AgroPortal

a proposition for ontology-based services in the agronomic domain

Atelier InOvive 2015 - Rennes - 29 juin 2015

Clément Jonquet,
Esther Dzalé-Yeumo,
Elizabeth Arnaud,
Pierre Larmande

LIRMM

INRA SCIENCE & IMPACT

Bioversity International

IRD Institut de recherche pour le développement

IBC Institut de biologie computationnelle

Numev

Agence Nationale de la Recherche ANR

Why ontologies? Why an ontology repository?

Biologist have adopted ontologies

- To provide canonical representation of scientific knowledge
- To annotate experimental data to enable interpretation, comparison, and discovery across databases
- To facilitate knowledge-based applications for
  - Decision support
  - Natural language-processing
  - Data integration
- But ontologies are: spread out, in different formats, of different size, with different structures

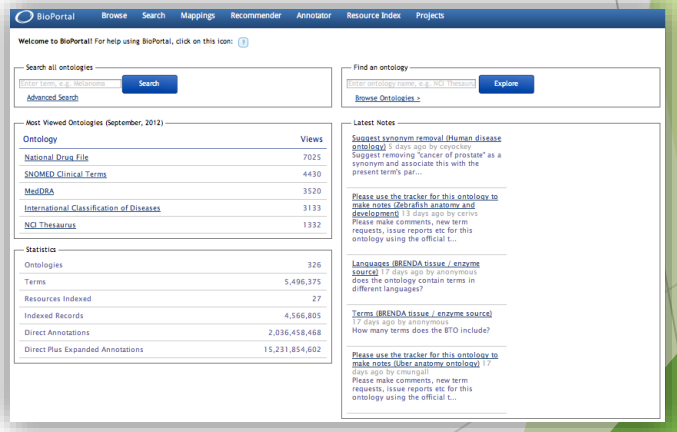
Working with vocabularies & ontologies – a portal please!

- You've built an ontology, how do you let the world know?
- You need an ontology, where do you go o get it?
- How do you know whether an ontology is any good?
- How do you find resources that are relevant to the domain of the ontology (or to specific terms)?
- How could you leverage your ontology to enable new science?
- How could you use ontologies without managing them ?

NCBO Bioportal : A “one stop shop” for Biomedical Ontologies

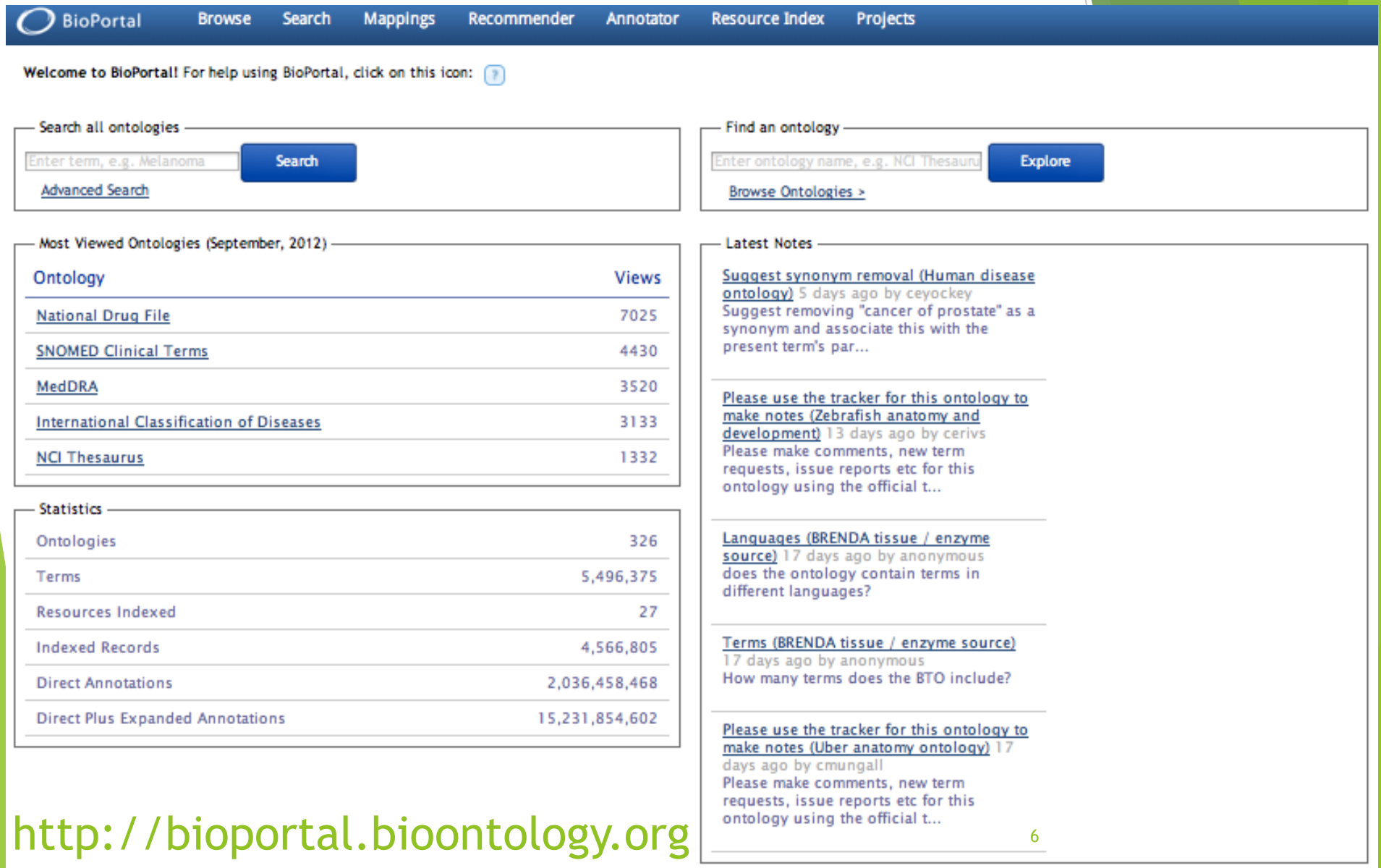
- Web repository for biomedical ontologies
  - Make ontologies accessible and usable – abstraction on format, locations, structure, etc.
  - Users can publish, download, browse, search, comment, align ontologies and use them for annotations both online and via a web services API.

- Online support for ontology
  - Peer review
  - Notes (comments and discussion)
  - Versioning
  - Mapping
  - Search
  - Resources



THE NATIONAL CENTER FOR BIOMEDICAL ONTOLOGY

BioPortal Ontology Repository

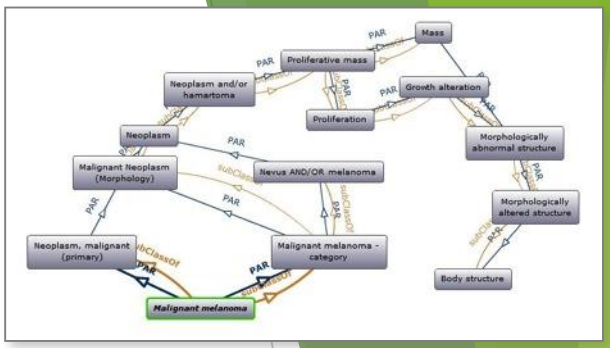


http://bioportal.bioontology.org

http://data.bioontology.org

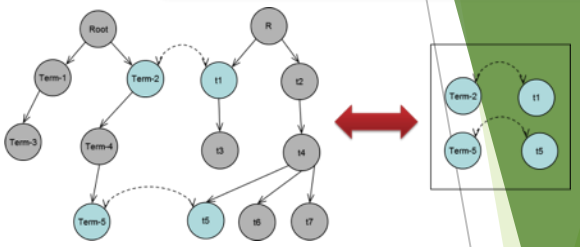
Ontology Services

- Search
- Traverse
- Comment
- Download



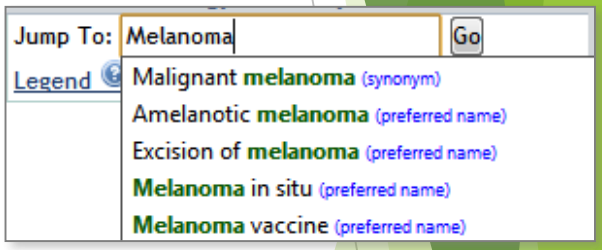
Mapping Services

- Create
- Upload
- Download



Widgets

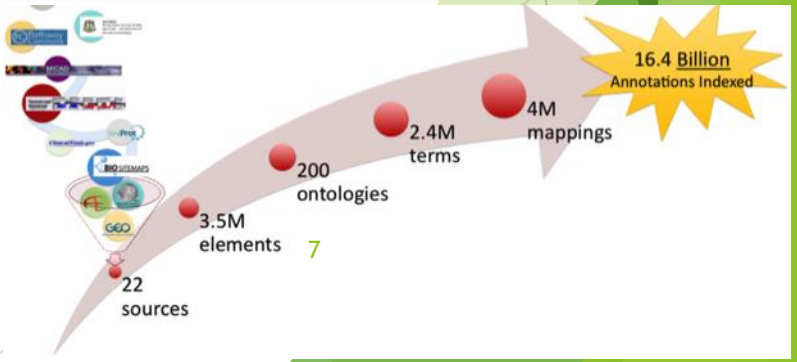
- Tree-view
- Auto-complete
- Graph-view



