

Domain Modeling Task

Mapping Module

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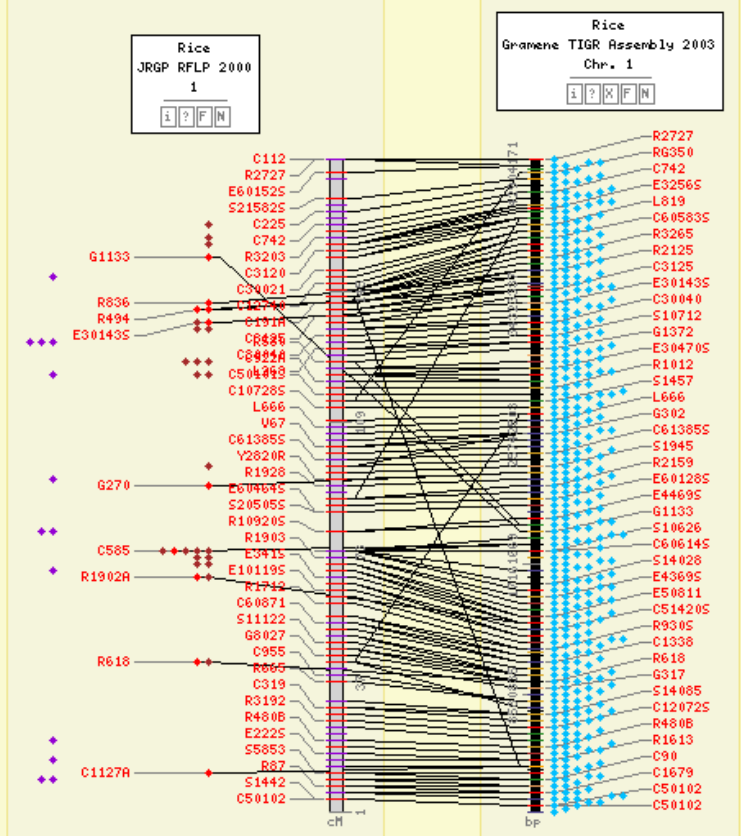
Mapping data :

- markers and loci
- genetic maps
- QTL maps
- physical maps
- sequence maps

Some of the basic concepts (semantic entities)

- Marker
- Locus
- Allele
- Chromosome
- Linkage Group
- Map
- Map Study
- Germplasm
- Haplotype
- Haplotype Block
- Genotype
- Genetic Map
- Physical Map
- Sequence Map
- Cytogenetic Map
- Contig Map
- QTL
- Others concepts?

*Definitions of the concepts :
cf Glossary document*



Concepts related to comparative mapping?

- *comparing two or more maps*
- *comparing two or more genomes*
- *consensus map*
- *etc.*

Feature Types:

- | BAC
- Centromere
- | interpolated phenotype
- | low LOD marker
- | Maize EST
- | Maize Marker
- | Marker
- | MMP Unigene
- | Rice Marker
- | Rice SSR
- | Sorghum BSS
- | Sorghum Marker
- | Tos17 Insertion
- | Wheat EST Marker

Features in red have correspondences

Evidence Types:

Black line denotes Automated name-based

Menu Symbols:

