TreeGenes
&
Tripal

treegenesdb.org

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TreeGenes Database: History

treegenesdb.org

- Began as the Dendrome project (USDA funded initiative) in 1993 to hold forest tree genetic maps and associated markers
- One of the 1st UDSA funded databases on the internet
- Schema has been changing and evolving ever since

TreeGenes
A Forest Tree Genome Database

TreeGenes Database: History

treegenesdb.org

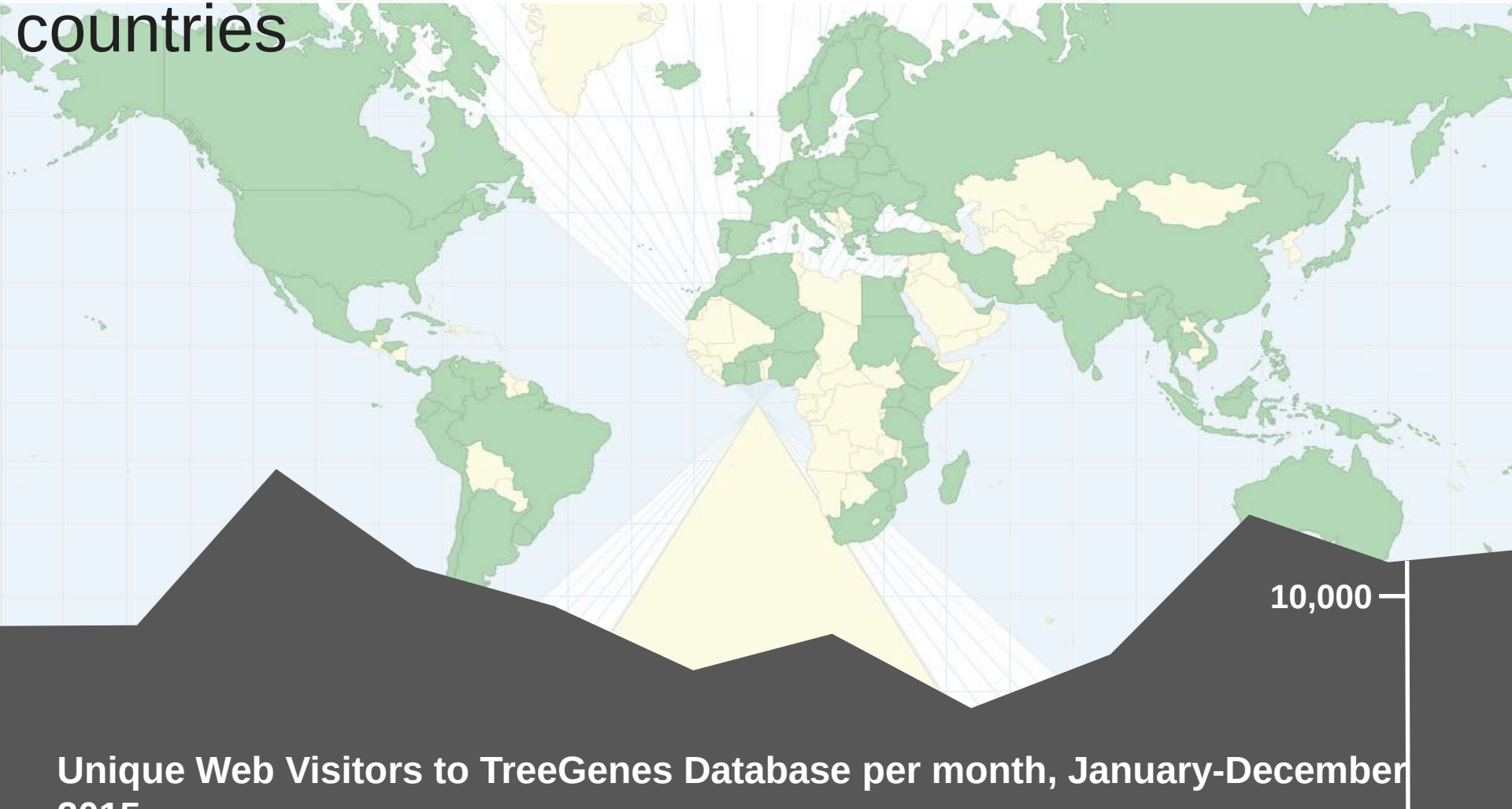
- Began to hold forest tree genetic maps and associated markers
- Expanded to other data types
  - Sequence
    - Reseqeuncing, Large-Scale Genotyping, Transcriptomics/Expression
    - Full Genome Sequences
  - Analysis and Visualization Tools
    - Ability for users to mine the data
  - Resources for the user community
    - Literature, Colleagues

