Cyril Pommier / GnpIS Phenotyping Information System: Ephesis

GnpIS Overview

- GnpIS Phenotyping Data: Ephesis
  - Ephesis Wheat
  - Ephesis Tree
- Integration in distributed information systems
- Perspectives

GnpIS Overview

- Integrative information system
  - Plant and bioaggressors
  - Multi thematic
    - Genetic
    - Genomic
    - Phenotyping
  - Public and private data: partners, international consortium
- INRA: French National Center for Agronomic Research
- URGi: INRA Research laboratory
  - Production
  - Data integration
  - Development

GnpIS Integrative and transversal tool

- Quick search interface
  - Google-like search on GnpIS
  - Entry point for thematic tools
Thematic interfaces

- Sequence
  - DNA Polymorphisms
  - Genotyping
  - NGS Sequence
- Phenotyping
  - Genetic resources characterization
  - Phenotyping experiment
- Association Genetic
- Maps, Markers, QTLs and MetaQTL
- Gene expression
- Genomic

Data integration

- Integration and interoperability based on Pivot scientific objects
  - Germplasm/plant material: taxon, genetic resource accession.
  - Genetic collections
  - SNP Markers
  - Phenotyping experiments
  - Marker
    - Genetic to Genomic
    - Ontologies
    - Project

Phenotyping in GnpIS scientific perimeter

- Geneticist and Agronomist
  - Ephesis partners
- Phenotype and environment Experimental data
  - Generic: Ontology driven
    - Levels: 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
  - Multigenotype experiment
    - Perennial
    - Annual

EPHESIS WEB APPLICATION

- Environment and Phenotype data access
  - Whole trial level
  - Plant/plot level
- Raw or elaborated data
  - Alphanumeric or complex, no images
  - Volume limitation
    - archiving system: Phenome example.
Phenotyping Interface Overview

Ephesis

- https://urgi.versailles.inra.fr/ephesis
- Two data access modalities
  - Trial centered
  - Experimentation data centered
- Two forms
  - Merged as single form: February 2014

Phenotyping Experimentation data form

Search criteria overview

- Three tabs
  - Genotype
  - Variables
  - Trial
- Query helper
  - Consistent criterion combination
  - Selection in one list limits choices for the other
  - Autocompletions

Genotype/Germplasm tab

- Taxon
- Genetic resource accession
- Genotype list builder
  - From taxons
  - Genotype accession
  - Collections

Variable tabs

- Ontology driven
- Reference Ontologies
- Specific ontologies
  - Trait
  - Environment
Trial details tabs

- Trial identification
  - ID
  - Name
- Phenotyping campaign
  - Group data within a trial
  - Year
- Experimental site

Query parameters

- Wheat data
- INRA wheat Breeding Network
- Estrees-Mons, Clermont-Ferrand, Dijon

Data visualization
Query parameters
- Quercus robur data
- Phenology variables

Multiannual Trials: Phenotyping campaign

DATA INTEGRATIONS AND DISTRIBUTED INFORMATIONS SYSTEMS
### GnpIS/Ephesis in distributed Information System

- **Phenome**
  - Integrative portal
- **Transplant**
  - Phenotype Data provider
  - Standards
    - Ontologies
    - File format

### Phenome Integrative portal

- **French Plant Phenotyping Platform**
  - High throughput Phenotyping
  - Field
  - Controlled environment
  - 9 nodes
- **Distributed information system**
  - Ontologies
  - Data production tool
  - Integrative Portal : Ephesis
  - Archiving System

### TransPLANT

- 4 year EU FP7-funded project (DG CONNECT) coordinated by EMBL-EBI
- An I3 project with elements of coordination, service and RTD
- [http://www.transplantdb.eu/](http://www.transplantdb.eu/)
- **Aims**
  - Provide of an integrating point of interactive access to diverse data sets
  - Develop common standards for use within transPLANT and a wider community
  - Engage with other related communities to share experiences, tools and roadmaps

### Transplant Coordination and Support Activities

- **WP1** Management
- **WP2** Interaction with relevant communities
- **WP3** Standards development
  - Ontologies (URGI)
    - Plant
    - Traits
    - Environment
    - CropOntology
  - File Standards (Polapgen)
- **WP4** User training

### Data quality for distributed information systems

- **Genotype identification**
  - Collection or Panel
  - Genetic resource centers coordination
- **Ontologies**
  - References
    - Crop Ontology : [www.cropontology.org](http://www.cropontology.org)
    - Vitis : Grape Ontology
    - Wheat : Wheat ontology
  - EO, to be developed
  - Chebi, Brenda Enzyme, Golm Metabolome
    - User specific ontology
  - Trial identification

### Perspectives

- Active development in the coming years
- Improved Environment handling
- Metadata enrichment
- **Distributed IS**
  - Ontologies
  - CropOntology
  - Transplant
  - Standard Exchange Format
    - Transplant
    - EPPN and PODD partnership under study
Thank you