CMTV

Comparative Map and Trait Viewer

May 17th, 2006

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OUTLINE

- Introduction to CMTV and some of its functionality
- Integration of CMTV with the GCP Platform
  - ISYS-Eclipse

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CMTV

- The Comparative Map and Trait Viewer (CMTV) provides visual integration of genomic data from disparate sources and allows rich client side interactivity and manipulation

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CMTV - Development

- Development of CMTV has been headed by NCGR, in association with four CGIAR centers (CIAT, CIMMYT, CIP and IRRI)
- Originally developed as part of ISYS

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ISYS

- ISYS (Integrated Systems) is a dynamic, flexible platform for the integration of bioinformatics tools, databases, and web-based resources
  - Component based architecture, allowing pluging-and-playing tools of interest
  - “DynamicDiscovery™ ” technology creates an exploratory environment where the user can navigate freely amongst registered components
    - The plug-in components, in synchronicity, tell you what can be done with a given set of data
- Components include CMTV, Blast, Entrez, maxdView and many others

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CMTV – Main Features

- The ability to visualize QTL data in “heat strips” or histogram plots, or as regions of significance above a threshold

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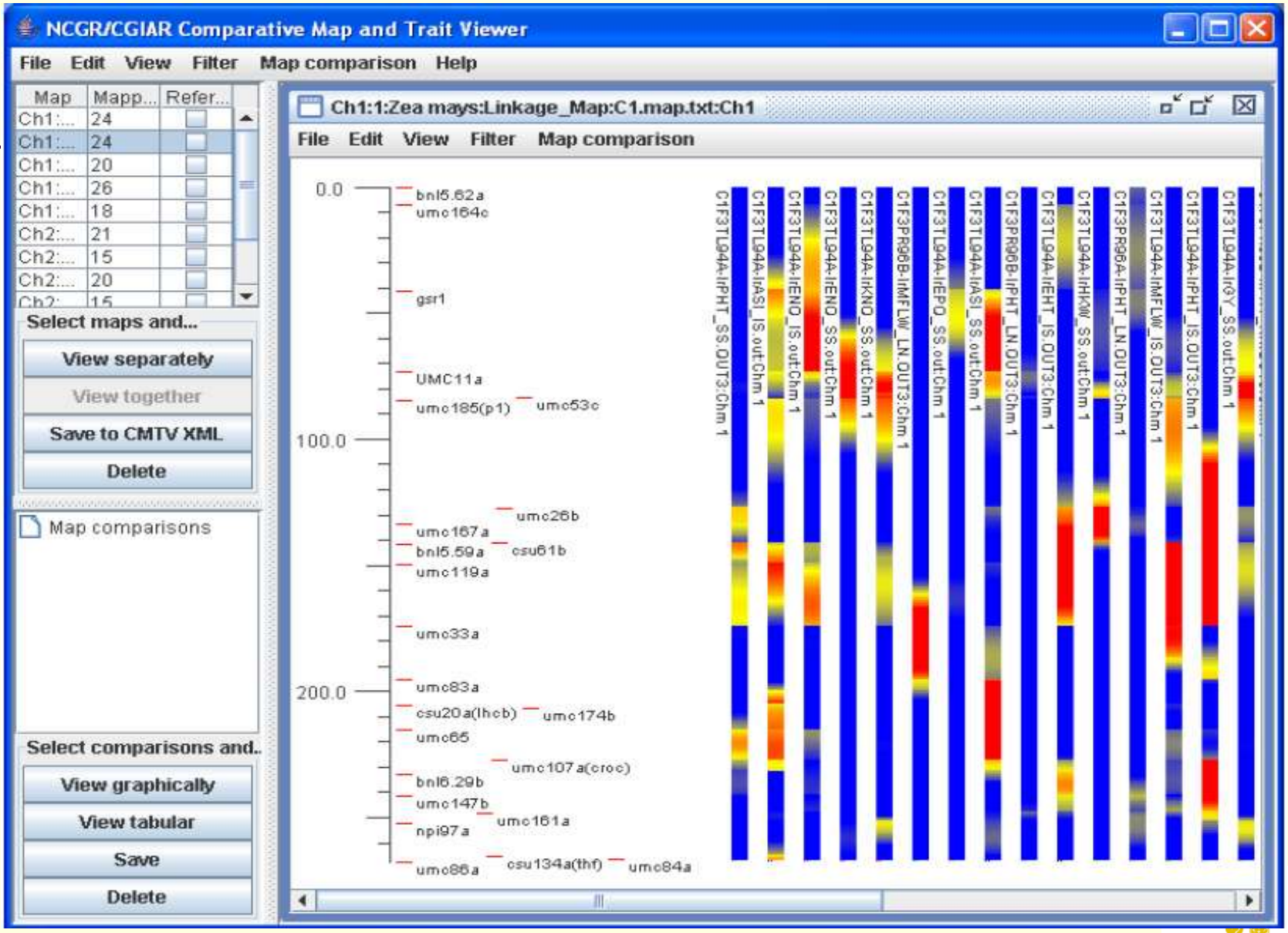
NCGR/CGIAR Comparative Map and Trait Viewer
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CMTV – Main Features