TreeGenes
A Forest Tree Genome Database

TreeGenes Database: Users

treegenesdb.org

2,086 users from 862 organizations in 94 countries



Unique Web Visitors to TreeGenes Database per month, January-December 2015

TreeGenes Database: Species

treegenesdb.org

- 1,774 species from 101 genera
  - At least one genetic artifact from each species
  - Conifers but is also inclusive of all forest trees
- Full genome sequence: 13 species
- Transcriptome/Expression resources: 3,920,817 sequences from 263 species
- 106 genetic maps from 35 species

TreeGenes Database: Data Sources

Automated scripts

- Primary databases such as NCBI
- Appropriate data should be submitted to primary databases **first**

User submissions

- For data and metadata not captured well by primary databases

TreeGenes Database: Data Sources

Automated scripts

- NCBI
  - Transcripts, Protein, Unigene Databases
  - Linked to literature records, etc.
  - Incorporated into visualization tools
- Literature
  - Web of Science, PubMed

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TreeGenes Database: Data Sources

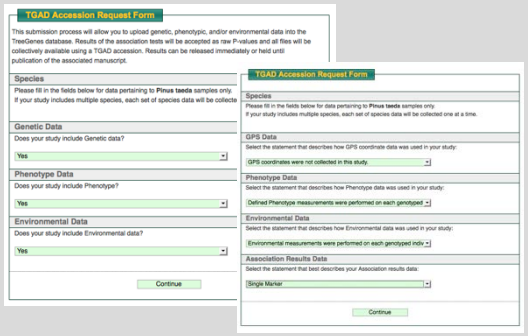
User submissions

- Internal projects or collaborations (day one)
- Submissions of data post-analysis at publication time

TreeGenes Database: Data Sources

treegenesdb.org

User submissions



Submit genetic maps, association or population study data

Most submissions from journal requirement: Tree Genetics and Genomes

TreeGenes Database: Data Sources

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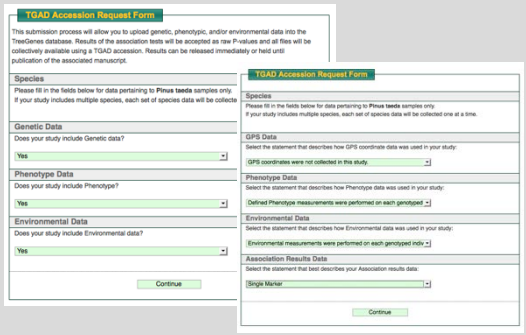
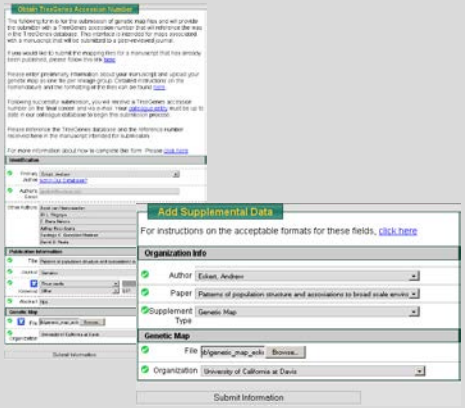
User submissions

Genetic maps, association or population studies





TreeGenes Data Repository

A listing of data submissions is displayed below.
To submit data to TreeGenes, click here.

