# United States Department of Agriculture

# International Project to Develop a Global Plant Genebank and Information Management System

## Summary

The GRIN-Global Project is creating a new version of the Germplasm Resource Information System (GRIN), providing the world's crop genebanks with a powerful but easy-to-use plant genetic resource (PGR) information management system.

Programming strategies support continuous evaluation and refinement; advanced prototypes will be extensively beta-tested. The project team will identify barriers to adoption and evaluate the system during and following implementation.

Bioversity International will deploy GRIN-Global worldwide, working cooperatively with users to document the system in Arabic, English, French, Russian, and Spanish, translate its interface, and implement it in partner countries.
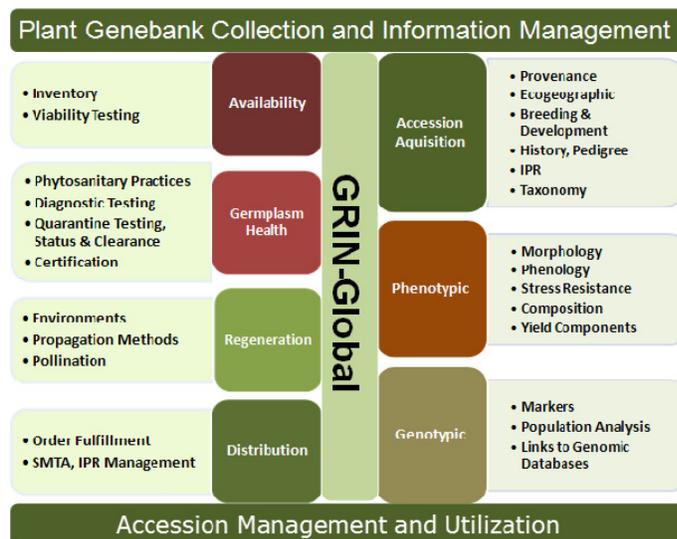
The system uses a .NET ("dot net") framework and Visual Studio development environment. This technology allows data to be stored locally or on networks. Centralized data can be distributed to offsite systems. GRIN-Global accommodates commercial and open-source programming tools and requires no licensing fees.

## GRIN and the Need for GRIN-Global

USDA Agricultural Research Service (ARS) developed, supported, and enhanced GRIN throughout GRIN's 25+ year history. Widely recognized as the world's premier genebank management system, GRIN's information and content have been indispensable to researchers and genebank personnel. However, its inherent complexity and licensing fees prevented some international genebanks from adopting it for routine use.

Many national genebanks lack access to high-quality information technology resources needed to manage their collections. Therefore, the Global Crop Diversity Trust initiated the GRIN-Global Project to meet their common needs and reduce redundant efforts being expended by genebanks and independent consortia.

### A $2.3 Million Project Partnership

GRIN-Global is being developed jointly by the **USDA Agricultural Research Service**, **Bioversity International**, and the **Global Crop Diversity Trust**.

www.ars.usda.gov          www.bioversityinternational.org          www.croptrust.org

**USDA-ARS** provides an enhanced GRIN database schema and a core set of Web services and technologies for updating data stored on a centralized system and for distributing the data to existing offsite systems.

**Bioversity International** supports deployment of GRIN-Global internationally through regional PGR networks, its Regional Offices, and the System-wide Genetic Resources Programme, working to identify cooperators to document GRIN-Global in other languages and implement it in partner countries.

## Project Team

Core development team personnel include staff from —

- USDA-ARS, National Germplasm Resources Laboratory, Beltsville, Maryland, USA
- UDA-ARS, Plant Introduction Research Unit, Ames, Iowa, USA
- USDA-ARS, National Clonal Germplasm Repository, Corvallis, Oregon, USA
- Bioversity International, Rome, Italy

## Design of the GRIN-Global System

GRIN-Global is built using the well-established three-tier (Presentation, Business, and Data) architecture design.

**Presentation** - Can assume different forms. For example, the GRIN-Global Web site retrieves PGR data from the database using the Business Tier's Web services. Similarly, the GRIN-Global Curator Tool, a desktop .NET application, uses the same Web services to retrieve data.
- Third-party applications, such as model organism databases, or Web sites connecting to the Business Tier Web services can retrieve data.

**Business** - Contains a full complement of software modules.
- Accessible to any computer connected to the Internet via standard protocols.
- Current Web services use the SOAP protocol, providing data in XML format.

**Data** - Database where PGR data is permanently stored.
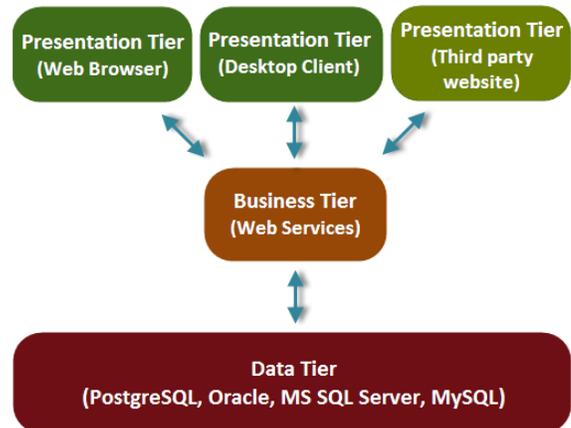


## Advantages

GRIN-Global will be—

- Continually maintained and updated.
- Customizable and scalable to meet local system requirements.
- Capable of exporting and importing data between spreadsheets and GRIN-Global's database.
- Highly flexible with customizable screen views, forms, and menus.

### …for Genebanks

Can be implemented in different ways, ranging from a simple genebank inventory application to a widely distributed system supporting online user searching and germplasm ordering.

- Operates over a network or on "stand-alone" personal computers.
- Supports any one of four frequently used databases: PostgreSQL, MS SQL Server, Oracle, and MySQL.
- Enables maximum flexibility in delegating user rights.
- Provides interfaces in Arabic, English, French, Russian, and Spanish.

### …for Researchers

Provides immediate access to PGR information.

- Incorporates an easy-to-use interface for extracting and manipulating PGR information.
- Facilitates germplasm ordering to meet specific research needs.
- Meets other databases' interoperability requirements.

## Contact

For more information, visit www.grin-global.org

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