Gramene's Ontologies Tutorial

This database is a collective resource of structured controlled vocabularies (Ontologies) for knowledge domains and their associations.

Knowledge Domains:

- Plant Ontology (PO)
  - Plant Structure (morphology, organs, tissue and cell types)*
  - Growth stages (plant growth and developmental stages)
- Trait Ontology (TO)
  - Plant traits and phenotypes
- Gene Ontology (GO)
  - Molecular function
  - Biological process
  - Cellular component
- Environment Ontology (EO)
- Gramene's taxonomy ontology (GR_tax)

Associations:

Use this database to quickly find Ensembl rice genes (from TIGR's rice genome assembly), proteins from SWISSPROT-TrEMBL representing Poaceae (grass) family, rice genes, QTL and map sets.

Note: Remember that different ontologies are for different purposes and do not overlap with each other.

For more information on each ontology type please visit the current ontologies section at Gramene

Tutorial Help

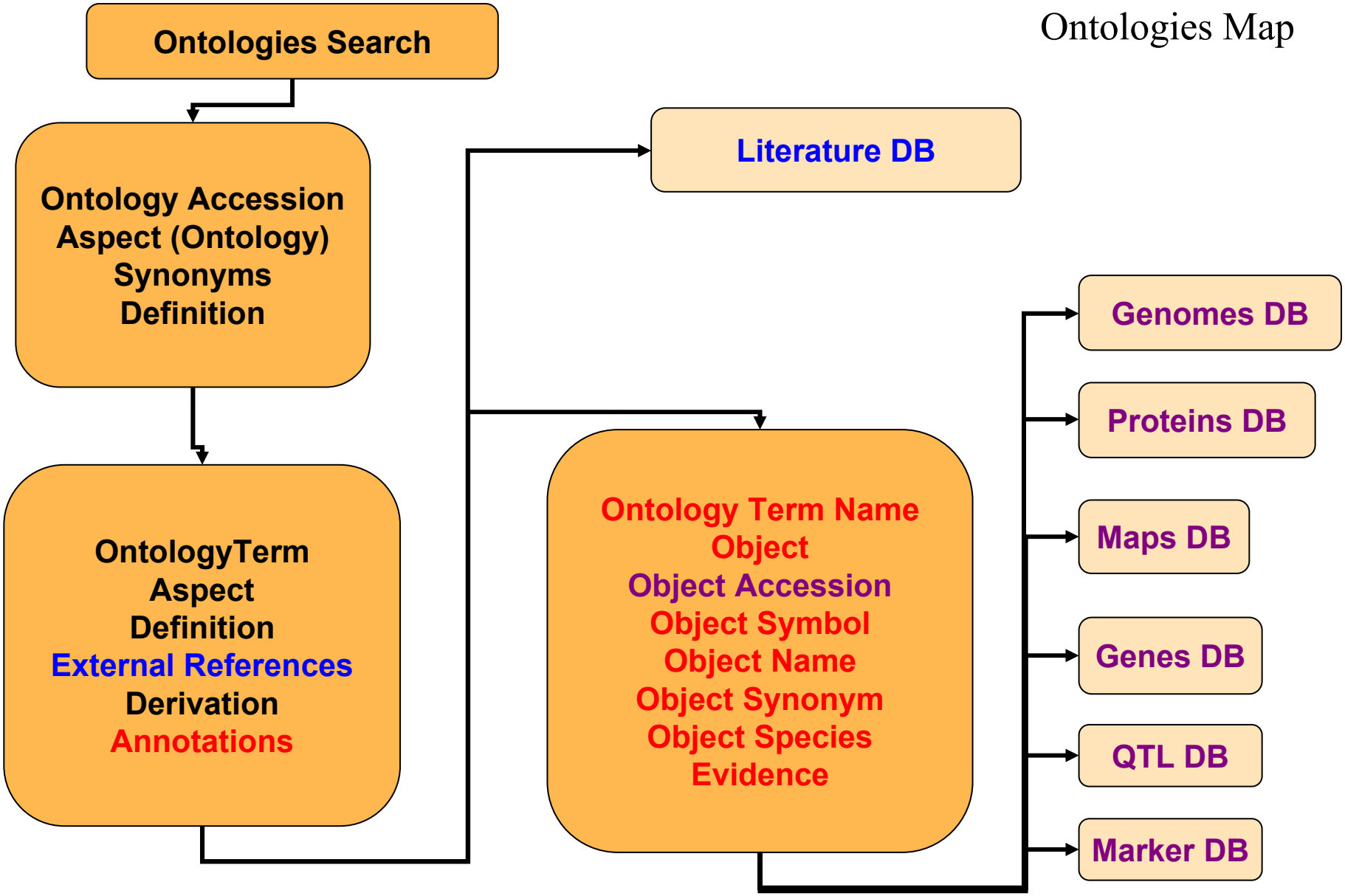
The hand icon indicates a link that allows you to go to the same page in your web browser.