Date	Accession	Paper Title	Species	Data Statistics	Data Files
8/5/2011	TGDR001	Association genetics of traits controlling lignin and cellulose biosynthesis in black cottonwood (Populus trichocarpa, Salicaceae) secondary xylem.	Populus trichocarpa	Total Sites: 1 Total Samples: 480 Total Genotypes: 419520 Total AFLP Markers: 0 Total RAPD Markers: 0 Total SNP Markers: 874 Total cpSSR Markers: 0 Total SSR Markers: 0 Total Phenotypes: 1344 Total Environmentals (per sample): 0 Total Environmentals (per site): 0	Covariate Data (Population Structure) Genotype Data (SNP) GPS Data Haplotype Data Phenotype Data Phenotype Definitions
9/25/2012	TGDR002	Astonishingly low genetic variation in Quercus acutissima, an important tree species in Satoyama, a traditional Japanese rural forest and agricultural landscape, revealed by chloroplast microsatellite markers	Quercus acutissima	Total Sites: 59 Total Samples: 2152 Total Genotypes: 12912 Total AFLP Markers: 0 Total RAPD Markers: 0 Total SNP Markers: 0 Total cpSSR Markers: 6 Total SSR Markers: 0 Total Phenotypes: 0 Total Environmentals (per sample): 0 Total Environmentals (per site): 0	Genotype Data (cpSSR) GPS Data Haplotype Data Supplemental Data
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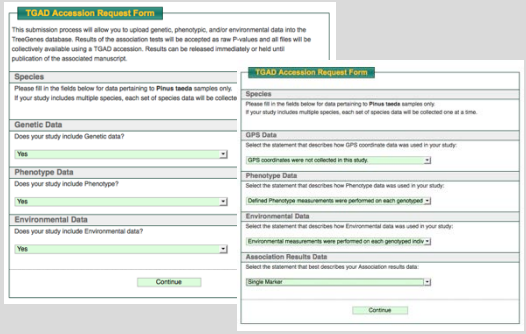
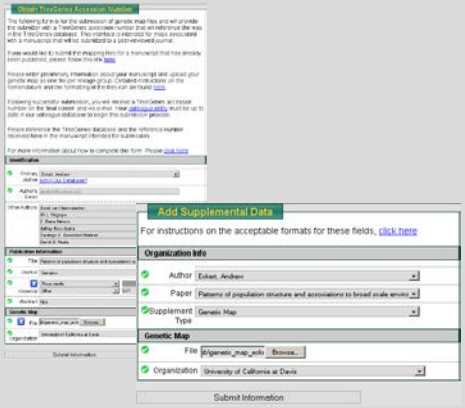
TreeGenes Database: Data Sources

treegenesdb.org

User submissions

Genetic maps, association or population studies





Obtain TGDR accession number!

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TreeGenes Database: Data Sources

