

POC tutorial#4: POC website and Browser

This tutorial will run automatically in Quicktime.
To run the tutorial at your own pace use the
internal controllers within the tutorial.

-  button goes to next slide
-  button goes to previous slide
-  button goes to last slide
-  button goes to previous slide

Using the POC website

- A. Using the AmiGO Plant Ontology Browser**
- B. Downloading data from the CVS repository**
- C. Project documentation**
- D. Citing the Plant Ontology**
- E. Ways to participate-PO mailing lists**
- F. Submitting feedback and term requests**



Plant Ontology™ Consortium

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Plant Ontology (PO)

The main objective of the Plant Ontology Consortium (POC) is to develop, curate and share controlled vocabularies (ontologies) that describe plant structures and growth and developmental stages, providing a semantic framework for meaningful cross-species queries across databases. The Plant Ontology (PO) has been developed and maintained with the primary goal to facilitate and accommodate functional annotation efforts in plant databases and by the plant research community at large. The initial releases of the PO integrated existing ontologies for Arabidopsis, maize and rice; more recent versions of the ontology encompass terms relevant to Fabaceae, Solanaceae and other cereal crops. As a part of the [POC project](#), participating databases such as TAIR, NASC, Gramene and MaizeGDB have been using PO to describe expression patterns of genes and phenotypes of mutants and natural variants. The Plant Ontology Consortium (POC) is funded by the [National Science Foundation](#).

• Plant Structure

A controlled vocabulary of botanical terms describing morphological and anatomical structures representing organ, tissue and cell types and their relationships. Examples are stamen, gynoecium, petal, parenchyma, guard cell, etc.

• Growth and developmental stages

A controlled vocabulary of terms describing (i) whole plant growth stages and (ii) plant structure developmental stages. Examples are seedling growth, rosette growth, leaf development stages, embryo development stages, flower development stages, etc.

Plant ontology is not an extensive collection of botanical terms, but rather a complex hierarchical structure in which botanical concepts are described by their meaning and by relationship to each other. The main purpose of these vocabularies is to facilitate cross database querying and to foster consistent use of these vocabularies in the annotation of tissue and/or growth stage specific expression of genes, proteins and phenotypes. Educational aspect of the plant ontology is to some extent limited; this is imposed by the structure of the ontology itself and the limitations of the current software.

Participants and Contributors

The [Plant Ontology Consortium](#) core members are [Gramene](#) database, The Arabidopsis Information Resource ([TAIR](#)), [MaizeGDB](#), University of Missouri at St. Louis, [Missouri Botanical Garden](#) at St. Louis MO. POC collaborators are International rice informations System ([IRIS](#)), [MIPS](#) database, [Oryzabase](#), Open Biological Ontologies project ([OBO](#)), Gene Ontology Consortium ([GO](#)), [Deep Gene](#) project and [Solanaceae Genomics Network](#).

What's New...!

[News Archive...](#)

July 8, 2007

[POC Presentation](#) at ASPB meeting, Chicago, July 7-11, 2007

Jun 10, 2007

[RCN Plant and Trait Ontology workshop](#) at CSHL, NY, January 10-11, 2007.

Jan 25, 2007

Publication: Plant Structure Ontology. Unified Vocabulary of Anatomy and Morphology of a Flowering Plant. [Illic et al \(2007\)](#).

Jan 24, 2007

Submit your Plant Ontology term requests using the SourceForge's [PO tracker](#).

Jan 10, 2007

[POC Presentation](#) at Plant and Animal Genome meeting, San Diego, January 13-17, 2007.

Release notes

Find the most recent information on the database and website changes by visiting the [release notes](#) page.



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The toolbar is used to navigate within the website.

- Plant Structure

- Growth and developmental stages

Plant ontology is not an extensive collection of botanical terms, but rather a complex hierarchical structure in which botanical concepts are described by their meaning and by relationship to each other. The main purpose of these vocabularies is to facilitate cross database querying and to foster consistent use of these vocabularies in the annotation of tissue and/or growth stage specific expression of genes, proteins and phenotypes. Educational aspect of the plant ontology is to some extent limited; this is imposed by the structure of the ontology itself and the limitations of the current software.