- Construction and visualization of comparisons of sets of maps based on analysis of corresponding loci

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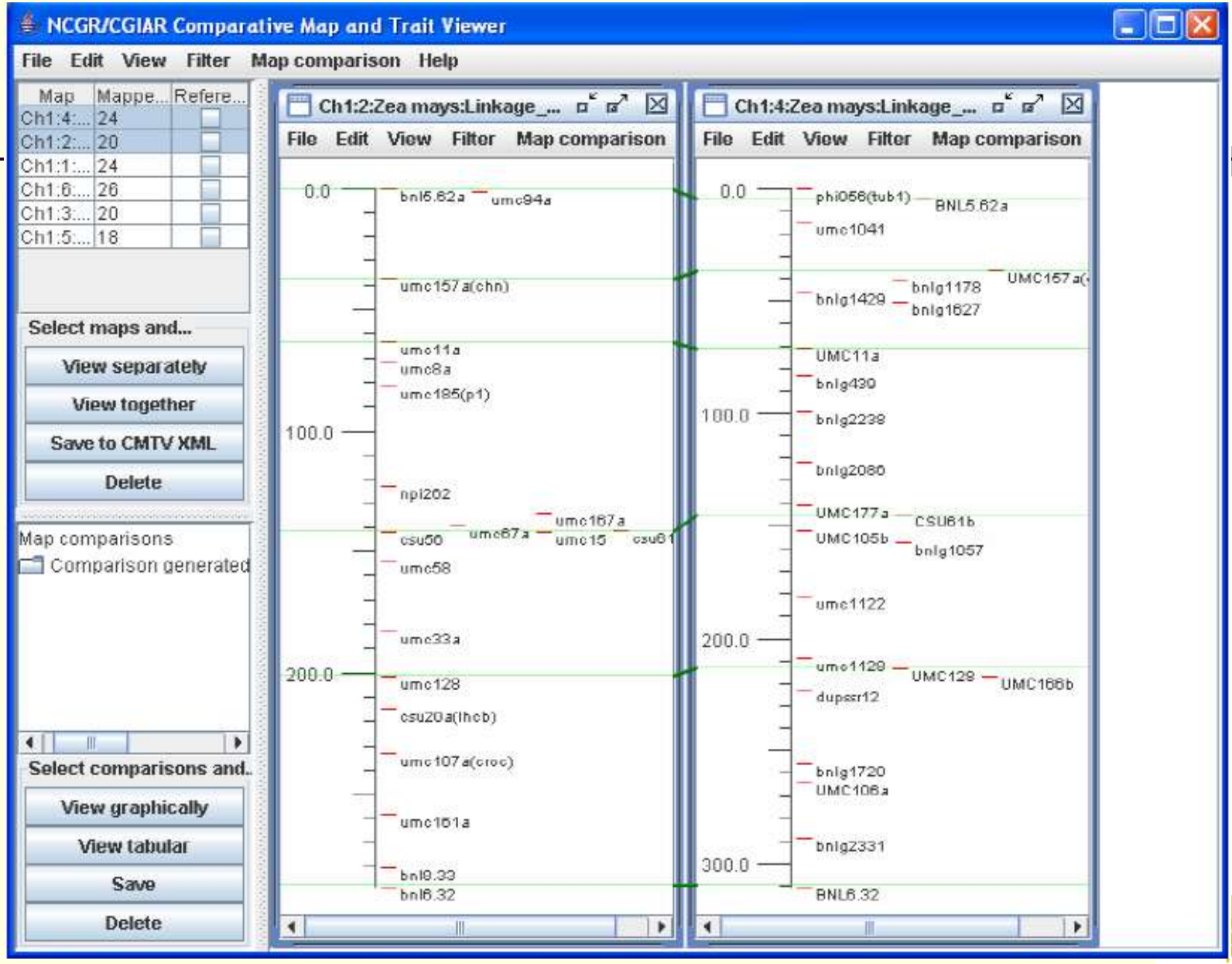
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UMC177a
CSU61b
UMC105b
bnlg1057
umc1122
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umc1129
UMC129
UMC166b
dupssr12
bnlg1720
UMC106a
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CMTV – Main Features