treegenesdb.org

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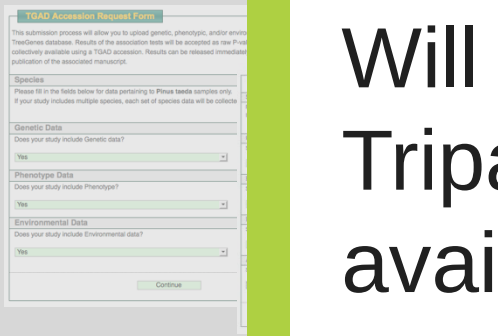
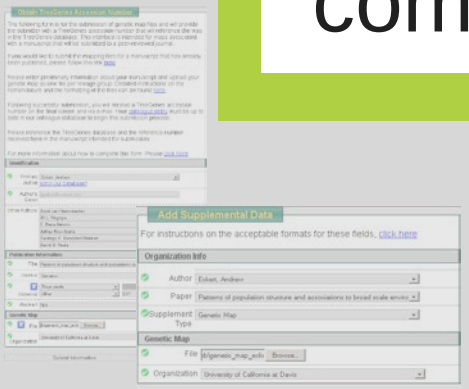
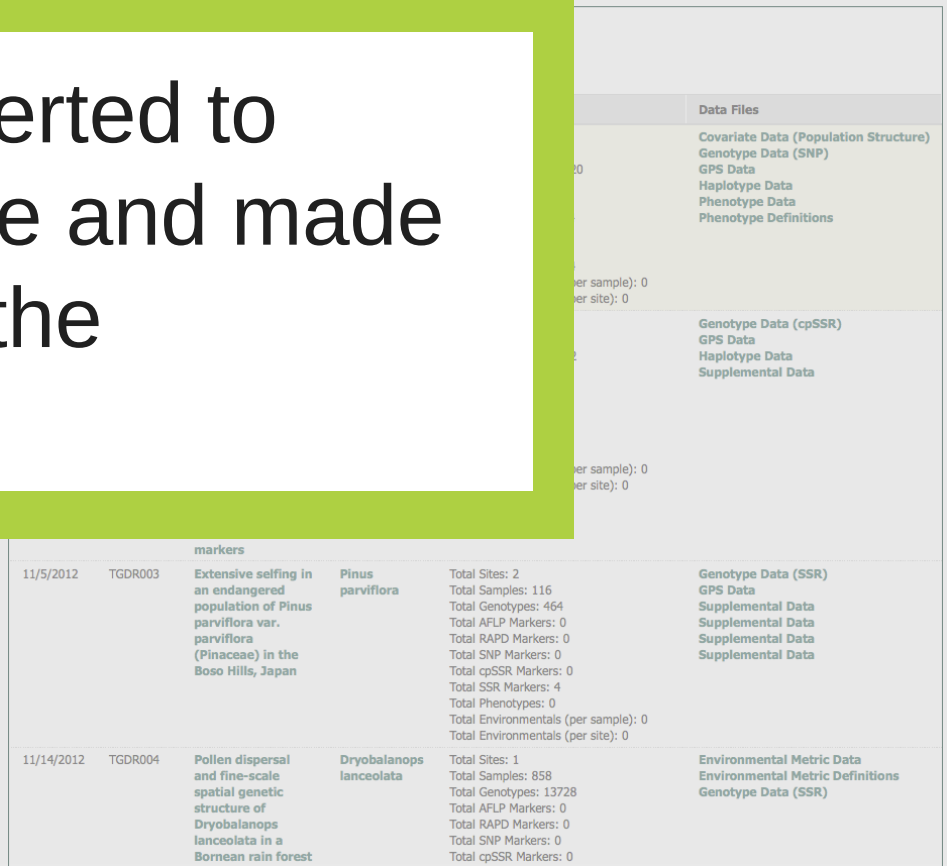




Will be converted to Tripal module and made available to the community



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TreeGenes Database: Data Access