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Jan 10, 2007
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Plant Ontology™ Consortium

[Advanced Search](#) [Browse](#) [Help](#) [Request PO Term](#) [Home](#)

Click to
browse the
ontology tree

Search the Plant Ontology database
(e.g. endosperm or PO:0009089)

Type in one
or more
word or PO
ID

☒ PO terms ☐ Annotations ☐ exact match

Submit Query

The main objective of the Plant Ontology Consortium is to develop meaningful cross-species ontologies that describe plant structure, growth and development. The primary goal is to facilitate communication within the plant community at large. Recent versions of the Plant Ontology Consortium (POC) project, particularly the POC project, participate in the development of expression patterns funded by the National Science Foundation.

Plant Structure

A controlled vocabulary of plant tissue and cell types.

Growth and Development

A controlled vocabulary of plant growth stages. Examples include development of the root, shoot, and flower.

Plant ontology is not a botanical concept. The goal of the Plant Ontology Consortium is to develop vocabularies that facilitate communication within the plant community. The primary goal is to facilitate communication within the plant community at large. Recent versions of the Plant Ontology Consortium (POC) project, particularly the POC project, participate in the development of expression patterns funded by the National Science Foundation.

Participants and Sponsors

The Plant Ontology Consortium is a collaboration of the MaizeGDB, University of Missouri, and the University of California, Davis.

International rice information system (IRIS), MIPS database, Oryzabase, Open Biological Ontologies project (OBO), Gene Ontology Consortium (GO), Deep Gene project and Solanaceae Genomics Network.

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Browsing the ontologies in AmiGO



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Search PO ☒ Ontology ☐ Annotations ☐ Exact Match

Filter tree view ?

Filter by ontology

Ontology

All
Plant Growth Stage
Plant Structure

Filter Annotation Objects Counts

Data source

All
Gramene Genes
Gramene QTL
MaizeGDB

☒ **all : all [15859]** 

☒  PO:0009012 : plant growth and development stages [9619]

☒  PO:0009011 : plant structure [15768]

Graphical View
Permalink
Download as XML
Download as flat file

Legend

☒ Click to expand

 Click to get annotations distribution

Relationship Types

 is a

 part of

 develops from

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Expanding nodes



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Search PO ☒ Ontology ☐ Annotations ☐ Exact Match

Filter tree view ?

Filter by ontology

Ontology

All
Plant Growth Stage
Plant Structure

Filter Annotation Objects Counts

Data source

All
Gramene Genes
Gramene QTL
MaizeGDB

☒ **all : all [15859]** 

☒  PO:0009012 : plant growth and development stages [9619]

☒  PO:0009011 : plant structure [15768]

Graphical View
Permalink
Download as XML
Download as flat file

Legend
☒ Click to expand
 Click to get annotations distribution
Relationship Types
 is a
 part of
 develops from

To expand a node, click on the [+] sign next to the node/term.

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The expanded view



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Search PO☒ Ontology☐ Annotations☐ Exact MatchSubmit Query

Filter tree view ?

Filter by ontology

Ontology

AllPlant Growth StagePlant Structure

Filter Annotation Objects Counts

Data source

AllGramene GenesGramene QTLMaizeGDB

Set filters

Remove all filters

☐ all : all [15859]

☐ **PO:0009012 : plant growth and development stages [9619]**

☐ **PO:0007021 : plant structure development stages [142]**

☐ PO:0007615 : flower development stages [57]

0001002 : fruit development stages [2]
0001083 : inflorescence development stages [8]
0001050 : leaf development stages [18]
0007520 : root development stages [1]
0001170 : seed development stages [69]
07033 : whole plant growth stages [9049]

☒ **PO:0009011 : plant structure [15768]**

Graphical View
Permalink
Download as XML
Download as flat file

Legend

Click to expand
 Click to get annotations distribution

Relationship Types

is a
 part of
 develops from

To collapse the node, click on the [-] sign next to the term.

The expanded node now displays all of the children of that node.