If you are viewing this tutorial with Adobe Acrobat Reader, click the "bookmarks" on the left hand side of the Reader for easier navigation.

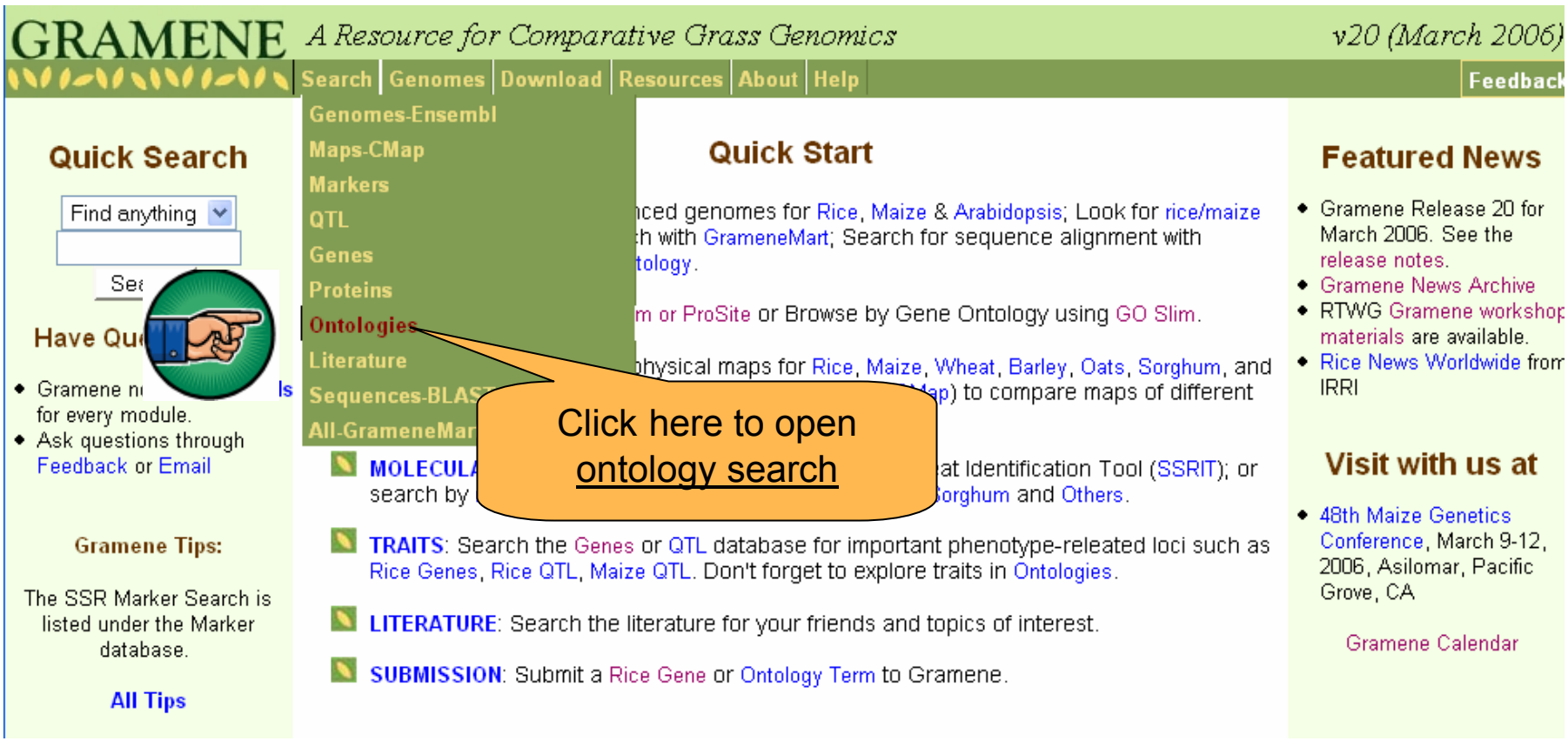
Action Options are noted in this type of font.