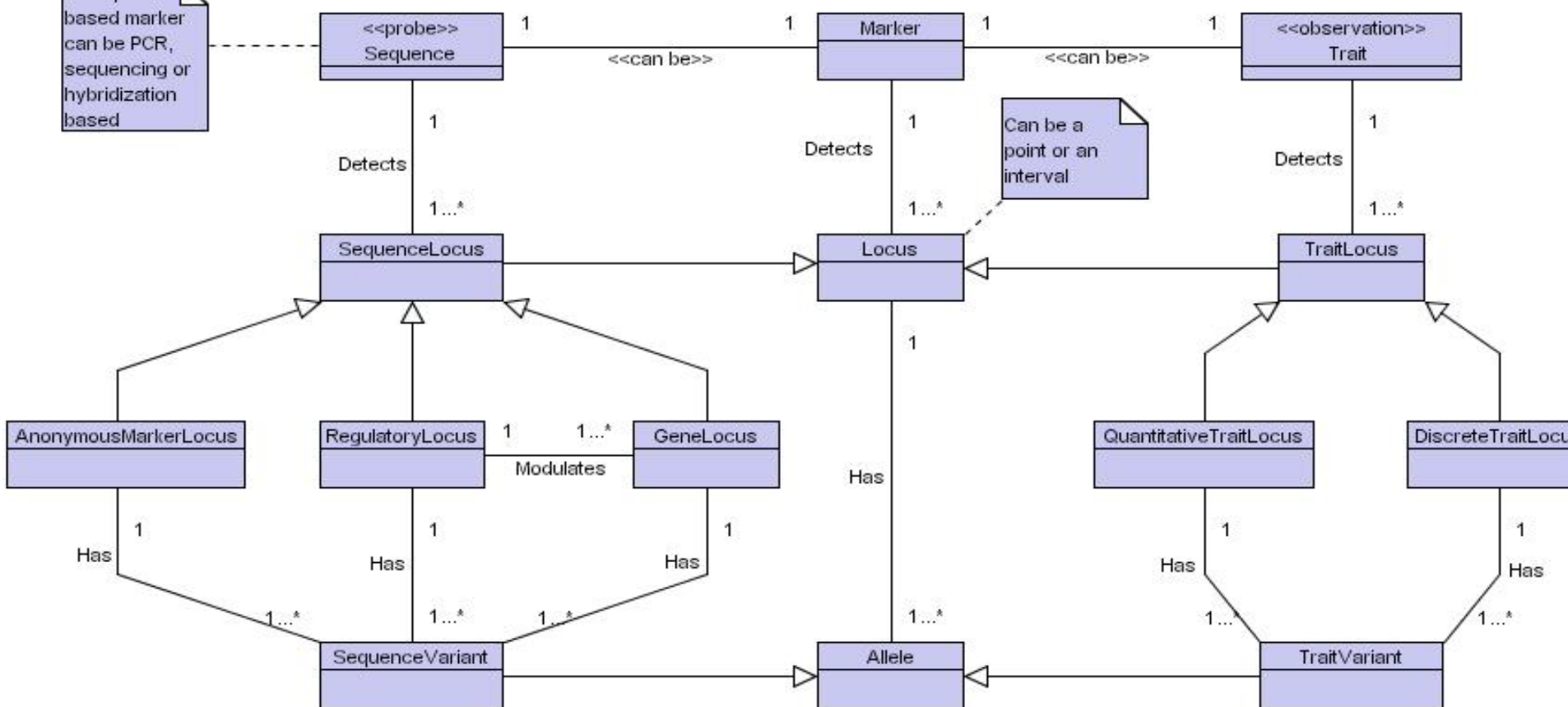
- i Map Set Info
- ? Map Details
- X Delete Map
- F Flip Map
- N New Map View

Map Locus Class Model (workshop IRRI July 2004)

Locus Class Model

A sequence based marker can be PCR, sequencing or hybridization based

Can be a point or an interval



Overlaps with other domain components

- Markers, loci and locus variants ("alleles")
-> Genotype domain
- Sequence map
-> Functional genomics domain
- Germplasm
-> Germplasm domain

Models and ontologies available for the mapping theme

- ✓ Databases : many information systems
- ✓ Ontologies : ?

Data Models available

. **Gramene**, <http://www.gramene.org/>

Cereals

Viewers : Cmap, Genome Browser (adapted from Ensembl)

Remark : involved in ontologies development

. **TAIR**, <http://www.arabidopsis.org/>

Arabidopsis

Viewers : MapViewer, SeqViewer

Remark : involved in ontologies development

. **MaizeGDB**, <http://www.maizegdb.org>

Maize

Viewers : Visual Map Display (beta), links to Gramene and NCBI Map Viewer

Remark : involved in ontologies development

. **GrainGenes**, <http://wheat.pw.usda.gov/>

Wheat, barley, rye, triticale, oats

Viewers : Cmap, GBrowse

NCGR LIS legume database, <http://www.comparative-legumes.org/>

legumes

viewers : Cmap

UKCropNet, <http://www.ukcrop.net/>

Arabidopsis, Barley, Brassica, Forage grasses, Millet, etc.

viewers : Pairwise Comparative Map, Comparative Physical and Genetic Map, Genome Map Viewer

TropGENE-DB, <http://tropgenedb.cirad.fr/>

OrygenesDB, <http://orygenesdb.cirad.fr>

Rice, Musa, Cotton, Cocoa, Sugarcane (Sorghum soon)

viewers : Cmap, GBrowse

Germinate, <http://germinate.scri.sari.ac.uk/cgi-bin/germinate/germinate.cgi>

Maize, Barley and Solanaceae (in development)

.ENSEMBL, <http://www.ensembl.org/>

Metazoan genomes

Viewers : Ensembl Genome Browser

Remark : genome sequence annotation

.TIGR, <http://www.tigr.org/tdb/euk/>

Arabidopsis, Rice, Wheat, Maize, etc. genomes

Remark : genome sequence annotation

.Many other model plant database groups ...

Ontologies

No real ontology dedicated to mapping data !

- **SO (Sequence Ontology)** -> sequence annotation
- **IPGRI descriptors** -> genetic markers technologies

Connection to existing ontologies

OBO consortium, *<http://obo.sourceforge.net/cgi-bin/table.cgi>*

- Gene Ontology
- Plant Ontology
- Trait Ontology
- Cell Type Ontology
- etc.

International partners

- ✓ International plant database experts
- ✓ Ontology experts
- ✓ GCP bioinformatician experts
- ✓ GCP biologists experts involved in mapping data

Strategy, process

- Confirm a consensus high level domain model structure
- Identify minimal semantic cross linkages between global modules
- Establish a moderated forum for public feedback about the domain model.
- Mapping domain meeting (associated to another related domain meeting?)