

The Plant Ontology: A Tool for Linking Plant Anatomy and Development to Genomics Across Plant Taxa.

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The Plant Ontology (PO: <http://www.plantontology.org>) is a structured vocabulary and database resource for all plant scientists that links plant anatomy, morphology and development to the rapidly expanding field of plant genomics. The primary purpose of the PO is to facilitate cross-database querying and to foster the consistent use of vocabularies in annotation of genomics data. The PO encompasses all plant species, ranging from angiosperms to gymnosperms, pteridophytes (ferns), lycophytes (lycophytes) and bryophytes (liverworts, mosses and hornworts). Recent changes in the PO include the addition of new ontology terms and annotations to describe non-seed plants, such as *Physcomitrella* and woody plant species. An essential feature of the PO is the set of freely accessible web links from terms to associated annotations, which are structure- or development-specific genes, proteins and phenotypes sourced from numerous plant genomics datasets. Currently, the PO includes over 2 million such annotations associated with almost 1500 terms. Outreach activities include workshops, conference presentations and outreach booths. Software tools enabling further use of the PO include ontology term web services, an image annotation desktop application (SIA) and a semantic annotation wiki for plant genes (under development). The combination of ontology terms and the annotation of diverse gene expression and phenotype data sets facilitates diverse analyses, including assessing the similarity between genes of inter- or intra-specific origin and the exploration of structural homologies among organs, tissues and cell types. The PO is a valuable resource for both research and teaching that can be used as a guide to plant structures and growth and developmental landmarks in life cycles of plants across many taxa.