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Gramene database: A resource for comparative plant genomics, pathways and phylogenomics analyses

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Abstract

The Gramene database (<http://www.gramene.org>) is a powerful online resource for agricultural researchers, plant breeders and educators that provides easy access to reference data, visualizations and analytical tools for conducting cross-species comparisons. Learn the benefits of using Gramene to enrich your lectures, accelerate your research goals, and respond to your organismal community needs. Gramene's genomes portal hosts browsers for 44 complete reference genomes, including crops and model organisms, each displaying functional annotations, gene-trees with orthologous and paralogous gene classification, and whole-genome alignments. SNP and structural diversity data, available for 11 species, are displayed in the context of gene annotation, protein domains and functional consequences on transcript structure (e.g., missense variant). Browsers from multiple species can be viewed simultaneously with links to community-driven organismal databases. Thus, while hosting the underlying data for comparative studies, the portal also provides unified access to diverse plant community resources, and the ability for communities to upload and display private data sets in multiple standard formats. Our BioMart data mining interface enable complex queries and bulk download of sequence, annotation, homology and variation data. Gramene's pathway portal, the Plant Reactome, hosts over 240 pathways curated in rice and inferred in 66 additional plant species by orthology projection. Users may compare pathways across species, query and visualize curated expression data from EMBL-EBI's Expression Atlas in the context of pathways, analyze genome-scale expression data, and conduct pathway enrichment analysis. Our integrated search database and modern user interface leverage these diverse annotations to facilitate finding genes through selecting auto-suggested filters with interactive views of the results.

Keywords: database, biomaart, plant genomes, SNP, plant reactome

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