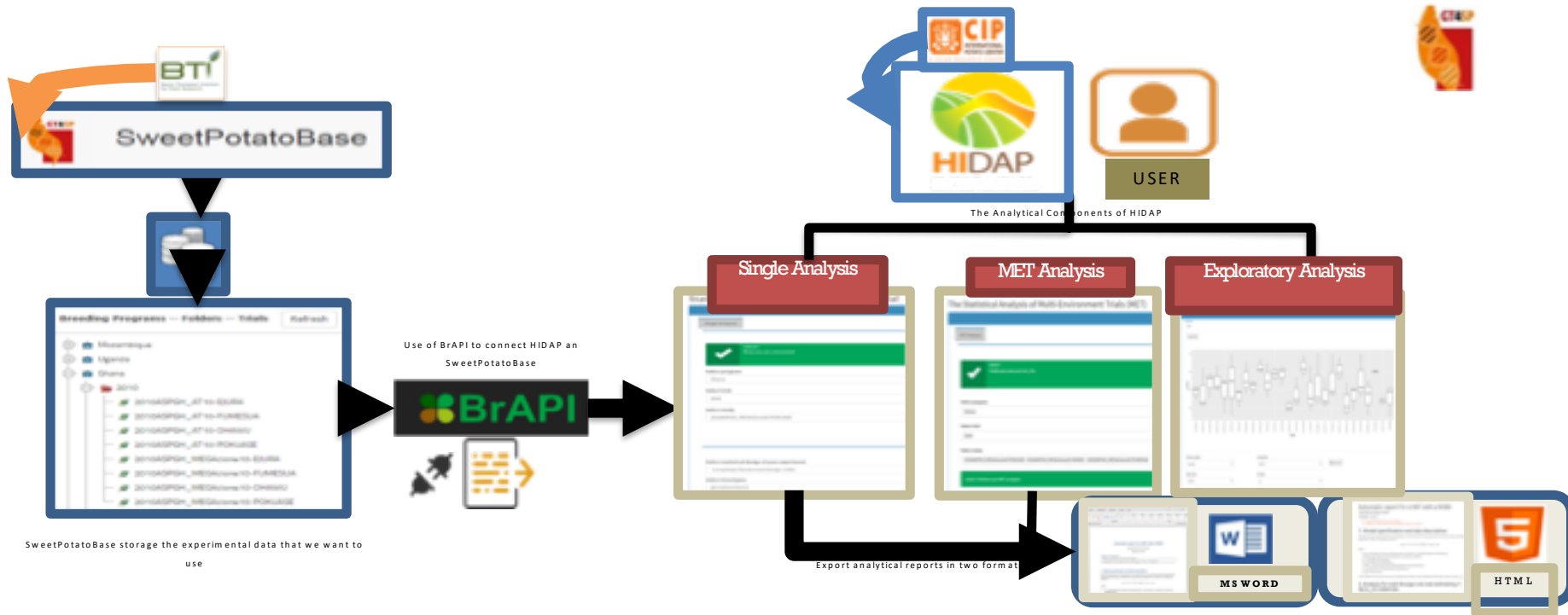
iPlant



Benefit 1 : BrAPI for R analysis



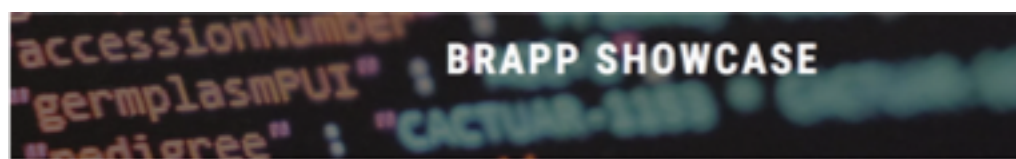
Workflow HIDAP-SweetPotatoBase



Brapi/v1/study/table web service → ISA Raw data file

Benefit 2: BrAPPS

- Tools integrable in any BrAPI compliant System
 - ♦ <https://www.brapi.org/brapps.php>



BRAPP SHOWCASE

Welcome to the BrAPI Application Showcase, or BrAPPS for short. Each of these BrAPPS is an independent tool which can run on its own or can be easily integrated with a larger system. And of course, each BrAPP is completely BrAPI driven and can be used with any BrAPI compliant system. The goal is to keep the BrAPI community informed about what tools are available and encourage functionality sharing. If you have a BrAPP you would like to share with the community please reach out to a [BrAPI Coordinator](#).