Annotation → **Term recognition**

Expression, Expression of bladder, bladder, smooth, bladder muscle, muscle, smooth muscle, cells, mechanical, mechanical stimulation, stimulation, Chronic, results, bladder overdistension, associated, associated with, with, loss, genes, altered

Data Access → **Search "data" annotated with a given term**



http://bioportal.bioontology.org

Why don't have a portal like the NCBO BioPortal for the agronomic & plant domain?

- NCBO BioPortal is specific for health and biomedical ontologies
  - Overlaps exist (GO, ENVO, PATO, SIO, BFO…)
  - But many plant/agro related ontologies are not covered
- NCBO technology is domain-independent and open source
  - Virtual appliance

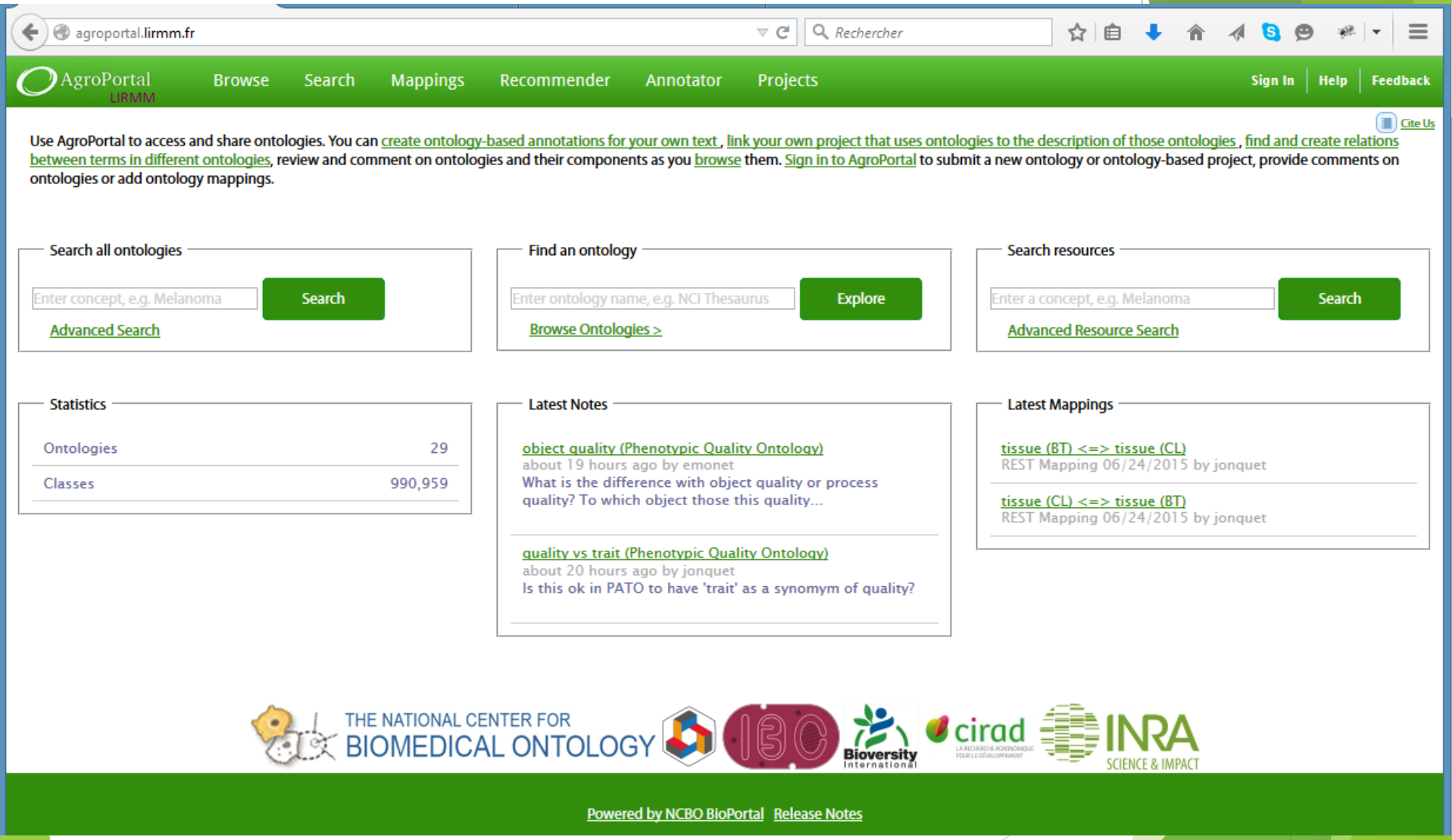
A few ontologies used in agronomic sciences

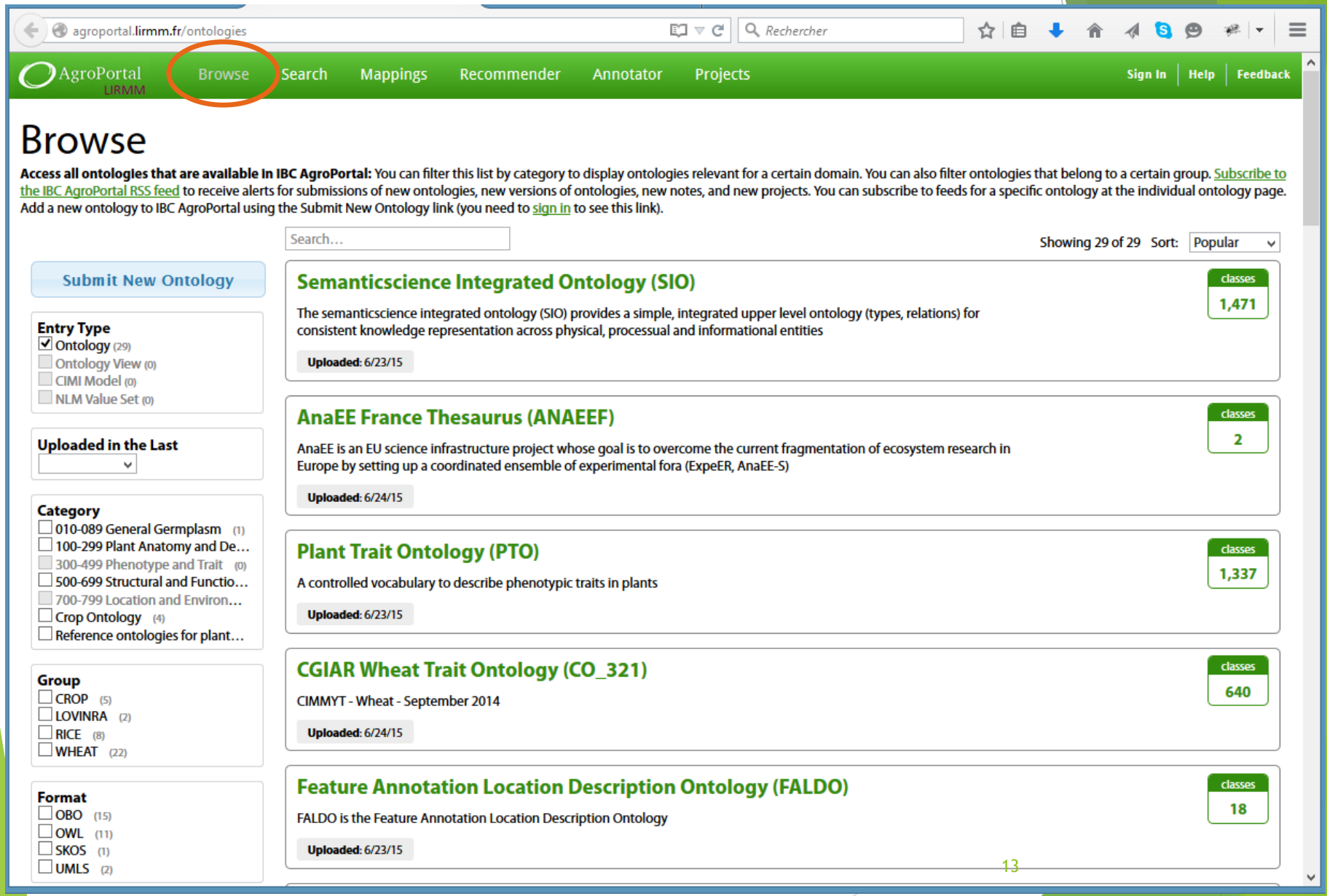
- Already in NCBO BioPortal
  - Plant Ontology, Plant Trait Ontology,
  - GO, SIO, PATO, ENVO, EFO, CL, etc.
- Not in
  - Crop OntologIES
    - Rice trait ontology, Wheat trait ontology, Wheat Anatomy & Development Ontology, Multicrop passport ontology, Bioversity molecular markers ontology
  - Other
    - Agrovoc
    - Anaee thesaurus
    - National Agriculture Library thesaurus
    - Feature annotation location description ontology