Notes or comments use this style font.

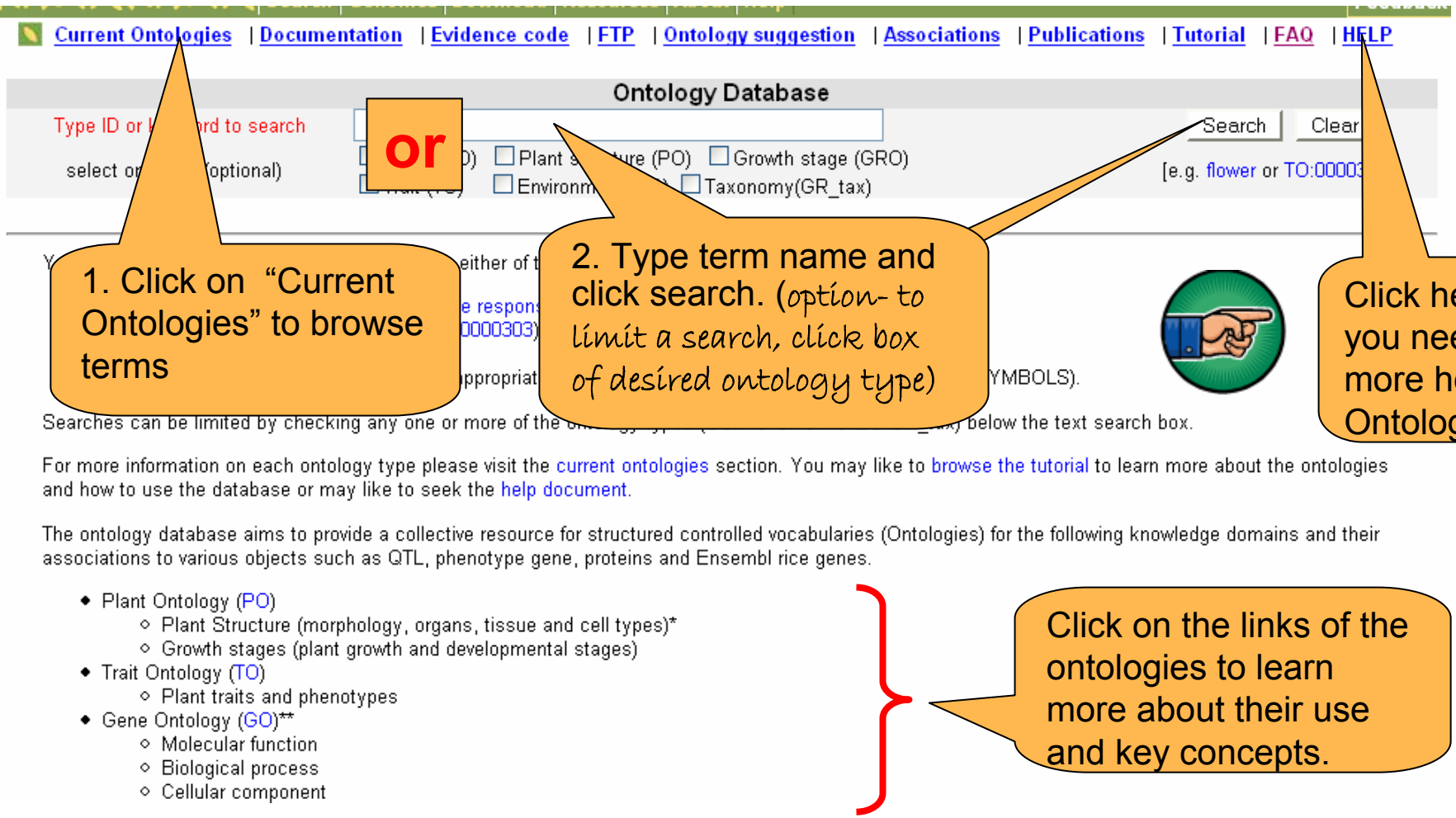
Ontologies Map



Gramene Home Page



Ontology Home Page



Browsing the Ontology Database

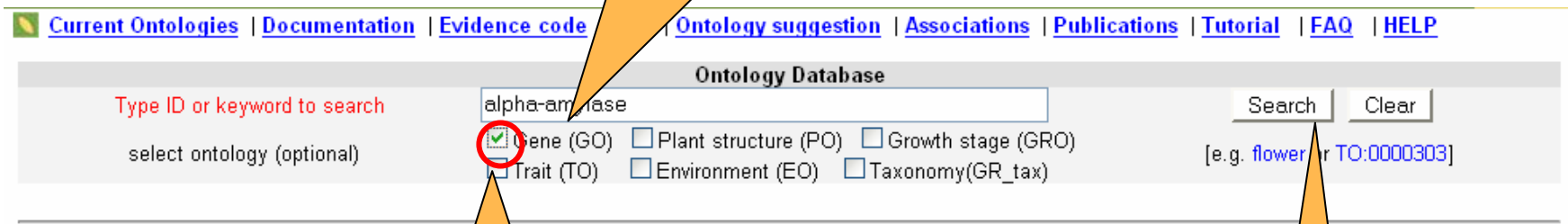
Current Ontologies | Documentation | Evidence code | FTP | Ontology suggestion | Associations | Publications | Tutorial | FAQ | HELP

Current Ontologies	Browse	Download
Trait Ontology™ (TO) It is a controlled vocabulary to describe each trait as a distinguishable feature, characteristic, quality or phenotypic feature of a developing or mature individual. Examples are glutinous endosperm, disease resistance, plant height, photosensitivity, male sterility, etc.	BROWSE	Ontology Definitions
Gene Ontology™ (GO) Developed by the Gene Ontology Consortium to help annotate information on gene products (not the genes) using the following three organizing principles of molecular function, biological process and cellular component. Copyright © Gene Ontology Consortium.		Definitions (combined)
Molecular Function: The tasks performed by individual gene products; example is Rubisco	BROWSE	Ontology
Biological Process: Broad biological goals, such as photosynthesis or ripening, that are accomplished by ordered assemblies of molecular functions.	BROWSE	Ontology
Cellular Component: Subcellular structures, locations, and macromolecular complexes; examples include chl… etc.	BROWSE	Ontology
Plant Ontology™ (PO) Gramene is collaborating with The Plant Ontology Consortium (POC) to develop a controlled vocabulary for plant stru…		
Plant Structure (PO): The controlled vocabulary of plant structures representing organs, tissue and cell type… al, parenchyma, guard cell, etc.	BROWSE	Ontology Definitions
Cereal Plant Growth Stages (GRO): The controlled vocabulary of growth and developmental stages in vari… ion, seedling, booting, flowering, etc. Available only for rice, maize, sorghum, wheat, wheat, oat and barley.	BROWSE	Ontology Definitions
Environment Ontology (EO) It represents a controlled vocabulary to describe different types of supplemental environments that have been reported in the experimental profiles of gene expression and phenotype (mutant and QTL) studies on cereal plants.	BROWSE	Ontology
Taxonomy Ontology (GR_tax) It is a representation of the taxonomy tree in the ontology format. Each term in this ontology can represent subspecies, species, genus, order, class or any rank in the classification. Primarily derived from NCBI Taxonomy, the revisions were made as and when/where required in the rankings. The rank of genome types was added by this project. This taxonomy ontology focuses on the Poaceae (Gramineae) family of plant taxonomy only.	BROWSE	Ontology