- Construction of consensus maps using corresponding well-ordered loci to anchor the interpolation of the data from multiple experiments

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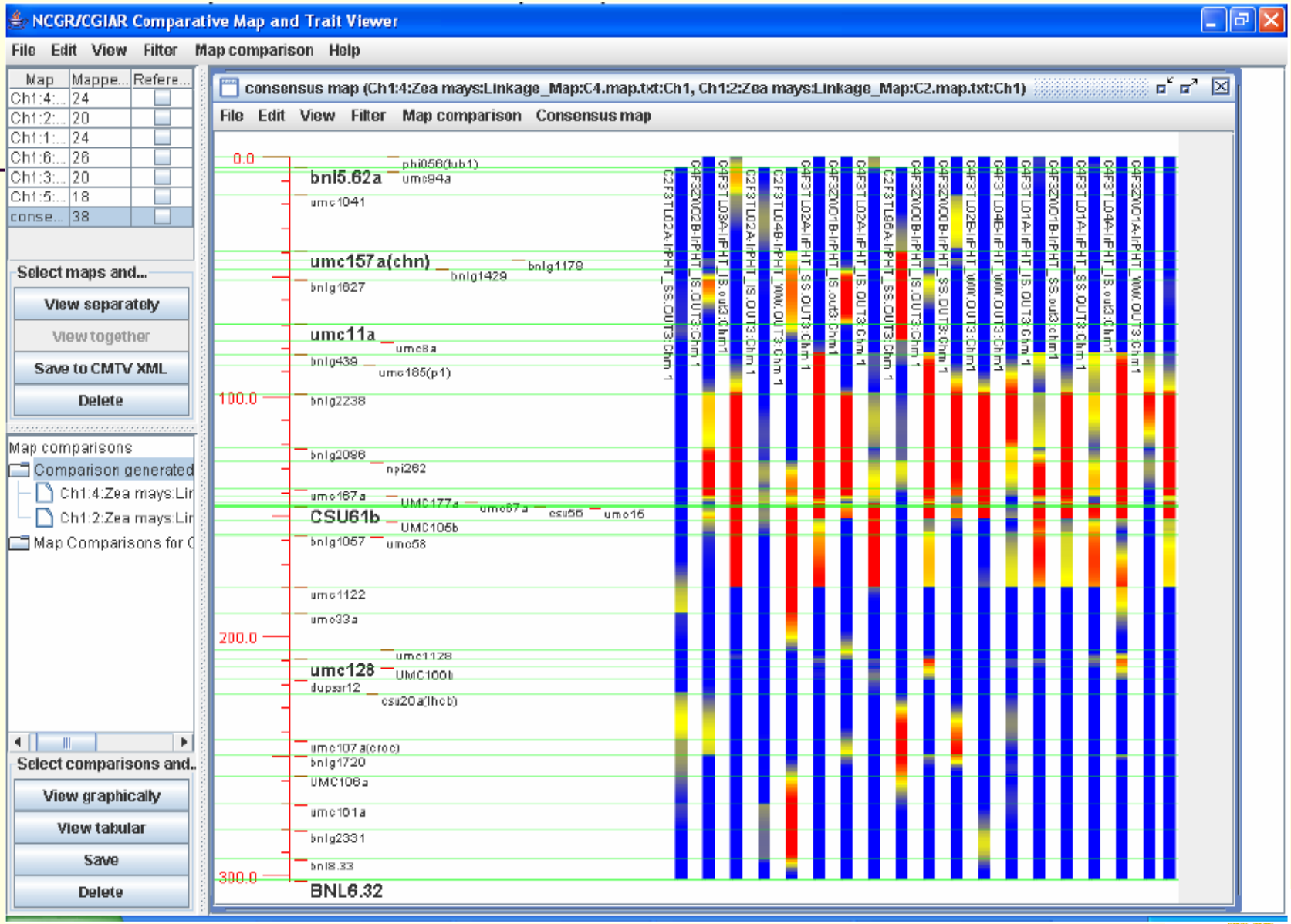
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npi262
umc167a
UMC177a
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csu56
umc16
CSU61b
UMC105b
bnlg1057
umc58
umc1122
umc33a
umc1128
umc128
UMC100b
dupssr12
csu20a(lhcb)
umc107a(croc)
bnlg1720
UMC106a
umc101a
bnlg2331
bnl8.33
BNL6.32