Objectives of AgroPortal project

- Develop and support a reference ontology repository for the agronomic domain
  - One-stop-shop for plant/agronomic related ontologies
  - Primary focus on the agronomic & plant domain
- Reusing the NCBO BioPortal technology
  - Avoid to re-implement what has been done
  - Facilitate interoperability
  - Reusing the scientific outcomes, experience & methods of the biomedical domain
- Enable straightforward use of agronomic related ontologies
  - Respect the requirements of the agronomic community
  - Fully semantic web compliant infrastructure

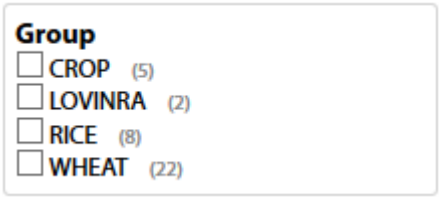
How does it looks?

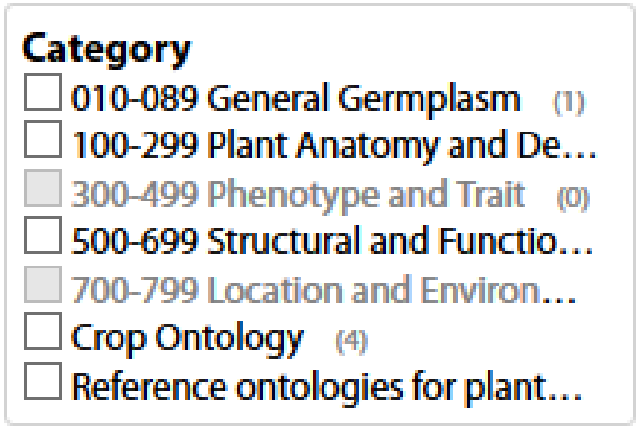

agroportal.lirmm.fr
Rechercher
AgroPortal
LIRMM
Browse
Search
Mappings
Recommender
Annotator
Projects
Sign In
Help
Feedback
Cite Us
Use AgroPortal to access and share ontologies. You can create ontology-based annotations for your own text , link your own project that uses ontologies to the description of those ontologies , find and create relations between terms in different ontologies, review and comment on ontologies and their components as you browse them. Sign in to AgroPortal to submit a new ontology or ontology-based project, provide comments on ontologies or add ontology mappings.
Search all ontologies
Enter concept, e.g. Melanoma
Search
Advanced Search
Find an ontology
Enter ontology name, e.g. NCI Thesaurus
Explore
Browse Ontologies >
Search resources
Enter a concept, e.g. Melanoma
Search
Advanced Resource Search
Statistics
Ontologies 29
Classes 990,959
Latest Notes
object quality (Phenotypic Quality Ontology)
about 19 hours ago by emonet
What is the difference with object quality or process quality? To which object those this quality...
quality vs trait (Phenotypic Quality Ontology)
about 20 hours ago by jonquet
Is this ok in PATO to have 'trait' as a synomym of quality?
Latest Mappings
tissue (BT) <=> tissue (CL)
REST Mapping 06/24/2015 by jonquet
tissue (CL) <=> tissue (BT)
REST Mapping 06/24/2015 by jonquet
THE NATIONAL CENTER FOR
BIOMEDICAL ONTOLOGY
Bioversity International
cirad
INRA
SCIENCE & IMPACT
Powered by NCBO BioPortal
Release Notes