3. Click on "BROWSE" to navigate through the desired ontology type.

Searching the Ontology Database

Type your query
e.g. Example is a search for function alpha-amylase



Select "Gene Ontology" to search the GO database (or select one or more others appropriate to your term.) (Molecular Function is part of Gene Ontology)

Click search

Gene Ontology (GO) search results

Exact ontology **term**

Definition of the ontology term

Summary for *alpha-amylase*

Items 1 to 4 of 4

#	Term Accession	Aspect	Term Name	Synonym	Definition
1	GO:0004556	Molecular Function	alpha-amylase activity	None	Catalysis of the endohydrolysis of 1,4-alpha-D-glucosidic linkages in polysaccharides containing three or more 1,4-alpha-linked D-glucose units.
2	GO:0004574	Molecular Function	oligo-1,6-glucosidase activity	sucrase-isomaltas	Catalysis of the hydrolysis of 1,6-alpha-D-glucosidic linkages in some oligosaccharides produced from starch and glycogen by alpha-amylase, and in isomaltose.
3	GO:0015066	Molecular Function	alpha-amylase inhibitor activity	None	Stops, prevents or reduces the activity of alpha-amylase.
4	GO:0030157	Biological Process	pancreatic juice secretion	None	regulated release of pancreatic juice by the exocrine pancreas into the upper part of the stine. Pancreatic juice is slightly alkaline and contains numerous enzymes and inactive me precursors including alpha-amylase, chymotrypsinogen, lipase, boxypeptidase, proelastase, prophospholipase A2, ribonuclease, and trypsinogen. Its ncentration of bicarbonate ions helps to neutralize the acid from the stomach.

Ontology Accession for the ontology term. Select to view detailed information.

Synonyms (if any)

Ontology Term Accession Detail

Exact **ontology term**

Definition of the term

External references used for defining or associated to synonyms

The **lineage** of alpha-amylase activity as a molecular function

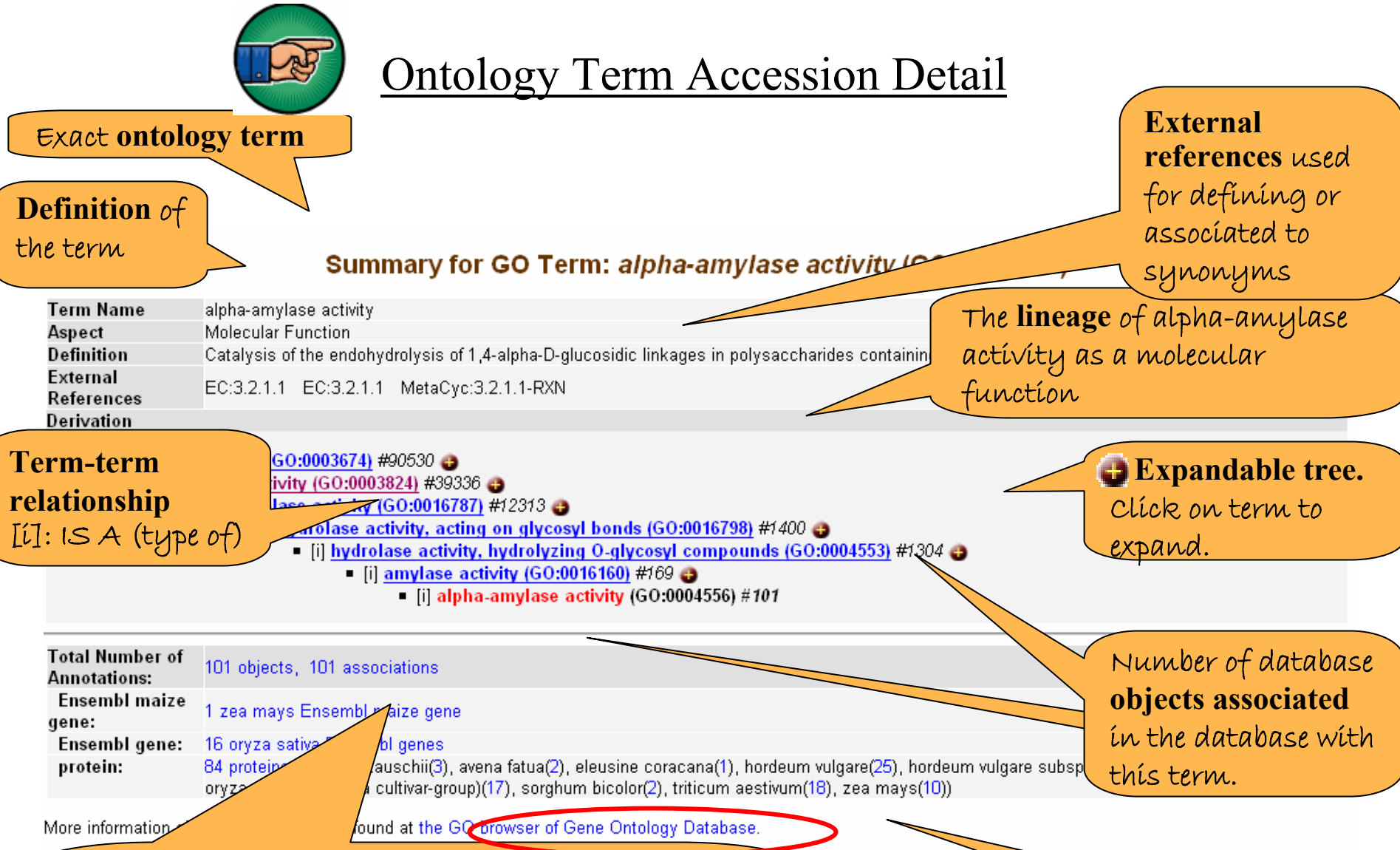
Term-term relationship
[i]: IS A (type of)