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The relationship type legend

- [-] all : all [15859] 
 - [-] ⓘ PO:0009012 : plant growth and development stages [9619] 
 - [+] ⓘ PO:0007021 : plant structure development stages [142]
 - [+] ⓘ PO:0007033 : whole plant growth stages [9049]
 - [-] ⓘ PO:0009011 : plant structure [15768] 
 - [-] ⓘ PO:0009004 : gametophyte [248] 
 - [-] ⓘ PO:0020092 : female gametophyte [17] 
 - [-] ⓘ PO:0020093 : antipodal cell [0]
 - [-] ⓘ PO:0020090 : central cell [2]
 - [+] ⓘ PO:0020096 : egg apparatus [2]
 - [-] ⓘ PO:0020091 : male gametophyte [237] 
 - [-] ⓘ PO:0020097 : generative cell [6] 
 - [-] ⓘ PO:0000084 : sperm cell [6]
 - [-] ⓘ PO:0006345 : pollen tube [13] 
 - [-] ⓘ PO:0000028 : pollen tube tip [0]
 - [-] ⓘ PO:0000084 : sperm cell [6]
 - [-] ⓘ PO:0020099 : vegetative cell [3]

Graphical View
Permalink
Download as XML
Download as flat file

Legend

- [+] Click to expand
-  Click to get annotations distribution

Relationship Types

- ⓘ is a
- Ⓟ part of
- Ⓢ develops from

The legend explains the relationship type icons used in the tree browser.

Search Ontology Term

[Advanced Search](#) [Browse](#) [Help](#) [Request PO Term](#) [Home](#)

Search PO ☒ Ontology ☐ Annotations ☐ Exact Match

Search
endosperm

click

Term Search Results

15 results for **endosperm** **in field(s) term name, synonyms**

Filter search results [?](#)

Ontology

All

Plant Growth Stage

Plant Structure

Set filters

Remove all filters

Term	Ontology
basal endosperm transfer cell ; PO:0009018 [show def] [view annotations]	plant structure
basal endosperm transfer layer ; PO:0009019 [show def] [view annotations]	plant structure
cellular endosperm ; PO:0009100 [show def] [view annotations]	plant structure
endosperm ; PO:0009089 [view annotations]	plant structure
central endosperm	
chalazal cyst ;	
Query matches synonym chalazal endosperm cyst	
endosperm ; PO:0009089 [show def] [view annotations]	plant structure
endosperm development stages ; PO:0007633 [show def] [view annotations]	plant growth and development

Nutritive tissue in a seed, in angiosperms usually triploid and formed after fertilization by the fusion of one gamete with the polar nucleus, sometimes diploid or polyploid.

Finding the term details

[Advanced Search](#) [Browse](#) [Help](#) [Request PO Term](#) [Home](#)

Search PO ☒ Ontology ☐ Annotations ☐ Exact Match

Term Search Results

15 results for **endosperm** in field(s) **term name, synonyms**

Filter search results ?

Ontology

All

Plant Growth Stage

Plant Structure

Term	Ontology
basal endosperm transfer cell ; PO:0009018 [show def] [view annotations]	plant structure
basal endosperm transfer layer ; PO:0009019 [show def] [view annotations]	plant structure
cellular endosperm ; PO:0000199 [show def] [view annotations]	plant structure
central endosperm ; PO:0006220 [show def] [view annotations]	plant structure
chalazal cyst ; PO:0000201 [show def] [view annotations]	structure
Query matches synonym chalazal endosperm	
endosperm ; PO:0009089 [show def] [view annotations]	plant structure
endosperm development stages ; PO:0007633 [show def] [view annotations]	plant growth and development

Click on the term to display the term detail page.

The term detail view

endosperm

[Term information](#) [Term lineage](#) [External references](#) [Term annotations](#)

Term Information

Accession	PO:0009089
Ontology	plant structure
Synonyms	None
Definition	Nutritive tissue in a seed, in angiosperms usually triploid and formed after fertilization by the fusion of one gamete with the GR:pj
Comment	None

The detailed view shows the term identifier, aspect, synonyms, definition, curator comments and term lineage in a tree view format.

Term Lineage

Filter tree view ?

Filter Annotation Objects Counts

Data source

All
Gramene Genes
Gramene QTL
MaizeGDB

Term View Options

☒ Term ancestors

☐ Term parents, siblings and children

Set filters

Remove all filters

all : all [15859]

- PO:0009011 : plant structure [15768]
 - PO:0009003 : sporophyte [13227]
 - PO:0006342 : infructescence [4109]
 - PO:0009001 : fruit [4108]
 - PO:0009010 : seed [2927]
 - PO:0009089 : endosperm [714]**
 - PO:0009010 : seed [2927]
 - PO:0009089 : endosperm [714]**
 - PO:0009007 : tissue [1580]
 - PO:0009089 : endosperm [714]**

Graphical View
View in tree browser

To view the term lineage in a graphical format click on the Graphical View link.

