Progress Report on Citrus Genome Database


Vision of Citrus Genome Database

• To provide high-quality online community database resources to enable Citrus research in genomics, genetics and breeding
  • Easy to use
  • Easy to manage and update
  • Resource efficient
  • Interoperable with other useful database

Community Databases and Big Data

Recent advances in sequencing, genotyping, and phenotyping technologies have led to a paradigm shift in crop science research – driven by "Big Data"

Individual scientists now routinely
  • Sequence and genotype genomes from populations, families, individuals of interest
  • Pursue large-scale gene expression studies
  • Create highly saturated genetic maps
  • Identify genome wide loci influencing traits of interest
  • Conduct large-scale standardized phenotyping.

Building an Efficient Database

Drupal

Content Management System

Drupal modules as web front-end for Chado

Chado

Generic Database schema

CGD Funding

• 2009-2014:
  • Funded by USDA NIFA SCRI (development of tfGDR)
  • Tree fruit Genome Database Resources
  • GDR (Genome Database for Rosaceae)
  • CGD (Citrus Genome Databases)
  • Washington State University, University of Florida & Clemson University
• 2014 – 2019:
  • USDA NIFA NRSP10 (Crop Database Resources, $2m)
  • NSF PGRP (Tree Crop Databases, $4.7m) – pending
  • Will seek further funding to support curation activity

Core development with new funding

• Further incorporate Marker-Assisted Breeding tools to aid breeders
  • Data Collection
  • Tripal interface for field apps for breeders (Field Book)
• Tripal interface for current breeders toolbox in GDR (Genome Database for Rosaceae)
  • Data management (search/download)
  • Decision support (Cross Assist, Seedling Select)
• Further Development of genetic and genomic data tools
• Web services
Current data

- Genomics
  - EST Unigenes
  - New gene data parsed from NCBI nr database
  - WGS and annotation
  - Pathway data (CitrusCyc)
- Genetics
  - Significant Increase in marker and map data and QTL/molecular diversity data newly added (3477 markers, 51 maps, 74 QTLs)
  - New search/detail pages added

http://www.citrusgenomedb.org/

Species Page

Genome Page

Search page for genes/sequences
Genetic Data

- Genetic map, Markers, Trait (QTL) data are being collected
  - Data on 3,427 genetic markers, 51 genetic maps and 74 QTLs are available
- Map, marker, QTL pages linked to CMap, the comparative map viewer
- New search pages for marker, trait loci (MTL and QTL) and molecular diversity are available

Marker Search

Trait Loci (QTL/MTL) Search
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- Citrus, Rosaceae, and cotton research communities and the Bioinformatics Community

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[Images and logos of USDA, NIFA, and UF IFAS]