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CMTV, part of ISYS

- CMTV uses ISYS to connect to data sources and other tools
- CMTV can interact with ISYS components via user driven events such as feature selection or filtering
- CMTV's structural/comparative perspective on data may be simultaneously viewed in relation to functional classification systems such as GO or biochemical interaction networks such as PathDB

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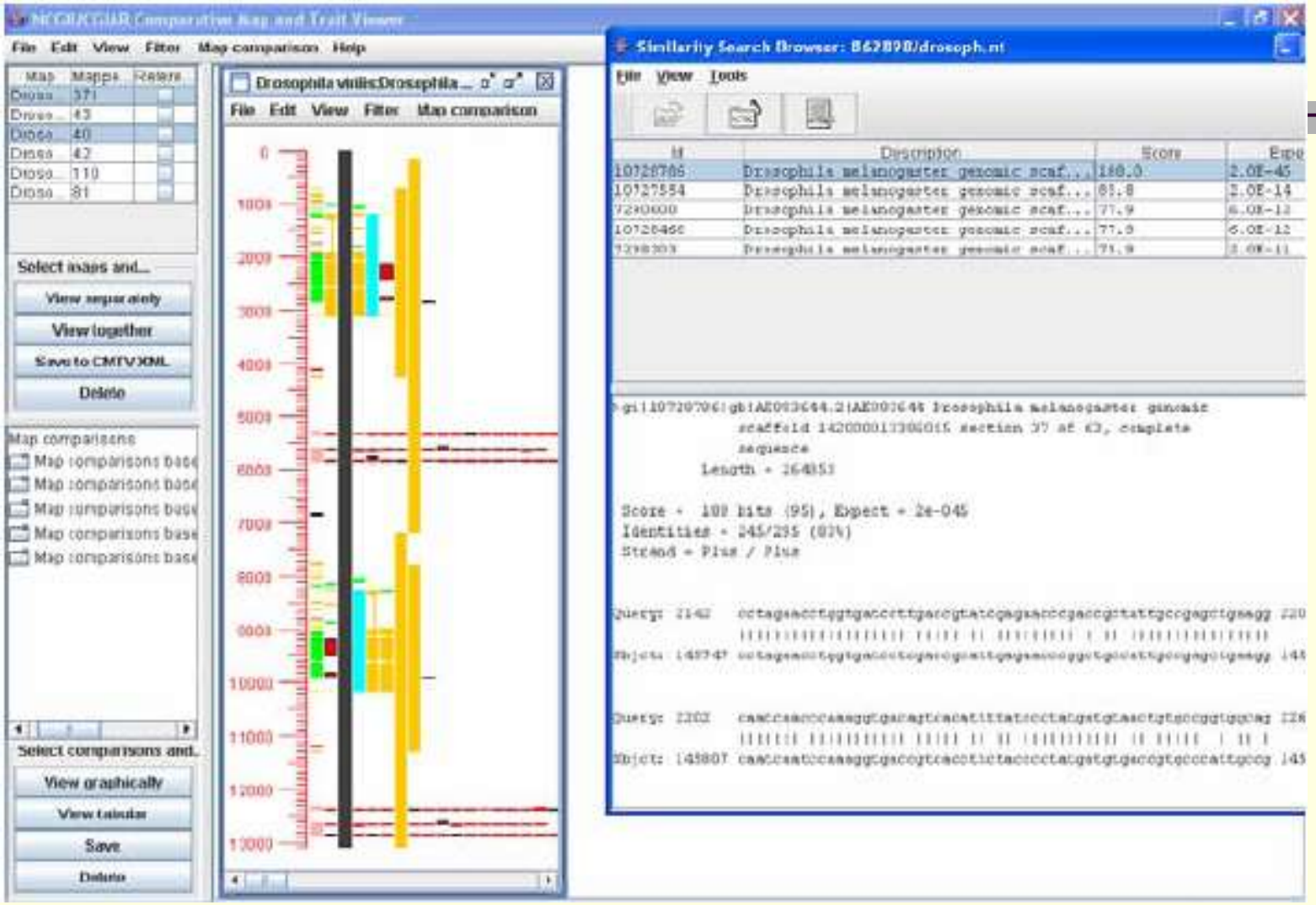
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Save
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Drosophila virilis:Drosophila...
File Edit View Filter Map comparison
Similarity Search Browser: 862898/drosoph.nt
File View Tools
Description
Score
Length = 164853
Score = 108 bits (95), Expect = 2e-045
Identities = 245/295 (83%)
Strand = Plus / Plus