Legend

- Click to expand
- Click to get annotations distribution

Relationship Types

- is a
- part of
- develops from

[Back to top](#)

External References

The graphical view

endosperm Graphical View

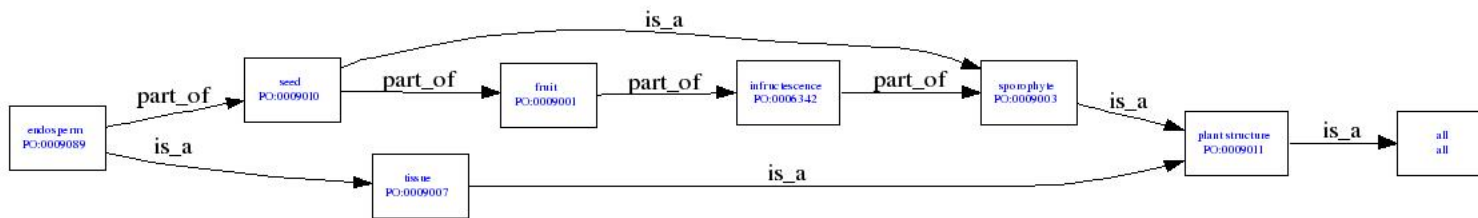
Graph View Options

Layout

Box Color

Text Color

Format



The graph can be displayed horizontally or vertically and in different colors.

View Annotations (Gene Products)

Advanced Search Browse Help Request PO Term Home

Search PO ☒ Ontology ☐ Annotations ☐ Exact Match

Term Search Results

15 results for **endosperm** in field(s) **term name, synonyms**

Filter search results ?

Ontology

All
Plant Growth Stage
Plant Structure

Term	Ontology
basal endosperm transfer cell ; PO:0009018 [show def] [view annotations]	plant structure
basal endosperm transfer layer ; PO:0009019 [show def] [view annotations]	plant structure
cellular endosperm ; PO:0000199 [show def] [view annotations]	plant structure
central endosperm ; PO:0006220 [show def] [view annotations]	plant structure
chalazal cyst ; PO:0000201 [show def] [view annotations]	plant structure
Query matches synonym chalazal endosperm cyst	
endosperm ; PO:0009089 [show def] [view annotations]	plant structure
endosperm development stages ; PO:0007633 [show def] [view annotations]	plant growth and development

Click to view
gene/gene product
annotated to
endosperm

View Annotations (Gene Products)

endosperm

Term annotations ↓ Term information → Term lineage → External references →

Filter annotations displayed ?

Filter annotations

Species	Data source	Evidence Code
All	All	All Curator Approved
A. thaliana	Gramene Genes	IC
O. sativa	Gramene QTL	IDA
S. bicolor	MaizeGDB	IEP

View annotations

☒ All annotations ☐ Direct annotations

Set filters

Remove all filters

Annotations to endosperm ; PO:0009089 and its children

Get this data as [RDF/XML](#).

[endosperm ; PO:0009089](#) [\[show def\]](#)

Qualifier	Name / Symbol	Information	Evidence	Reference	Assigned by
☐	AB14 ABA INSENSITIVE 4	gene from <i>Arabidopsis thaliana</i>	IDA	PMID:16844907	TAIR
☐	ACT11 ACTIN-11	gene from <i>Arabidopsis thaliana</i>	IDA	PMID:9037165	TAIR
☐	ADC2 ARGININE DECARBOXYLASE	gene from <i>Arabidopsis thaliana</i>	IDA	PMID:15733873	TAIR
☐	ae1 amylose extender-1	gene from <i>Oryza sativa</i>	IMP	GR ref:5683	Gramene (via Gramene Genes)
☐	ae1 amylose extender1	gene from <i>Zea mays</i>	IMP	MaizeGDB:935747	MaizeGDB
☐	ae2 amylose extender-2	gene from <i>Oryza sativa</i>	IMP	GR ref:5694	Gramene (via Gramene Genes)

Click the name to view the annotation details

Annotations (Gene Products) details

ae1

Information

Name(s) amylose extender-1
Type **gene**
Species [Oryza sativa](#)
Synonyms High amylose mutant
Database Gramene Genes [GR_gene:GR:0060016](#)
Sequence No peptide sequence available

Click to link to
external database

[Back to top](#)

Term Annotations

Filter annotations displayed ?