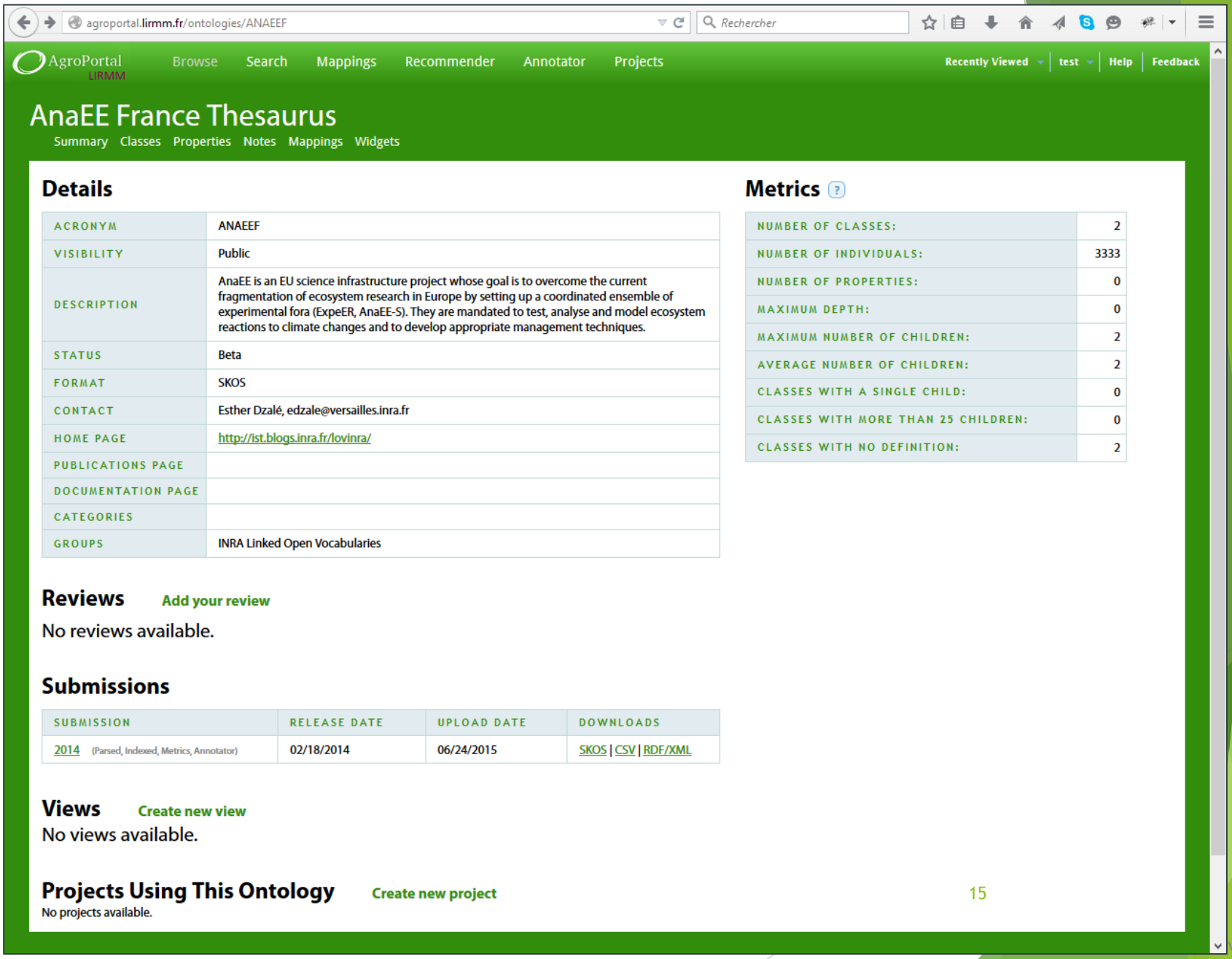

agroportal.lirmm.fr/ontologies
Rechercher
AgroPortal LIRMM
Browse
Search
Mappings
Recommender
Annotator
Projects
Sign In
Help
Feedback
Browse
Access all ontologies that are available in IBC AgroPortal: You can filter this list by category to display ontologies relevant for a certain domain. You can also filter ontologies that belong to a certain group. Subscribe to the IBC AgroPortal RSS feed to receive alerts for submissions of new ontologies, new versions of ontologies, new notes, and new projects. You can subscribe to feeds for a specific ontology at the individual ontology page. Add a new ontology to IBC AgroPortal using the Submit New Ontology link (you need to sign in to see this link).
Search...
Showing 29 of 29 Sort: Popular
Submit New Ontology
Entry Type
Ontology (29)
Ontology View (0)
CIMI Model (0)
NLM Value Set (0)
Uploaded in the Last
Category
010-089 General Germplasm (1)
100-299 Plant Anatomy and De...
300-499 Phenotype and Trait (0)
500-699 Structural and Functio...
700-799 Location and Environ...
Crop Ontology (4)
Reference ontologies for plant...
Group
CROP (5)
LOVINRA (2)
RICE (8)
WHEAT (22)
Format
OBO (15)
OWL (11)
SKOS (1)
UMLS (2)
Semanticscience Integrated Ontology (SIO)
The semanticscience integrated ontology (SIO) provides a simple, integrated upper level ontology (types, relations) for consistent knowledge representation across physical, processual and informational entities
Uploaded: 6/23/15
classes 1,471
AnaEE France Thesaurus (ANAEEF)
AnaEE is an EU science infrastructure project whose goal is to overcome the current fragmentation of ecosystem research in Europe by setting up a coordinated ensemble of experimental fora (ExpeER, AnaEE-S)
Uploaded: 6/24/15
classes 2
Plant Trait Ontology (PTO)
A controlled vocabulary to describe phenotypic traits in plants
Uploaded: 6/23/15
classes 1,337
CGIAR Wheat Trait Ontology (CO_321)
CIMMYT - Wheat - September 2014
Uploaded: 6/24/15
classes 640
Feature Annotation Location Description Ontology (FALDO)
FALDO is the Feature Annotation Location Description Ontology
Uploaded: 6/23/15
classes 18

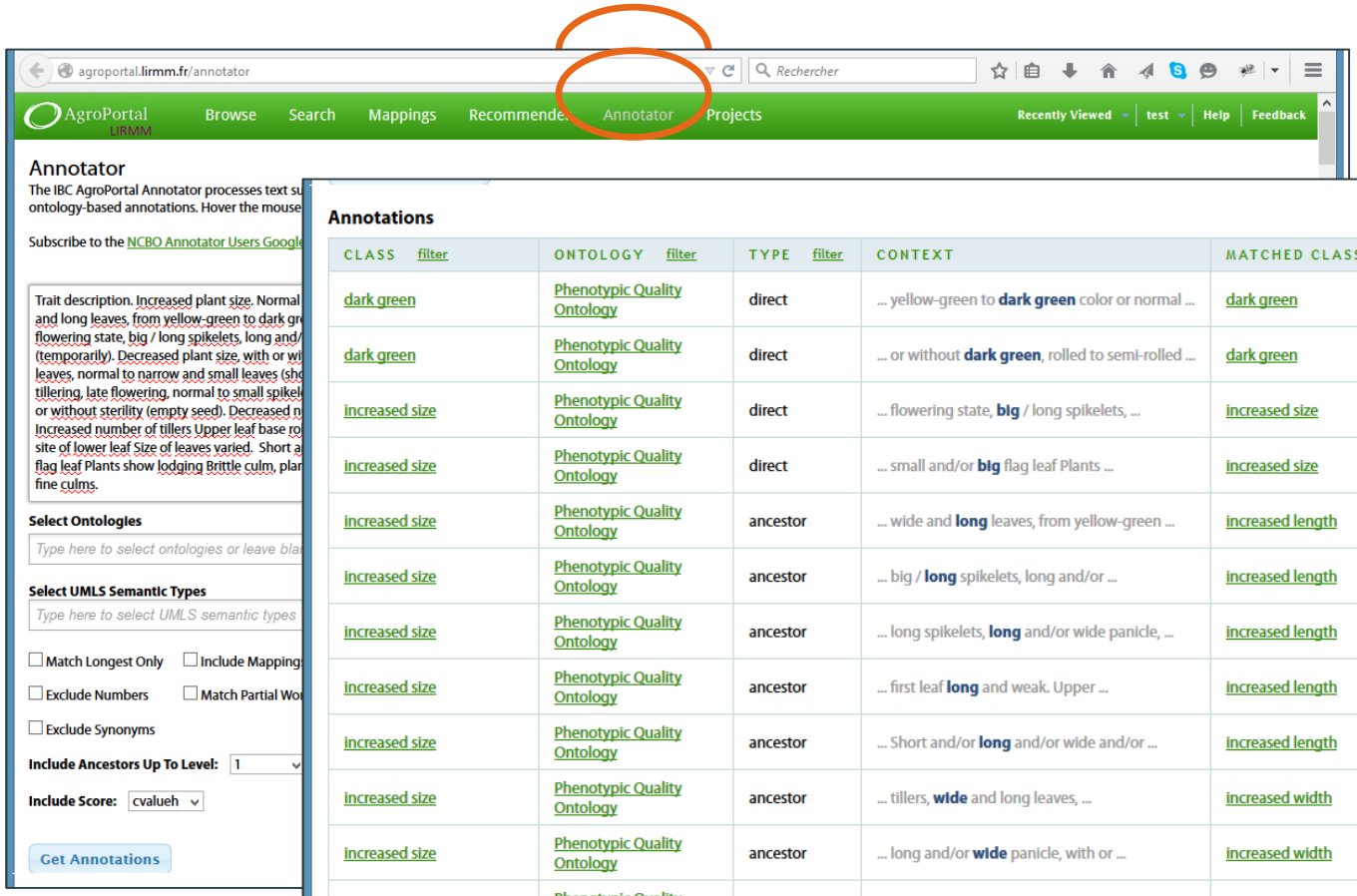
Available ontologies

- Already 29 ontologies… and we expect around 40 soon.
  - (half are not included in the NCBO BioPortal)
- Ontologies are organized in Groups and Categories