CMTV, used at CIMMYT

- At CIMMYT, CMTV has been used to successfully construct drought tolerance consensus maps for Maize
  - By taking the QTL data produced for different drought tolerant traits assayed under different conditions, the consensus maps were then used as a common framework for viewing the QTL data

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Integration of CMTV with GCP Platform

- What is the Generation Challenge Programme (GCP) Platform?
  - An attempt to model all types of germplasm, genotyping, phenotyping, genomics and GIS data
  - Ultimately, creating standard data formats for storage, interchange, analysis and visualization of this data can be developed
  - This will allow one tool, for example, to use output from another tool and establish and construct conceptual linkages between data

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Integration of CMTV with GCP Platform

- To carry out this integration:
  - Created a PostgreSQL database, amalgamating CIMMYT and ISYS Map and QTL data (Previously scattered across data files and an Access Database)
  - Map the database onto the GCP Platform's domain model using Hibernate
  - Map the required objects in the domain model into ISYS objects *(For CMTV to visualize data from the domain model, they need to be wrapped as ISYS objects)*

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ISYS-Eclipse

- Standalone RCP carrying out integration
- CMTV, data sources and other ISYS tools are distributed as plug-ins
- Uses Eclipse update manager
- Result: Fully customizable and extendible application in terms of a list of services and data sources available

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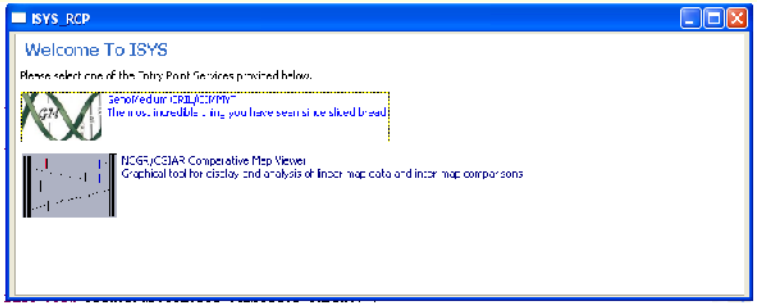
ISYS-Eclipse