Expandable tree. Click on term to expand.

Number of database **objects associated** in the database with this term.

Links to **source** that originally developed this ontology.

Click on link to get a complete list of set of genes/proteins/QTL/maps etc. that may be associated with the given ontology term (see next slide for oryza sativa example.)



Ontology Associations

Clicking on the active column headers will sort by that column

Term alpha-amylase activity (GO:0004556) Associations

Items 1 to 16 of 16 — Download

Term Name	Object Type	Object Accession ID	Object Symbol	Object Name	Object Synonyms	Species	Evidence
alpha-amylase activity	Ensembl gene	LOC_Os01g51760	LOC_Os01g51760	alpha-amylase		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os02g32660	LOC_Os02g32660	1,4-alpha-glucan branching enzyme iib, chl... precursor(ec 2.4.1.18) (starch branching enzy... (q-enzyme).; 1,4-alpha-glucan branching enzy... rice		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os02g52700	LOC_Os02g52700	Alph...		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os02g52710	LOC_Os02g52710	Alpha am...		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene			...alpha-dextrin endo-1,6-alpha-glucosidase		Oryza sativa	IEA
alpha-amy activity	Ensembl gene			..., catalytic domain		Oryza sativa	IE
alpha-amy activity	Ensembl gene			...pe starch debranching enzyme ISO2		Oryza sativa	
alpha-amy activity	Ensembl gene			... isozyme 2a precursor (ec 3.2.1.1) ...glucanglucanohydrolase)		Oryza sativa	
alpha-amylase activity	Ensembl gene	LOC_Os06g51080	LOC_Os06g51080	1,4-alpha-glucan branching enzyme iib, chloro... precursor(ec 2.4.1.18) (starch branching enzy... (q-enzyme).; 1,4-alpha-glucan branching enzy...			
alpha-amylase activity	Ensembl gene	LOC_Os08g3...		...r (ec 3.2.1...			
alpha-amylase activity	Ensembl gene	LOC_Os08g3...				Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os08g4...		...utative		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os09g28...		...r (ec 3.2.1.1) ...drolase)		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os09g28420	LOC_Os09g28420	alpha-amylase isozyme 3b precursor (ec 3.2.1.1) (1,4-alpha-d-glucanglucanohydrolase)		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os09g28430	LOC_Os09g28430	alpha-amylase isozyme 3c precursor (ec 3.2.1.1) (1,4-alpha-d-glucanglucanohydrolase)		Oryza sativa	IEA
alpha-amylase activity	Ensembl gene	LOC_Os09g29410	LOC_Os09g29410	isoamylase-type starch debranching enzyme ISO3		Oryza sativa	IEA

Click to download a zip file with tab delimited list of associations

The term and its children (indirectly associated to parent term if any) for which the object type was annotated

Method used to ascertain this association. Click on code for description.