GRAPHICAL FILTERING TOOL

FROM [CASSAVABASE](#)

[DEMO](#) [SOURCE](#) [CODE](#)

Built by Cassavabase, this is a fully BrAPI compliant tool for graphically building complex search and filter queries of Observational Data.



STUDY COMPARISON TOOL

FROM [CASSAVABASE](#)

[DEMO](#) [SOURCE](#) [CODE](#)

Built by Cassavabase, this is a fully BrAPI compliant tool for comparing the performance of germplasm across studies.



VARIABLE ONTOLOGY

FROM [URGI - INRA](#)

[DEMO](#) [SOURCE](#) [CODE](#)

Built by URGI - INRA, this is a javascript widget displaying all the variables of a BrAPI endpoint.

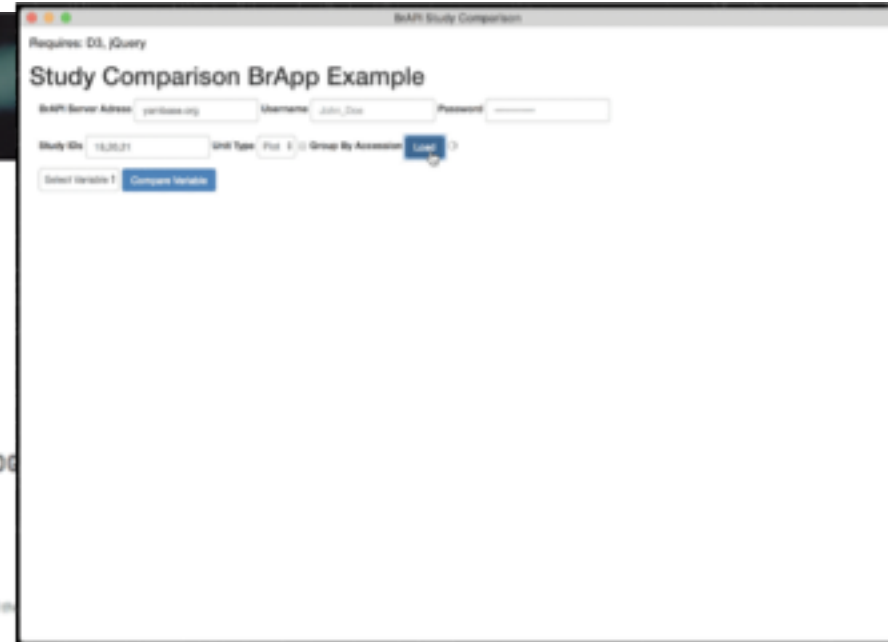


PEDIGREE VIEWER

FROM [CASSAVABASE](#)

[DEMO](#) [SOURCE](#) [CODE](#)

Built by Cassavabase, this is a fully BrAPI compliant tool for viewing and exploring germplasm pedigrees.



BrAPI Study Comparison

Requires: D3, jQuery

Study Comparison BrApp Example

BrAPI Server Address: Username: Password:

Study IDs: Unit Type: Group By Accession:

Elixir Plant Data Lookup Service

- Phenotype through Breeding API
- Generic WheatIS/transPlant for all other data types
- Future Elixir Core data resource or Recommended Interoperability Resource?
- Open source software.

- <https://github.com/elixir-europe/plant-brapi-etl-data-lookup-apis>



SEARCH FORM Reset tab

Germplasm **Variable**

Crop

Germplasm list (panel, collection, population)

Accession

RESULTS 29 match found

Phenotyping Study **URGI GnpIS** **ASSO_S1P9_FFLW8_Average:Gif-sur-Yvette Saint-Martin-de-Hinx Einbeck**
 "ASSO_S1P9_FFLW8_Average:Gif-sur-Yvette Saint-Martin-de-Hinx Einbeck" is a phenotyping study conducted from 2002-01-01 to 2005-01-01 (seasons: 2002,2003,2004,2005) in Average Gif-sur-Yvette,Saint-Martin-de-Hinx,Einbeck (France).