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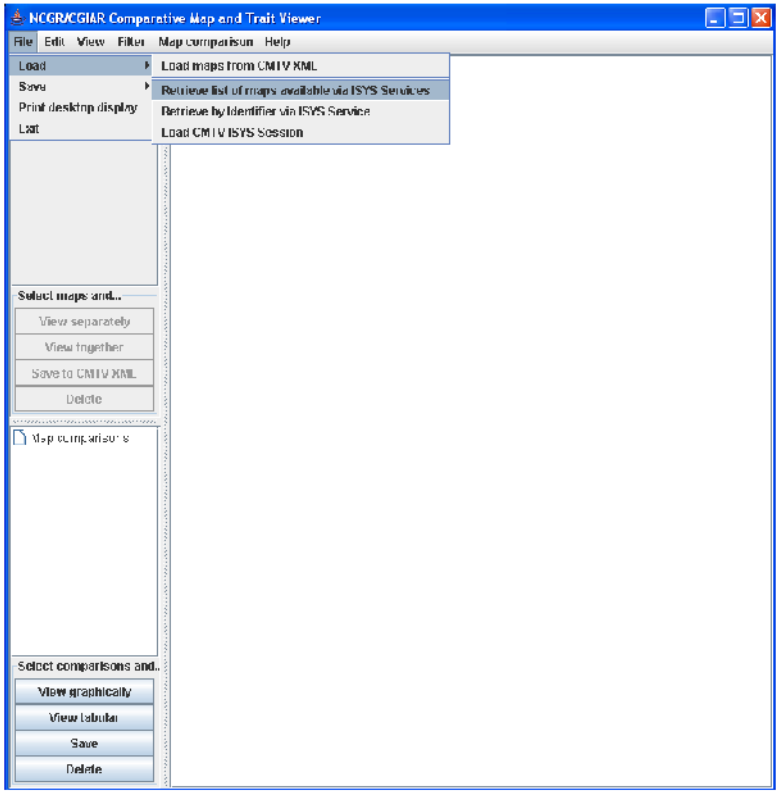
ISYS-Eclipse (within CMTV) …Retrieving Maps from ISYS



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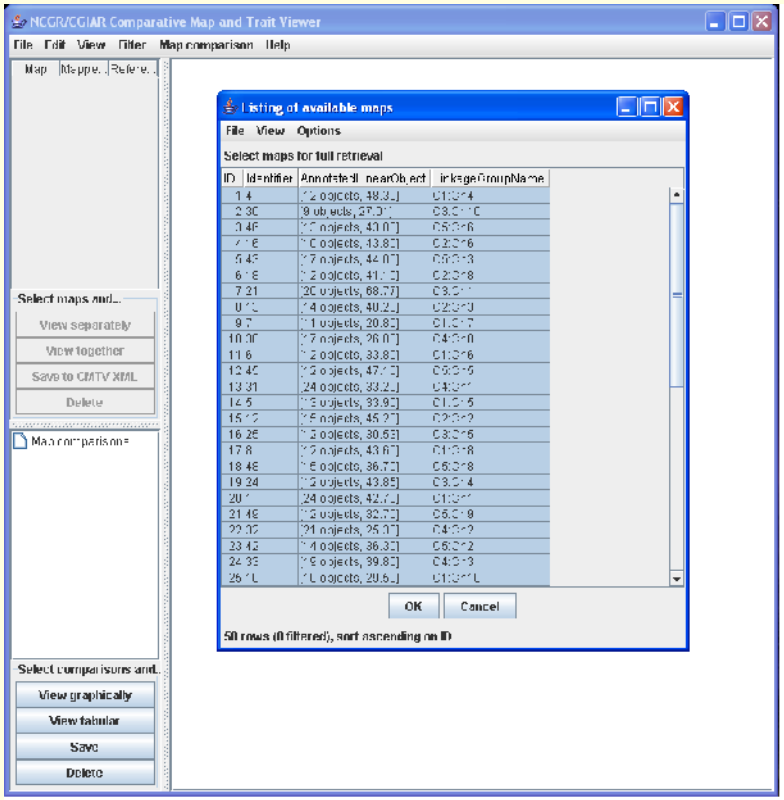
ISYS-Eclipse (within CMTV) …TableView of ISYS Maps



