

**Poster B-57**  
**Generation Challenge Programme**  
**(GCP) Domain Modeling and Crop**  
**Information Platform**



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**Short Abstract:** The Generation Challenge Programme (GCP; <http://www.generationcp.org>) is an international agricultural research consortium currently comprising 20 agricultural research institutes. The corresponding poster discusses the GCP's Domain Modeling (DM) undertaking and its incorporation into its 'crop information platform'. Lastly, it introduces a new and promising bioinformatics application called ISYSEclipse based on the platform.

**Long Abstract:**

The generation challenge programme (GCP; <http://www.generationcp.org>) is a global research consortium that currently comprises centres of the Consultative Group on International Agricultural Research (CGIAR), advanced research institutes (ARIs), and National Agricultural Research Systems (NARS) in developing countries. Utilizing advances in molecular biology, the GCP aims to develop a new generation of crops that better meet the needs of the resource poor. Critical to the success of such genomics-driven plant breeding is the development of a 'crop information platform' which aims to integrate the distributed information resources of the consortium members and provide an improved set of bioinformatics applications.

To achieve this aim, the GCP's 'crop information platform' centers on the creation of a Domain Model (DM). In brief, a DM is an abstract representation of some part of the world. In the context of the data being produced within the GCP, this abstraction spans entities for germplasm, genotyping, phenotyping, genomics and geographical information systems (GIS) data. Although the size of the domain embodies a significant undertaking, by attempting to model all types of data in one coordinated effort, it is hoped that standard data formats for storage, interchange, analysis and visualization of this data can be developed. This allows

one tool, for example, to use the output from another tool and to establish and construct conceptual linkages between data.

Where possible, existing models have been incorporated or further developed. The primary development language has been Java, utilizing object-oriented analysis and design techniques (OOAD). To communicate with databases, a lightweight object/relational mapping (ORM) framework called Hibernate was used. The resulting DM has been embedded into a standard three-layer software architecture consisting of presentation, logic, and data source tiers. Within the presentation tier are user interfaces, web services and visualization tools. These are all coupled to the logic tier which provides an implementation of the DM and interfaces to data sources. The bottom data source layer provides data from both GCP developed and third party data sources. Taken together, they comprise the GCP 'crop information platform'.

As part of its activity within the GCP 'crop information platform', CIMMYT (International Maize and Wheat Improvement Center) is producing a new bioinformatics application integrating third party tools with the platform. The application is called ISYSEclipse because it unifies the central interoperability ideas of ISYS (Integrated System, <http://www.ncgr.org/isys> ) with the plug-in based component infrastructure of Eclipse (<http://www.eclipse.org>). As a result, it will be fully customizable and extendible in terms of a list of services and data sources available. At the same time, the services brought together will exchange data seamlessly and assist the user in making sensible actions thereby profiting the end-user greatly.

The corresponding poster will discuss the GCP's DM undertaking, its integration in the GCP 'crop information platform' and lastly its implementation in ISYSEclipse. The GCP 'crop information platform' is entirely open sourced and licensed with the software posted to a project management site called CropForge (<http://cropforge.org>) and technical documentation hosted on a wiki called CropWiki (<http://cropwiki.irri.org/gcp>).