Filter Annotations

Evidence Code

All Curator Approved
IC
IDA
IEP

Ontology

All
Plant Growth Stage
Plant Structure

[Set filters](#)

[Remove all filters](#)

Qualifier	Term	Ontology	Evidence	Reference	Assigned by
	FR.04 fruit ripening complete [view annotations]	plant growth and development stage	IMP	GR ref:5683	Gramene (via Gramene Genes)
	endosperm [view annotations]	plant structure	IMP	GR ref:5683	Gramene (via Gramene Genes)

Annotation (rice gene *ae1*) is from Gramene

GRAMENE Search Gene

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Gene Search

Search for *: Search in: Gene Type: Species: Has Phenotype: ☐

* eg, *d1*, *dwarf-1*, GR:0060184, *flower**, **tillering stage** Or [view help](#)

OR

Browse by [Ontology Database](#) [Trait](#), [Plant Structure](#), [Growth Stage](#)

Summary for Gene: *ae1* (GR:0060016)

[General Info](#) | [Allele and Germplasm](#) | [Ontology Association](#) | [References](#)

General Information	
Accession	GR:0060016
Gene Symbol	<i>ae1</i>
Gene Name	<i>amylose extender-1</i>
Gene Synonym(s)	High amylose mutant
Species	Rice
Gene Type	Not sequenced
Has Phenotype	yes
Description	High amylose content (29.4%, to 35.4%), about twice as high as that of wild-type counterparts (17.9%), also has floury endosperm.
Phenotypic Image	 1. From left to right, normal, floury (<i>ae1</i>) and white-cored (<i>ae2</i>) endosperms.

Allele	ae1.1
Germplasm	EM129 , EM145 , EM10 , EM16-1 , EM72

Ontology Association	
Trait	amylose content (TO:0000196), endosperm color (TO:0000487), endosperm quality (TO:0000587)
Plant Structure	endosperm (PO:0009089)
Plant Growth and Development Stage	FR.04 fruit ripening complete (PO:0007038)

Search Annotations

 **Plant Ontology™ Consortium**

Advanced Search Browse Help Help Request PO Term Home

Search PO ☐ Ontology ☒ Annotations ☐ Exact Match

Check

Annotation Search Results

130 results for **endosperm** in field(s) **name(s), symbol, synonyms**

Filter search results ?

Filter Annotation Objects

Species	Data source
All	All
A. thaliana	Gramene Genes
O. sativa	Gramene QTL
S. bicolor	MaizeGDB

Filter Annotations Objects

Evidence Code	Ontology
All Curator Approved	All
IC	Plant Growth Stage
IDA	Plant Structure
IEP	

	Name	Details
☐	bt1 brittle endosperm 1	gene from <i>Zea mays</i>
☐	bt2 brittle endosperm 2	gene from <i>Zea mays</i>
☐	de*-B30 defective endosperm B30	gene from <i>Zea mays</i>
☐	du1 dull endosperm -1	gene from <i>Oryza sativa</i>
☐	du1 dull endosperm 1	gene from <i>Zea mays</i>
☐	du10 dull endosperm -10	gene from <i>Oryza sativa</i>

Click the name to view the details



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Ontology Download Instructions

CVS repository access

- **Anonymous access**

The CVS module name "**Poc**" can be checked out with the following
`cvs -d :pserver:anonymous@brebiou.cshl.edu:/usr/local/cvs co Poc`

There is no password for anonymous user. If your version of CVS asks for a password, use an empty password. Users can also browse the repository using Viewcvs by pointing a web browser to <http://brebiou.cshl.edu/viewcvs/Poc/>.

- **Developer access**

If you are an ontology developer recognized by the Plant Ontology Consortium, please follow the instructions on [developers guide to CVS access](#).

Browsing ontologies

If you are interested in browsing the Ontology please [visit the browser links](#)

Click here to find out how to download the ontology files and definitions from the CVS repository.

