AgroPortal: an open repository of ontologies and vocabularies for agriculture and nutrition data

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Abstract

Similarly to what happens in biomedicine, communities engaged in agronomic research need to access specific sets of ontologies for data annotation and integration. For instance, it has been established that the scientific challenges in plant breeding have switched from genetics to phenotyping and that standard traits/phenotypes vocabularies are necessary to facilitate breeder's data integration and comparison. In parallel of very specific crop dictionaries, important organizations have produced large reference vocabularies such as AGROVOC (Food and Agriculture Organization), NAL Thesaurus (National Agricultural Library) or the CAB Thesaurus (Centre for Agricultural Bioscience International). The more ontologies are being produced in the domain, the more the need to create, store and retrieve alignments between those ontologies become important. In fact, there exists a need of a one-stop-shop for agronomical, environmental and food related ontologies enabling to identify and select an ontology for a specific task as well as offering generic services to exploit them in search, annotation or other scientific data management processes.

In the biomedical domain, the NCBO BioPortal (http://bioportal.bioontology.org) is a well-known open repository for biomedical ontologies originally spread out over the web and in different formats. The NCBO BioPortal functionalities have been progressively extended in the last 10 years thanks to NIH support, and the platform is fully semantic web compliant. By reusing the NCBO BioPortal technology, we have already designed and implemented an advanced prototype ontology repository for the agronomy domain. The main objective of the AgroPortal project (http://agroportal.lirmm.fr) is to develop and support a reference ontology repository for the agronomic domain.

The AgroPortal project aims at reusing the scientific outcomes and experience of the biomedical domain in the context of plant, agronomic, food, environment sciences. We offer an ontology portal which features ontology hosting, search, versioning, visualization, comment, recommendation, enables semantic annotation, as well as storing and exploiting ontology alignments. The AgroPortal specifically pays attention to respect the requirements of the agronomic community in terms of ontology formats (e.g., SKOS, trait dictionaries) or supported features. Our vision is to adopt an open

and generic approach where users can themselves easily participate to the platform, upload and comment content (ontologies, mappings, projects).

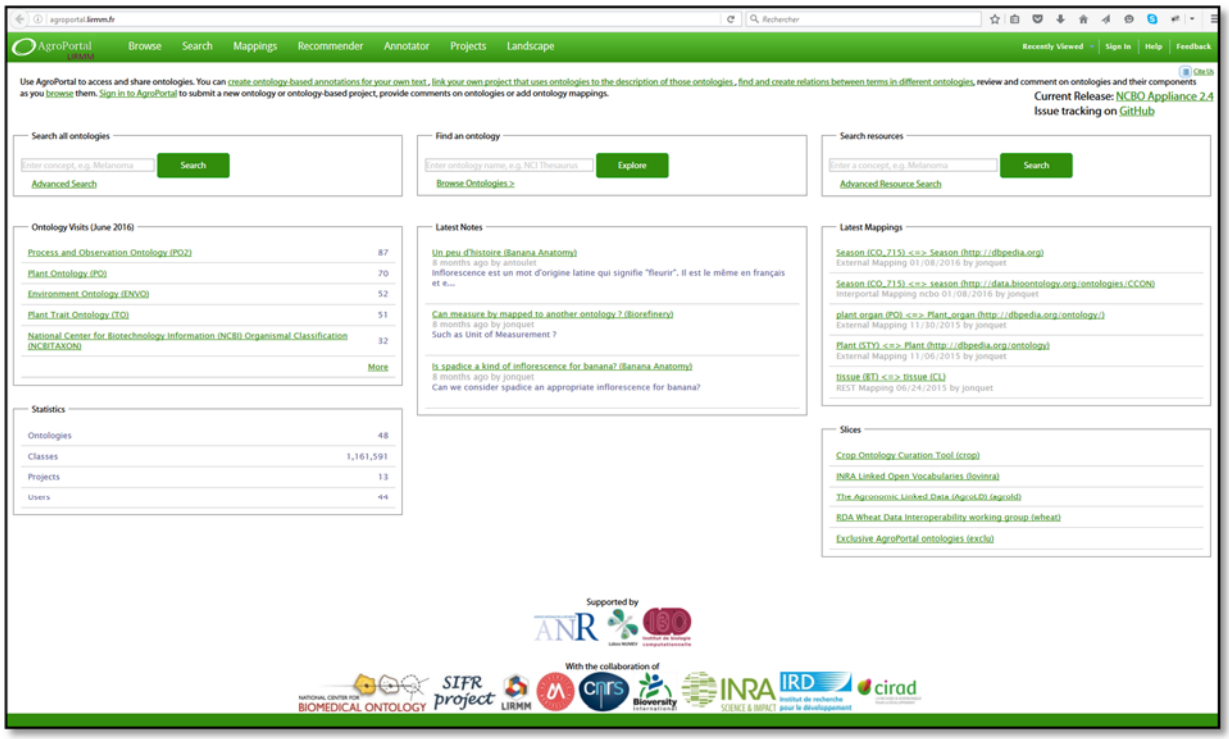
Our prototype platform (v1.0 beta released in January 2016) currently hosts 53 ontologies and we are working on 37 candidate ontologies. The features offered by the portal are for example: (i) to search across all the ontologies, (ii) to annotate a piece of text with all the ontologies, (iii) to store and serve mappings between ontologies within the portal or outside. Other features include: ontology versioning, UI widget, ontology metrics, ontology recommender service, projects listing, community feedback (comment, subscription to ontology changes), users' management (and public or private access to ontologies). In addition, two endpoints allow automatic querying of the content of the portal: (i) a REST web service API (http://data.agroportal.lirmm.fr) and (ii) a SPARQL endpoint (http://sparql.agroportal.lirmm.fr).