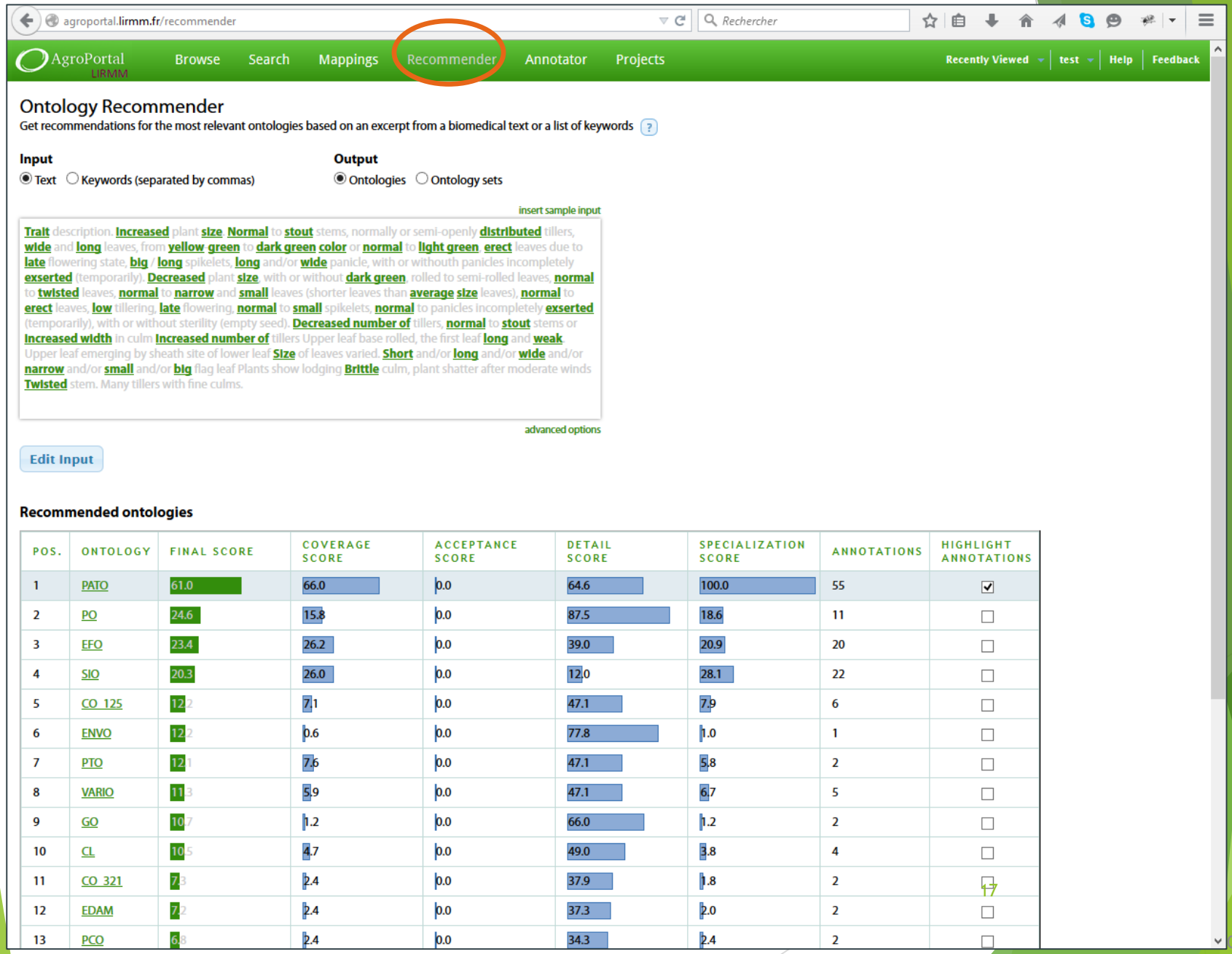

agroportal.lirmm.fr/ontologies/ANAEEF
Rechercher
AgroPortal LIRMM
Browse
Search
Mappings
Recommender
Annotator
Projects
Recently Viewed
test
Help
Feedback
AnaEE France Thesaurus
Summary Classes Properties Notes Mappings Widgets
Details
ACRONYM ANAEEF
VISIBILITY Public
DESCRIPTION AnaEE is an EU science infrastructure project whose goal is to overcome the current fragmentation of ecosystem research in Europe by setting up a coordinated ensemble of experimental fora (ExpeER, AnaEE-S). They are mandated to test, analyse and model ecosystem reactions to climate changes and to develop appropriate management techniques.
STATUS Beta
FORMAT SKOS
CONTACT Esther Dzalé, edzale@versailles.inra.fr
HOME PAGE http://ist.blogs.inra.fr/lovinra/
PUBLICATIONS PAGE
DOCUMENTATION PAGE
CATEGORIES
GROUPS INRA Linked Open Vocabularies
Metrics
NUMBER OF CLASSES: 2
NUMBER OF INDIVIDUALS: 3333
NUMBER OF PROPERTIES: 0
MAXIMUM DEPTH: 0
MAXIMUM NUMBER OF CHILDREN: 2
AVERAGE NUMBER OF CHILDREN: 2
CLASSES WITH A SINGLE CHILD: 0
CLASSES WITH MORE THAN 25 CHILDREN: 0
CLASSES WITH NO DEFINITION: 2
Reviews
Add your review
No reviews available.
Submissions
SUBMISSION
RELEASE DATE
UPLOAD DATE
DOWNLOADS
2014 (Parsed, Indexed, Metrics, Annotator)
02/18/2014
06/24/2015
SKOS | CSV | RDF/XML
Views
Create new view
No views available.
Projects Using This Ontology
Create new project
No projects available.