The main objective of the Plant Ontology Consortium (POC) is to develop meaningful cross-species queryable ontologies that describe plant tissue and cell types at the primary goal to facilitate and a community at large. The initial recent versions of the ontology POC project, participating data expression patterns of genes funded by the National Science

• Plant Structure

A controlled vocabulary of tissue and cell types at

• Growth and development

A controlled vocabulary of development stages. Examples are development stages, e

Plant ontology is not an external botanical concepts are described vocabularies is to facilitate cross-species tissue and/or growth stage specific to some extent limited; this

Participants and Contributors

The Plant Ontology Consortium includes the MaizeGDB, University of Missouri, International rice information system, and the Plant Ontology Consortium (GO), D

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Assignee: (?) Status: (?) Category: (?) Group: (?)
 Any Open Any Any
 Show only: Submitter username (show mine) : Summary keyword:
 Sort By: (?) ID Descending

Browse the Plant Ontology (PO) requests.

Request ID	Summary	Open Date	Priority	Assigned To	Submitted By
1766539	rhizome internode	2007-08-02 23:22	1	nobody	cmungall
1743001	inflorescence bifurcation stage	* 2007-06-25 13:07	5	nobody	zlippman
1697012	8 MaizeGDB anatomy terms not yet in PO	* 2007-04-09 10:45	5	nobody	nobody
1690786	Create new PO: Post Harvest stages	* 2007-03-29 12:54	5	nobody	cwtung
1682406	add pericarp vascular bundle	* 2007-03-16 15:07	5	nobody	cwtung
1682325	various vascular system terms	* 2007-03-16 13:04	5	nobody	donghui
1681621	leaf base vs. leaf axil?	* 2007-03-15 12:41	5	nobody	tairtb
1659401	new term: dispersed meristematic cell	* 2007-02-13 19:19	5	nobody	donghui
1658520	new term: filament vein	* 2007-02-12 19:48	5	nobody	donghui
1658519	new term: stigma vein	* 2007-02-12 19:48	5	nobody	donghui
1658517	new term: root vein	* 2007-02-12 19:46	5	nobody	donghui

* Denotes Requests 30 Days Old

Priority Colors:

1 2 3 4 5 6 7 8 9



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Documentation

About the project	Provides an overview of the PO project .
NSF award	The project is funded by the NSF plant genome research award #032 estimated amount of \$1,672,411
POC charter	Describes the Consortium's responsibilities and how can you participate
Citing POC	How to cite POC in your article.
Developers style guide	Key concepts and stylistic aspects of PO.
Principles and rationales of PO	• Key organizing principles and rules of Plant Structure Ontology examples and explanation of three "patterns" of the ontology • Key organizing principles and rules of Growth Stages Ontology • Key organizing principles and rules of Developmental Stages Ontology
Ontology Accessions	Guide to unique accessions/ids associated to each PO term.
DBXrefs	Provides a list of the database cross reference abbreviations used in the ontology files and the database.
Ontology file formats	Describes the flat file format used in ontology and definition files.
Annotation file formats	If your database/project would like to submit the annotations to the PO database, please consult the suggested file format .
Release notes	Find the most recent information on the database and website changes by visiting the release notes page.
Evidence codes	Describes the various evidence codes explaining how they are used for annotation of genes/gene products/phenotypes.
CVS repository	The CVS repository lists all the ontology and definition files.
Ontology Resources	The Internet resources , links to the projects working on ontologies, publications.
Publications	References and citations of interest on ontology, published by consortium members and collaborators.
Presentations	Lists all the presentation on Plant Ontology by consortium members • Introduction to the project (Slide show) • Poster presentation at 2004 Plant and Animal Genomes XII Conference

This section includes the PO developers style guide, lists of references for terms and other supporting documents for the project.



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Mailing lists

For general discussion & suggestions please write to po@plantontology.org or click on the [Feedback](#) link on the top of this page. You can also browse the [mail archive](#) to find latest developments at POC.

For announcements please write to po-announce@plantontology.org or browse the [mail archive](#) for any new announcements at POC.

For subscribing to the PO mailing lists please send an email to majordomo@plantontology.org and in the body of the e-mail (not the subject line) write: **subscribe po** or **subscribe po-announce**.

If you experience problem in subscribing to a mailing list please contact [Shuly Avraham](#) and mention which mailing list you want to subscribe to.

Go here to browse the contents of the PO email archive or join in the discussion by subscribing to the mailing list.



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