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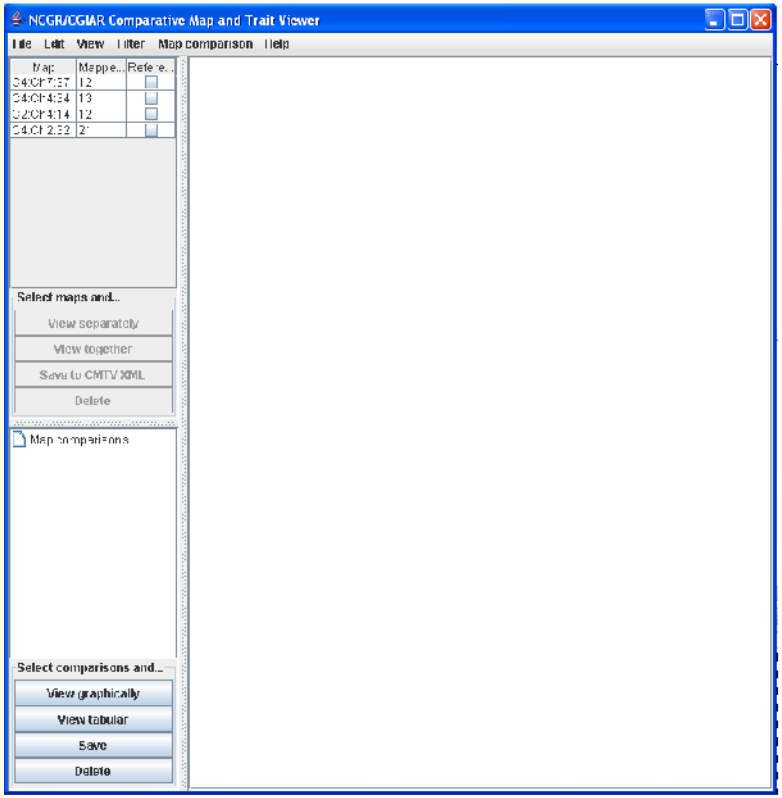
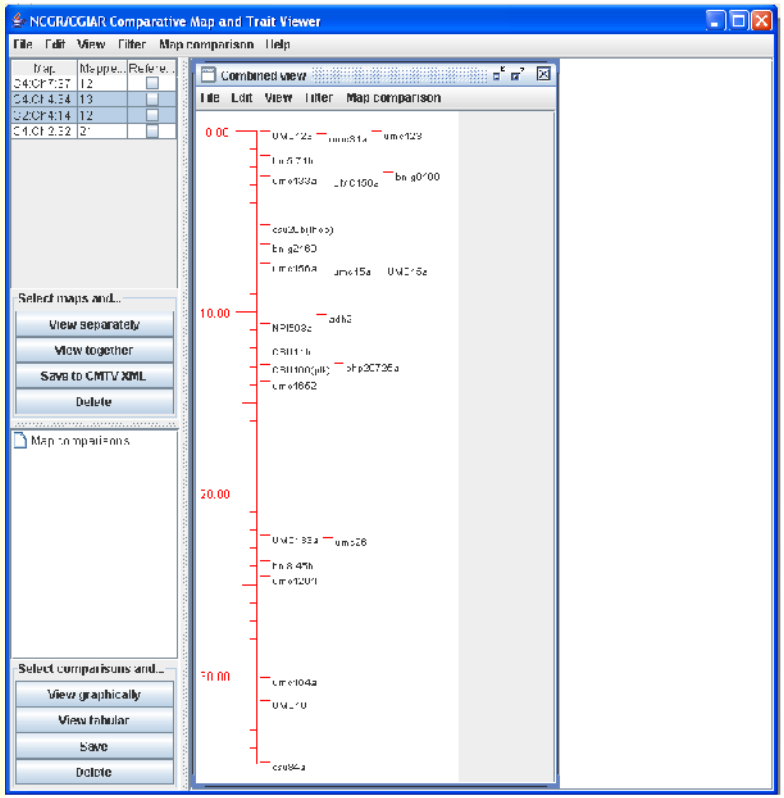
ISYS-Eclipse (within CMTV) …4 Maps retrieved



ISYS-Eclipse (within CMTV) …performed map comparison