Tools

- Existing viewers
- Custom development

TreeGenes Database: Interfaces

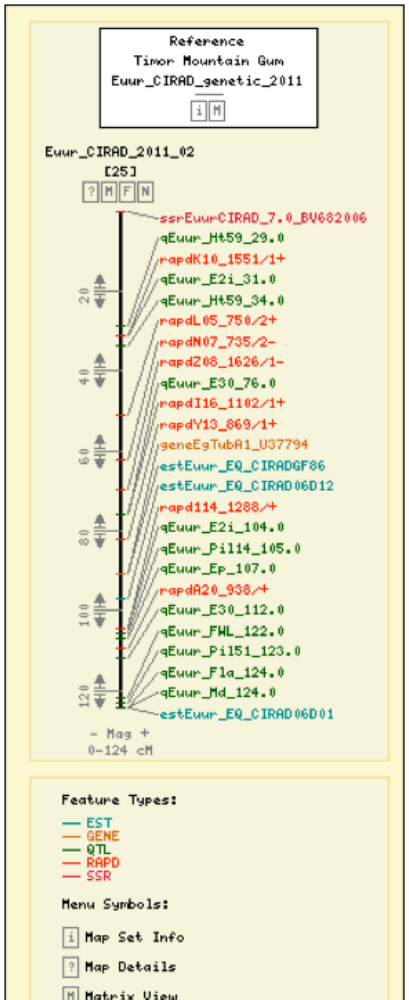
treegenesdb.org

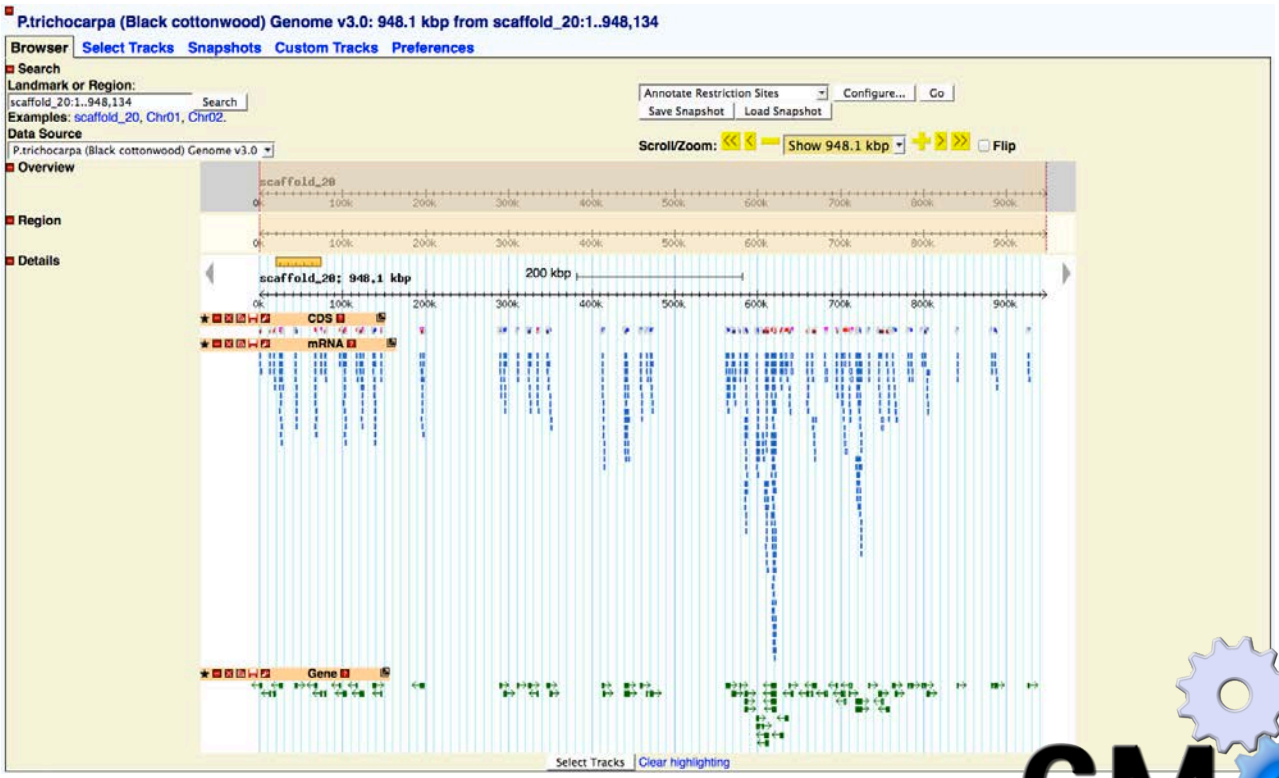
CMap

GBrowse

JBrowse

Web Apollo



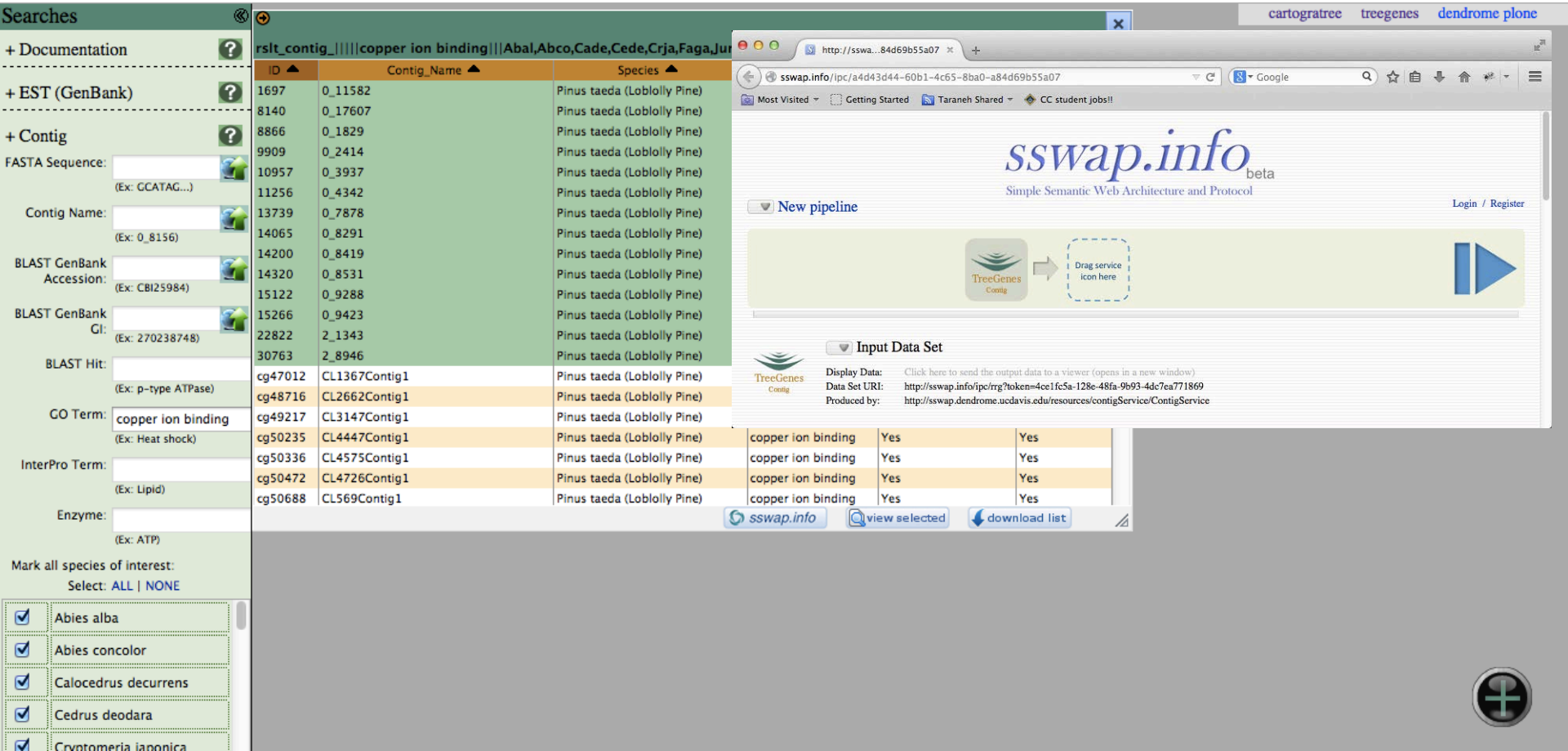


GMOD

TreeGenes Database: Interfaces

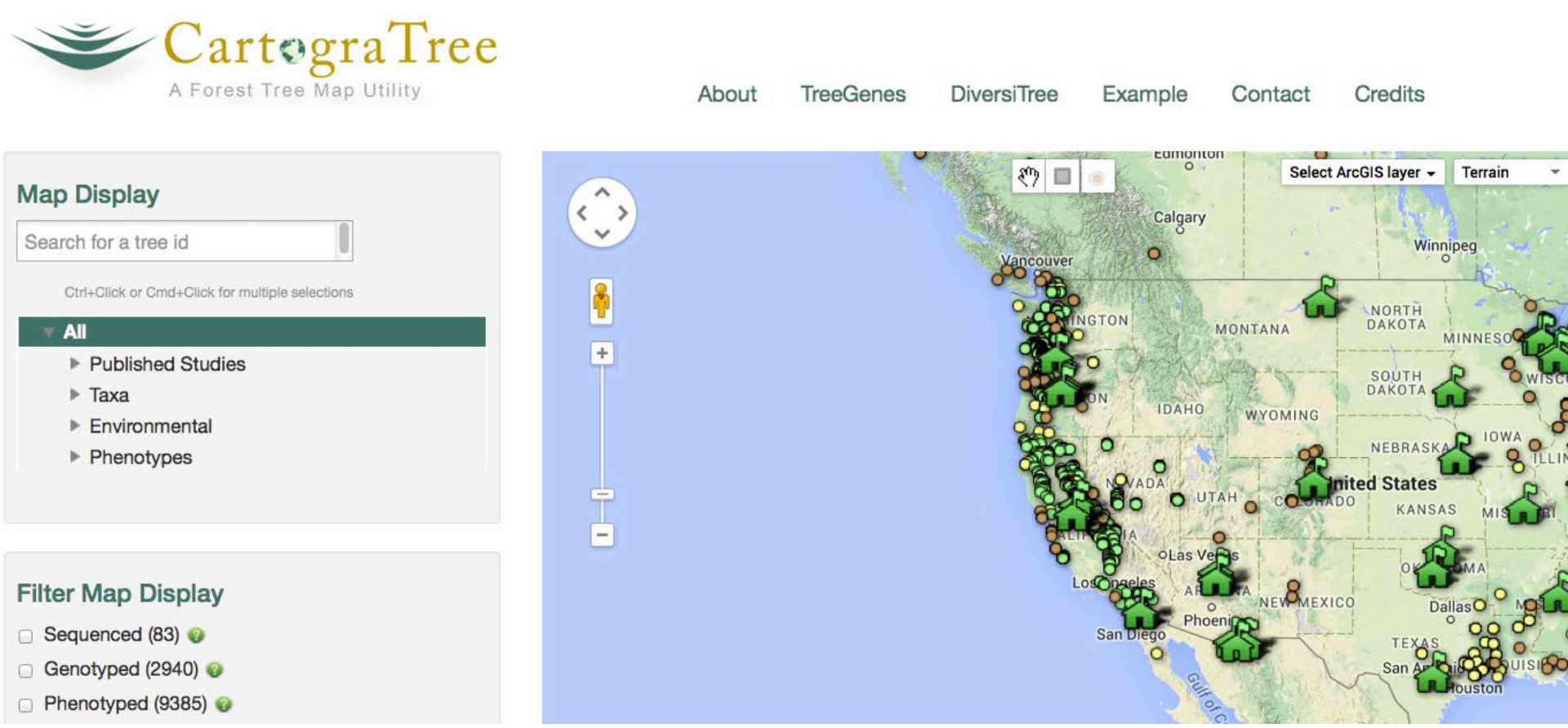
treegenesdb.org

DiversiTree – Bulk retrieval of resequencing data, genotypes, and phenotypes



TreeGenes Database: Interfaces

treegenesdb.org



- Providing context to geo-referenced data
- Data from TreeGenes, WorldClim, Ameriflux, TRY-db

TreeGenes Database:
Transition to Tripal

Transition to Tripal and Chado

Challenges

- Ontologies
- Standardizing for the first time
  - 25 years of custom schemas!

TreeGenes Database:
Transition to Tripal

Transition to Tripal and Chado

Advantages

- Ontologies
- Save time!
- Connect data with other databases (Tripal Gateway)
- Improve analytical capabilities (Tripal Gateway)
  - **Our contribution: analytical workflows**
- Review & clean up database

TreeGenes Database:
Transition to Tripal

Outcomes

- –Expanded datasets: access Hardwood Genomics, GDR, TreeGenes from one location
- –Expanded analytical, HPC resources
  - •Improve CartograTree capabilities
- –New Tripal module: user submission

TreeGenes Database: Team

treegenesdb.org **tg-help@ucdavis.edu**

Project Leads

Jill Wegrzyn

University of Connecticut

David Neale

Lead Database Administrator

Emily Grau **P0322**

Development Team

Steven A Demurjian Jr **P0383**

Hans Vasquez-Gross

Advising

Damian Gessler

Semantic Options

@TreeGenes

TreeGenes Database

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USDA

NSF