Links to the original entry in Gramene database. Click for TIGR gene report in Gramene.

Searching other ontologies

Previous slides presented the gene ontology (GO) example. The same procedure must be followed if you would like to search other ontologies.

The following table suggests the type of objects that are associated with different types of ontologies:

Ontology	Associated object types
Gene Ontology	Ensembl rice genes (from rice genome assembly) Proteins from SWISSPROT-TrEMBL
Plant Ontology Plant structure or anatomy (PO) Cereal plant growth stages (GRO)	 phenotype genes phenotype genes
Trait Ontology	Phenotype genes QTL
Environment Ontology	Coming soon
Gramene Taxonomy Ontology	Proteins from SWISSPROT-TrEMBL QTL Map sets

Other Options From Ontologyies

Click to learn about evidence used to make associations of ontology terms with different data types

Click to browse the frequently asked questions or access tutorial or help files.

Documentation	M... formation on ontology, their structure, concepts and help on how to search [VIEW] Release ... te
Evidence codes	Defines the evidence codes and explains how they are used for PO annotation of genes/ge... e products/phenotypes
FTP archive	Anonymous user access to Plant Ontology archive is at ftp://ftp.gramene.org/pub/gramene/CURRENT_RELE... /ontology/ The ontology files are organized by ontology type(s).
Ontology submission	Any suggestions for the addition, replacement or modification of the controlled vocabulary can ... de via a web based SUBMISSION FORM or by using a PDF of the form. If you have problems look for Submission h... cument.
Associations	Gene ontology a... sociations based on Gramene curation and Interpro assignments Results availab... at: • Gra... e [view] • Gr... ntology Consortium [view] - [download] • h... n Gene Ontology associations [view]
Publications	Gr... evelopment and integration of trait and gene ontologies for rice C... e and Functional Genomics, 2002, Vol 3(2), April, 2002 [Abstract] [Full Text] ...gy™ Consortium and Plant Ontologies ... Functional Genomics, 2002, Vol 3(2), April, 2002 [Abstract] [Full Text] ...e ontology resource: design and implementation. Genome Research, 2001, Vol 11(8), 1425-1433 [Abstract] [Full Text] Gene Ontology: tool for the unification of biology. Nature Genetics, 2000, 25: 25-29 [Abstract] [Full Text]

Click to access download instructions

Click to download the associations

Learn more about Gramene ontologies

Click to submit your ontology suggestions

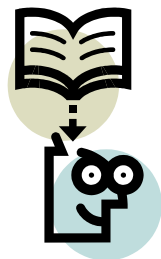
Learn more about ontologies from these publications

Action Steps: Things you can do

1) Make Suggestions

- Send us your review of the terms, definitions and relationships to ensure accuracy.
- Suggest new terms, definitions, or improvements to current structures.
- If you find incorrect associations, let us know.

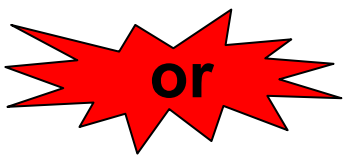
2) Use Ontologies

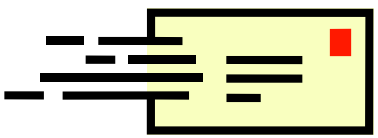


- Use current ontology terms in describing your data in publications and databases.
- If your project on cereal plants (especially rice [Oryza]) is generating data sets that may require these kinds of annotations and associations, we will be happy to help guide you through the annotation process and in setting up an Ontology database.

Contact Gramene

Use the feedback button, located at the top of every page, to provide feedback or to ask questions about Gramene.





Email Gramene at gramene@gramene.org