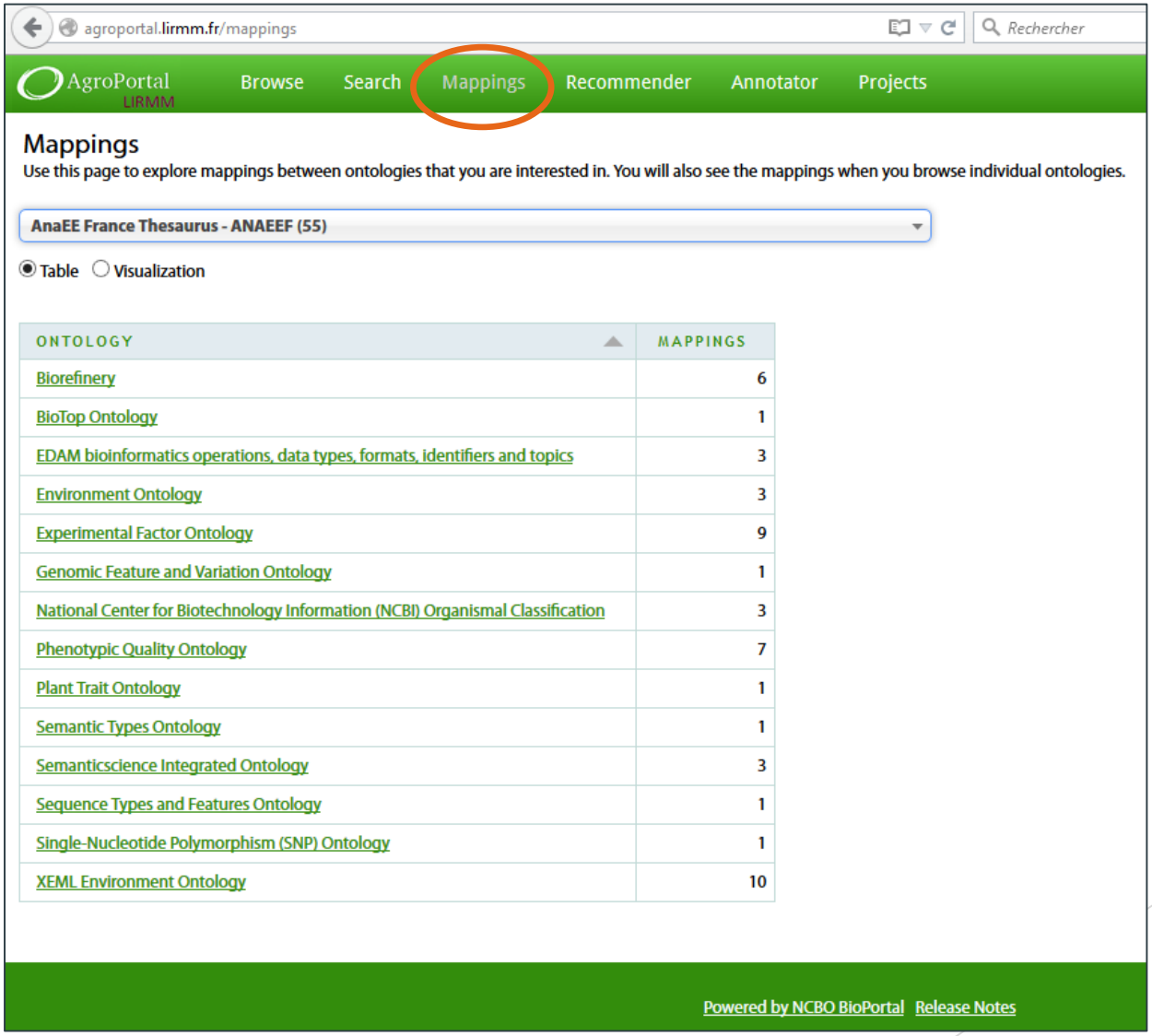
Annotations

*total results **338** (direct **155** / ancestor **183** / mapping **0**)*

CLASS filter	ONTOLOGY filter	TYPE filter	CONTEXT	MATCHED CLASS filter	MATCHED ONTOLOGY filter	SCORE
dark green	Phenotypic Quality Ontology	direct	... yellow-green to **dark green** color or normal ...	dark green	Phenotypic Quality Ontology	8.644
dark green	Phenotypic Quality Ontology	direct	... or without **dark green**, rolled to semi-rolled ...	dark green	Phenotypic Quality Ontology	8.644
increased size	Phenotypic Quality Ontology	direct	... flowering state, **big** / long spikelets, ...	increased size	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	direct	... small and/or **big** flag leaf Plants ...	increased size	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... wide and **long** leaves, from yellow-green ...	increased length	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... big / **long** spikelets, long and/or ...	increased length	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... long spikelets, **long** and/or wide panicle, ...	increased length	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... first leaf **long** and weak. Upper ...	increased length	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... Short and/or **long** and/or wide and/or ...	increased length	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... tillers, **wide** and long leaves, ...	increased width	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... long and/or **wide** panicle, with or ...	increased width	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... stems or **increased width** in culm Increased ...	increased width	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... long and/or **wide** and/or narrow and/or ...	increased width	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... Normal to **stout** stems, normally or ...	increased thickness	Phenotypic Quality Ontology	6.871
increased size	Phenotypic Quality Ontology	ancestor	... normal to **stout** stems or increased ...	increased thickness	Phenotypic Quality Ontology	6.871
flag leaf	Experimental Factor Ontology	direct	... and/or big **flag leaf** Plants show lodging ...	flag leaf	Experimental Factor Ontology	6.644
flag leaf	Plant Ontology	direct	... and/or big **flag leaf** Plants show lodging ...	flag leaf	Plant Ontology	6.644
normal	Phenotypic Quality Ontology	direct	... plant size. **Normal** to stout stems, ...	normal	Phenotypic Quality Ontology	6.459
normal	Phenotypic Quality Ontology	direct	... color or **normal** to light green, ...	normal	Phenotypic Quality Ontology	6.459


agroportal.lirmm.fr/recommender
Rechercher
AgroPortal LIRMM
Browse
Search
Mappings
Recommender
Annotator
Projects
Recently Viewed
test
Help
Feedback
Ontology Recommender
Get recommendations for the most relevant ontologies based on an excerpt from a biomedical text or a list of keywords
Input
Text
Keywords (separated by commas)
Output
Ontologies
Ontology sets
insert sample input
Trait description. Increased plant size. Normal to stout stems, normally or semi-openly distributed tillers, wide and long leaves, from yellow green to dark green color or normal to light green, erect leaves due to late flowering state, big / long spikelets, long and/or wide panicle, with or withouth panicles incompletely exserted (temporarily). Decreased plant size, with or without dark green, rolled to semi-rolled leaves, normal to twisted leaves, normal to narrow and small leaves (shorter leaves than average size leaves), normal to erect leaves, low tillering, late flowering, normal to small spikelets, normal to panicles incompletely exserted (temporarily), with or without sterility (empty seed). Decreased number of tillers, normal to stout stems or Increased width in culm Increased number of tillers Upper leaf base rolled, the first leaf long and weak. Upper leaf emerging by sheath site of lower leaf Size of leaves varied. Short and/or long and/or wide and/or narrow and/or small and/or big flag leaf Plants show lodging Brittle culm, plant shatter after moderate winds Twisted stem. Many tillers with fine culms.
advanced options
Edit Input
Recommended ontologies
POS. ONTOLOGY FINAL SCORE COVERAGE SCORE ACCEPTANCE SCORE DETAIL SCORE SPECIALIZATION SCORE ANNOTATIONS HIGHLIGHT ANNOTATIONS
1 PATO 61.0 66.0 0.0 64.6 100.0 55
2 PO 24.6 15.8 0.0 87.5 18.6 11
3 EFO 23.4 26.2 0.0 39.0 20.9 20
4 SIO 20.3 26.0 0.0 12.0 28.1 22
5 CO_125 12.2 7.1 0.0 47.1 7.9 6
6 ENVO 12.2 0.6 0.0 77.8 1.0 1
7 PTO 12.1 7.6 0.0 47.1 5.8 2
8 VARIO 11.3 5.9 0.0 47.1 6.7 5
9 GO 10.7 1.2 0.0 66.0 1.2 2
10 CL 10.5 4.7 0.0 49.0 3.8 4
11 CO_321 7.3 2.4 0.0 37.9 1.8 2
12 EDAM 7.2 2.4 0.0 37.3 2.0 2
13 PCO 6.8 2.4 0.0 34.3 2.4 2

Mappings


agroportal.lirmm.fr/mappings
Rechercher
AgroPortal
LIRMM
Browse
Search
Mappings
Recommender
Annotator
Projects
Mappings
Use this page to explore mappings between ontologies that you are interested in. You will also see the mappings when you browse individual ontologies.
AnaEE France Thesaurus - ANAEEF (55)
Table
Visualization
ONTOLOGY
MAPPINGS
Biorefinery 6
BioTop Ontology 1
EDAM bioinformatics operations, data types, formats, identifiers and topics 3
Environment Ontology 3
Experimental Factor Ontology 9
Genomic Feature and Variation Ontology 1
National Center for Biotechnology Information (NCBI) Organismal Classification 3
Phenotypic Quality Ontology 7
Plant Trait Ontology 1
Semantic Types Ontology 1
Semanticscience Integrated Ontology 3
Sequence Types and Features Ontology 1
Single-Nucleotide Polymorphism (SNP) Ontology 1
XEML Environment Ontology 10
Powered by NCBO BioPortal
Release Notes

Community based functionalities

Latest Mappings

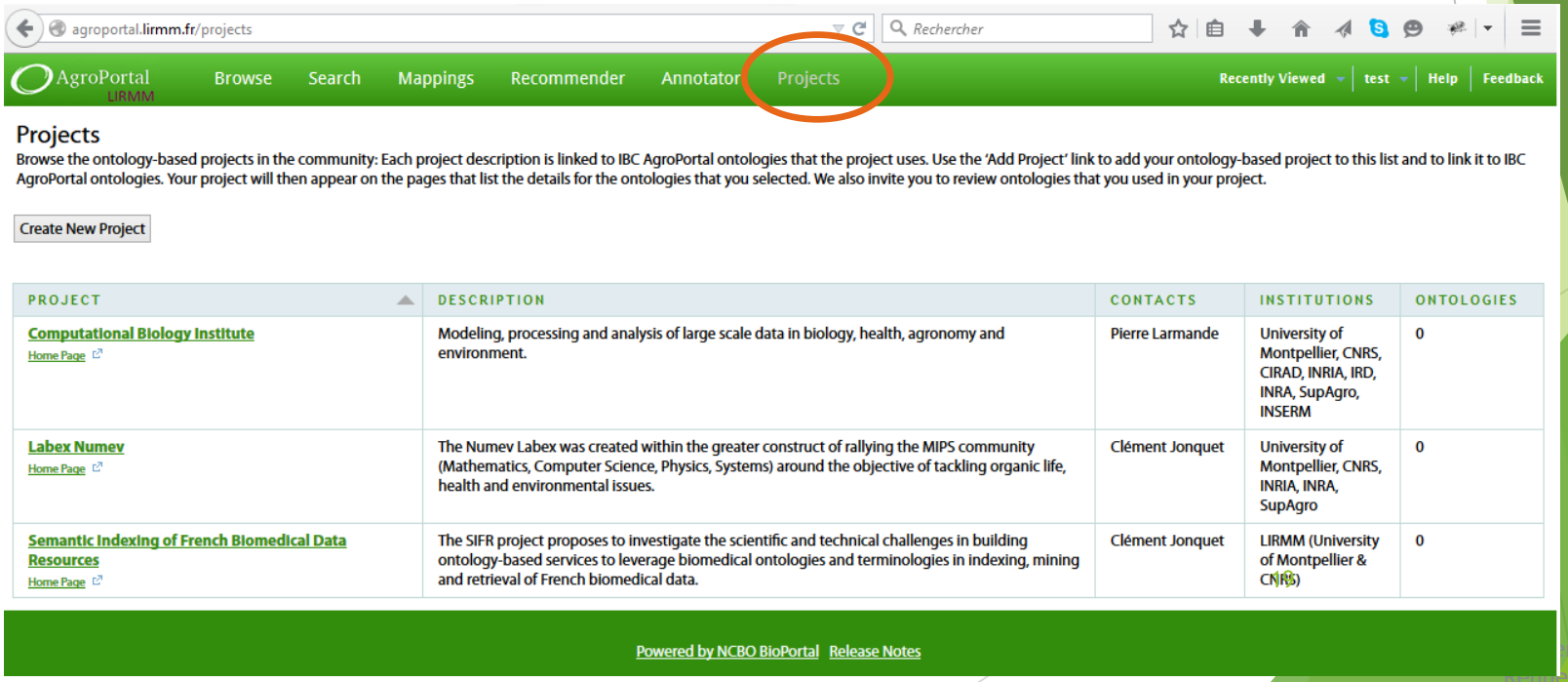
tissue (BT) <=> tissue (CL)
REST Mapping 06/24/2015 by jonquet