Germplasm **VIB PIPPA** **B73_RIL_2-way**
 "B73_RIL_2-way" is a Zea mays (Maize) accession.

Germplasm **VIB PIPPA** **B73_RIL_8-way**
 "B73_RIL_8-way" is a Zea mays (Maize) accession.

Germplasm **URGI GnpIS** **B73_inra**
 "B73_inra" is a Zea mays (Maize) accession (number: "B73_inra") managed by INRA.

Phenotyping Study **VIB PIPPA** **RIL_2-way batch 1**
 "RIL_2-way batch 1" is a phenotyping study conducted from 2011-09-21 to 2011-10-18.

Phenotyping Study **VIB PIPPA** **RIL_2-way batch 10**

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Elixir Plant Data Lookup Service Development

- 2018 Deliverable (D7.2):
 - ◆ Data Harvester finalized and published on github
 - ◆ Partners databases indexed through BrAPI
 - Elixir-nl(WUR)
 - Elixir-fr(INRA)
 - Elixir-be(VIB)
 - Elixir-pt(iBET)
 - Elixir-sl (NIB)
 - Elixir-fr(CIRAD) in progress
- Elixir new nodes
 - ◆ Italy (FMACH) → Elixir Staff Exchange
 - ◆ Germany (IPK)

How to join the BrAPI federation ?

- Implement minimum BrAPI web services
 - ◆ Location
 - ◆ Germplasm
 - ◆ Study
 - ◆ Trial
 - ◆ Observation Variable (optional)
 - ◆ Phenotype-search (optional)
 - ◆ Program (optional)
- Contact Elixir Plant to register
- Need help ?
 - ◆ Elixir Plant community
 - ◆ BrAPI community
 - ◆ Elixir staff exchange ?

MIAPPE STATUS AND PERSPECTIVES



Adoption

- Plant community involved
 - ◆ Elixir (European bioinformatic infrastructure)
 - ◆ Emphasis (European Phenotyping infrastructure)
 - ◆ Bioversity international CGIAR
- Breeding API is Elixir official Phenotyping standard web service
- MIAPPE and BrAPI high collaboration
 - ◆ adoption and compliance
- Data repositories and management tools



- ◆ GnpIS <https://urgi.versailles.inra.fr/gnpis/>



- ◆ eDale <https://edal.ipk-gatersleben.de/>



- ◆ PlantPhenoDB at IPGPAS <http://cropnet.pl/plantphenodb/>

- ◆ In progress: COPO, Elixir plant databases (iBet, WUR, VIB, ...), Brassica Information Portal, ...

Perspectives

- Version 2 : Emphasis, Elixir, ...
 - ◆ Environment
 - ◆ Sensor traceability
 - ◆ Phenoharmonis Workshop Montpellier may 2018
- Elixir data lookup service, MIAPPE enabled.
 - ◆ Data discovery
 - ◆ Elixir
 - ◆ WheatIS & Emphasis ?
 - ◆ Open source software
- Dataset Validation
 - ◆ Elixir
 - ◆ File archive (ISA Tab) and BrAPI based



Acknowledgment & Questions



- ♦ Paul Kersey
- ♦ Dan Bolser



- IPG PAS
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 - ♦ Pawel Krajewski



- ♦ Matthias Lange



- iBet



- ♦ Bruno Costa
- ♦ Inês Chaves
- ♦ Célia M. Miguel

- IGC
 - ♦ Daniel Faria



- ♦ Cyril Pommier
- ♦ Anne Françoise Adam Blondon
- ♦ Guillaume Cornut
- ♦ Thomas Letellier
- ♦ Célia Michotey
- ♦ François Tardieu
- ♦ Pascal Neveu
- ♦ Manuel Ruiz
- ♦ Pierre Larmande
- ♦ Hadi Quesneville
- ♦ Raphaël Flores



- Bioversity international CGIAR
 - ♦ Elizabeth Arnaud
 - ♦ Marie Angélique Laporte



- ♦ Frederik Coppens



- ♦ Richard Finkers



- ♦ Bjorn Usadel