Driving use cases:

- Agronomic Linked Data (http://agrold.org) project which builds a RDF knowledge base that integrates data from a variety of plant/rice resources (e.g., Gramene, SouthGreen, OryGeneDB) and provides a portal for bioinformaticians to exploit the homogenized data models.
- RDA Wheat Data Interoperability (WDI) working group (https://rd-alliance.org) which goal is to provide a common framework for describing, representing, linking and publishing wheat data with respect to open standards. More recently, another RDA working group (Rice Data Interoperability) have also expressed interest.
- INRA Linked Open Vocabularies (LovInra) is an effort to publish vocabularies produced or co-produced by INRA (French research institutes in agronomy) scientists and foster their reuse beyond the original researchers.
- The Crop Ontology project (www.cropontology.org) of the Consultative Group on International Agricultural Research (CGIAR) which goals is to publish online fully documented lists of breeding traits used for producing standard field books; and to support data analysis and integration of genetic and phenotypic data through harmonized breeders' data annotation.
- We are working with FAO to connect AgroPortal to the VEST Registry (http://aims.fao.org/fr/vest-registry) in order to produce a unique global map of existing vocabularies for the exchange of data in the field of food and agriculture. The prototype (to be launched at GODAN Summit: http://aims.fao.org/fr/vest-registry) already includes 245 *Knowledge Organization Systems*.

With the experience acquired in the biomedical domain and building atop of an already existing technology, we think that AgroPortal offers a robust and stable reference repository that will become highly valuable for the agronomic domain. The implication of associated partners (IBC, IRD, CIRAD, INRA, Bioversity International, EBI, FAO) and relations with existing international projects (e.g., Planteome, Elixir, BioSharing) illustrates the motivation and interests of the community.

Figure


AgroPortal
Browse
Search
Mappings
Recommender
Annotator
Projects
Landscape
Recently Viewed
Sign In
Help
Feedback
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.
Current Release: NCBO Appliance 2.4
Issue tracking on GitHub
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
Ontology Visits (June 2016)
Process and Observation Ontology (PO2) 87
Plant Ontology (PO) 70
Environment Ontology (ENVO) 52
Plant Trait Ontology (TO) 51
National Center for Biotechnology Information (NCBI) Organismal Classification (NCBITAXON) 32
More
Latest Notes
Un peu d'histoire (Banana Anatomy)
8 months ago by antoulet
Inflorescence est un mot d'origine latine qui signifie "fleurir". Il est le même en français et e...
Can measure by mapped to another ontology ? (Biorefinery)
8 months ago by jonquet
Such as Unit of Measurement ?
Is spadice a kind of inflorescence for banana? (Banana Anatomy)
8 months ago by jonquet
Can we consider spadice an appropriate inflorescence for banana?
Latest Mappings
Season (CO_715) <=> Season (http://dbpedia.org)
External Mapping 01/08/2016 by jonquet
Season (CO_715) <=> season (http://data.bioontology.org/ontologies/CCON)
Interportal Mapping ncbo 01/08/2016 by jonquet
plant organ (PO) <=> Plant_organ (http://dbpedia.org/ontology/)
External Mapping 11/30/2015 by jonquet
Plant (STY) <=> Plant (http://dbpedia.org/ontology)
External Mapping 11/06/2015 by jonquet
tissue (ET) <=> tissue (CL)
REST Mapping 06/24/2015 by jonquet
Statistics
Ontologies 48
Classes 1,161,591
Projects 13
Users 44
Slices
Crop Ontology Curation Tool (crop)
INRA Linked Open Vocabularies (lovinra)
The Agronomic Linked Data (AgroLD) (agrold)
RDA Wheat Data Interoperability working group (wheat)
Exclusive AgroPortal ontologies (exclu)
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