tissue (CL) <=> tissue (BT)
REST Mapping 06/24/2015 by jonquet

Latest Notes

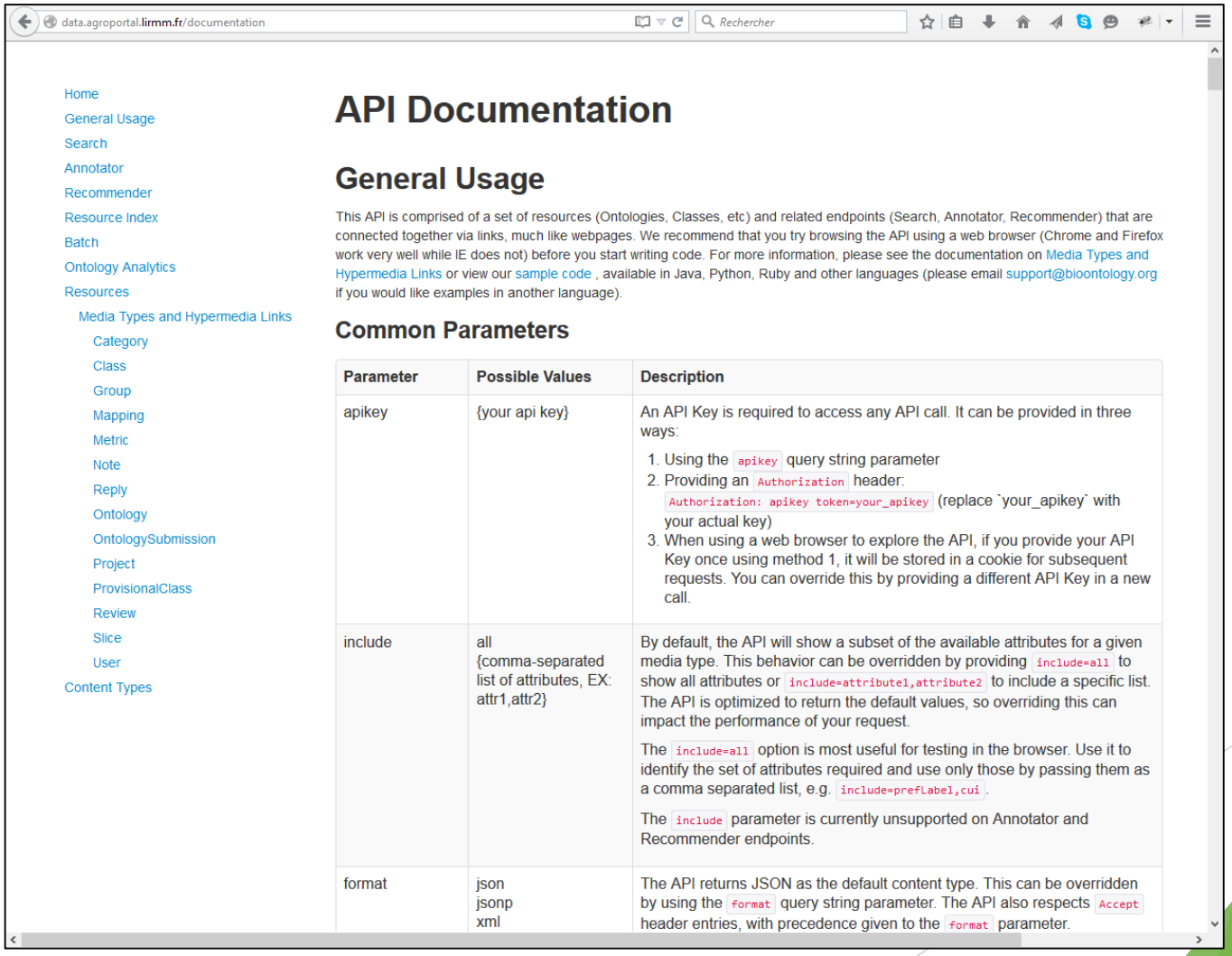
object quality (Phenotypic Quality Ontology)
about 19 hours ago by emonet
What is the difference with object quality or process quality? To which object those this quality...

quality vs trait (Phenotypic Quality Ontology)
about 20 hours ago by jonquet
Is this ok in PATO to have 'trait' as a synomym of quality?



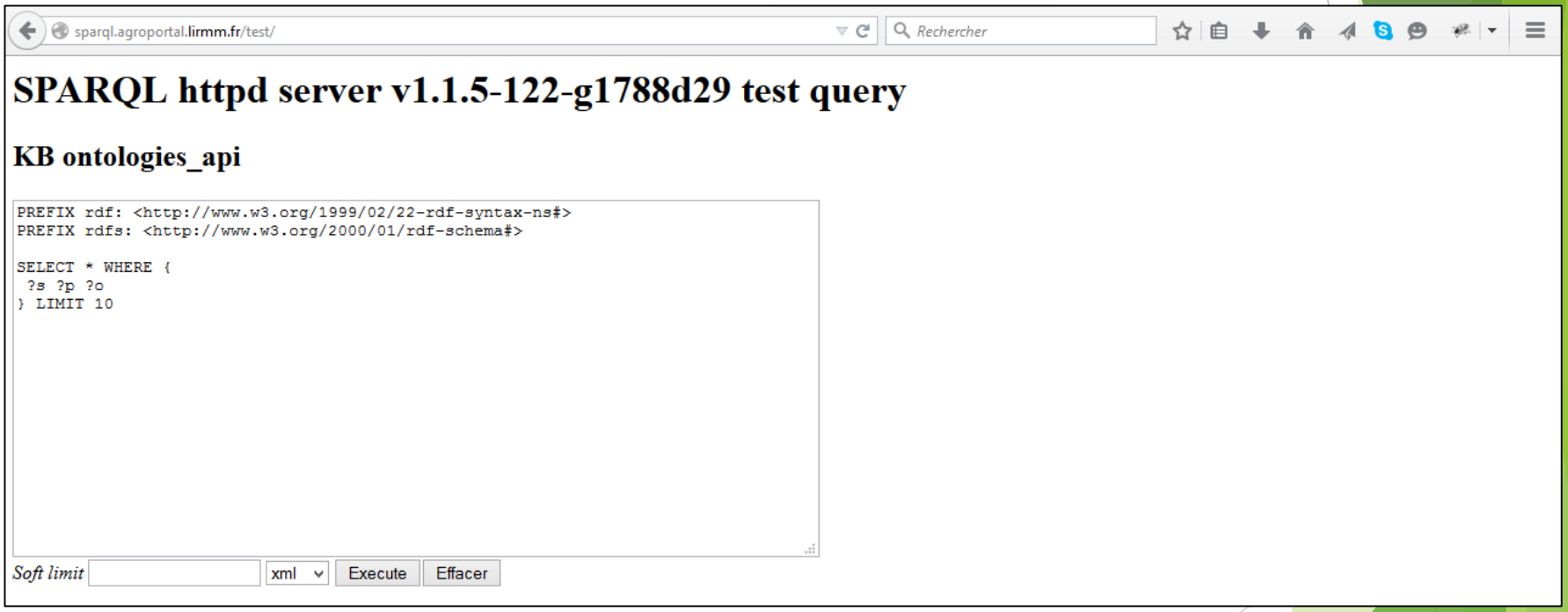
REST Web Service API:

http://data.agroportal.lirmm.fr/documentation



SPARQL endpoint:

http://sparql.agroportal.lirmm.fr



An ontology repository… who's gonna use it?

4 Driving Agronomic Use Cases

- IBC Rice Genomics
  - data integration and knowledge management related to rice

- RDA Wheat Data Interoperability working group
  - common framework for describing, representing, linking and publishing wheat data with respect to open standards

- INRA Linked Open Vocabularies, LovInra
  - publish vocabularies produced or co-produced by INRA scientists and foster their reuse beyond the original researchers

- The Crop Ontology project
  - publishes ontologies required for describing crop germplasm, traits and evaluation trials.

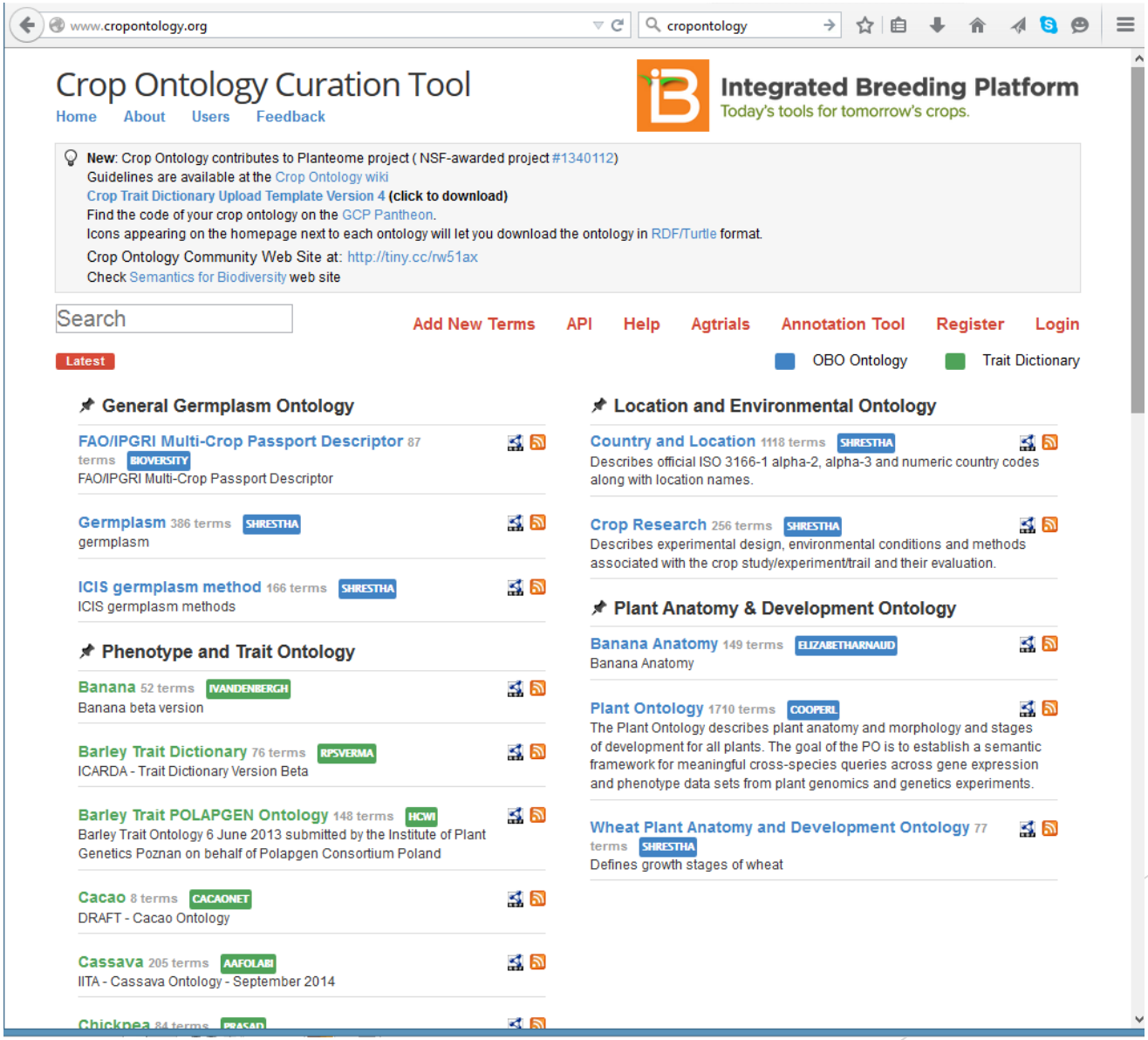
Each use case has a specific group in AgroPortal

- Feature to come: slices
  - Specific “entry” in the AgroPortal

LovInra

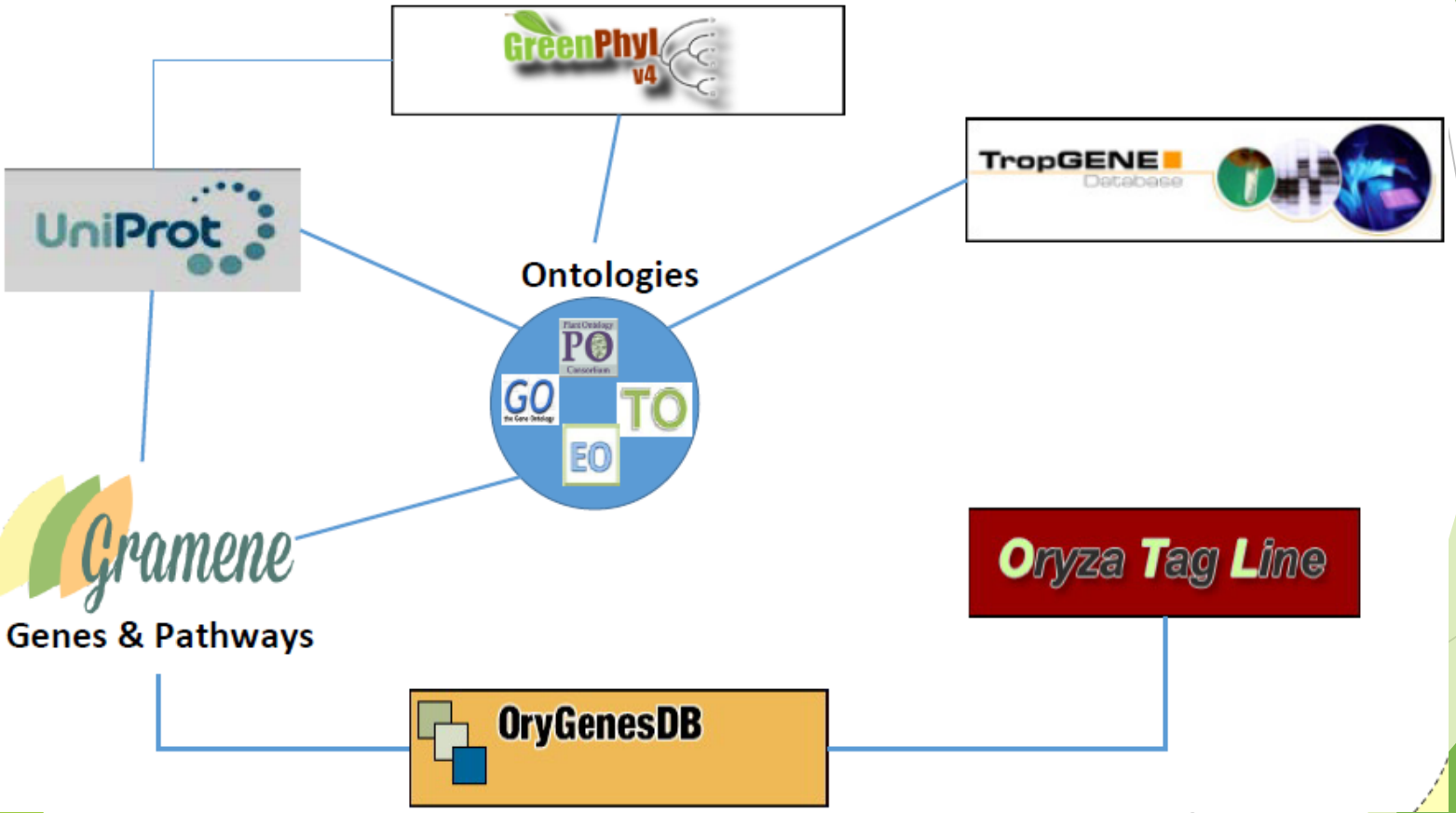
http://ist.blogs.inra.fr/lovinra

Cropontology.org



Agronomic Linked Data (AgroLD)

- Public SPARQL endpoint: http://volvestre.cirad.fr:8890/sparql



Other projects interested

- Planteome (www.planteome.org)
  - Development and enrichment of new and existing reference ontologies for plants
  - Data annoation
- iPlantCollaborative (www.iplantcollaborative.org)
- Elixir (www.elixir-europe.org)
  - US and EU cyberinfrastructure for life science
- IFB platforms (www.france-bioinformatique.fr)
  - (SouthGrenn, URGI, PlantNode, etc.)

Conclusion

AgroPortal is a starting project

- A platform for ontology publication (≠edition or curation)
- We expect it to become a reference platform
- One-stop-shop for plant/agronomic related ontologies
- Reuse NCBO technology and focus on customization and new science

Sign up and join us with your ontologies, feedback!

http://agroportal.lirmm.fr