



GRIN-Global

the solution for PGR documentation



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1. GRIN Documentation



**GRIN - Genetic Resources Information Network
(Plants, Animals, Microbes, Invertebrates)**

**>25 years, centralized USA on-line system, 26 repositories –
from northern to tropical crop collections
(all types of genebanks)**

**GRIN - reliable source of information, systematically
developed and managed, comprehensive, own standards,
metadata links, literature references...**

Database platform: Oracle

<http://www.ars-grin.gov/npgs/>



1. GRIN Documentation



Data and functional areas:

- Passport (“Accession”) >550 th. PGR
- GB storage (“Inventory”) – all types: seed, *in vitro*, field , cryo
- C&E data (“Observation”) – own crop descriptors
- Taxonomy – separate database, synonyms (recommended for crops)
- Web page - wide choice of searches, all information available (+large image documentation), on-line ordering tool



1. GRIN Documentation



- **GRIN** – sophisticated system tailored to the needs of the USA, long-term practice, systematic development
- **PC GRIN** application, 90-ties, different OS, freely downloadable (South American countries)
- **GRIN-Global idea** – innovation of the existing GRIN, enlargement of structure and functions, wide utilization

2. GRIN-Global Project



Target: To create a new flexible documentation system for genebank and crop collection management applicable everywhere in the world (different OS, database platforms, open source software, based on GRIN)

Duration: 2008-2010 (Dec. 2010 planned the final version)

Partners:



**Deployment out of the USA
(CGIAR centres, other GB)**



Development + USA utilization



Impulse + financing

2. GRIN-Global Project



Development team:

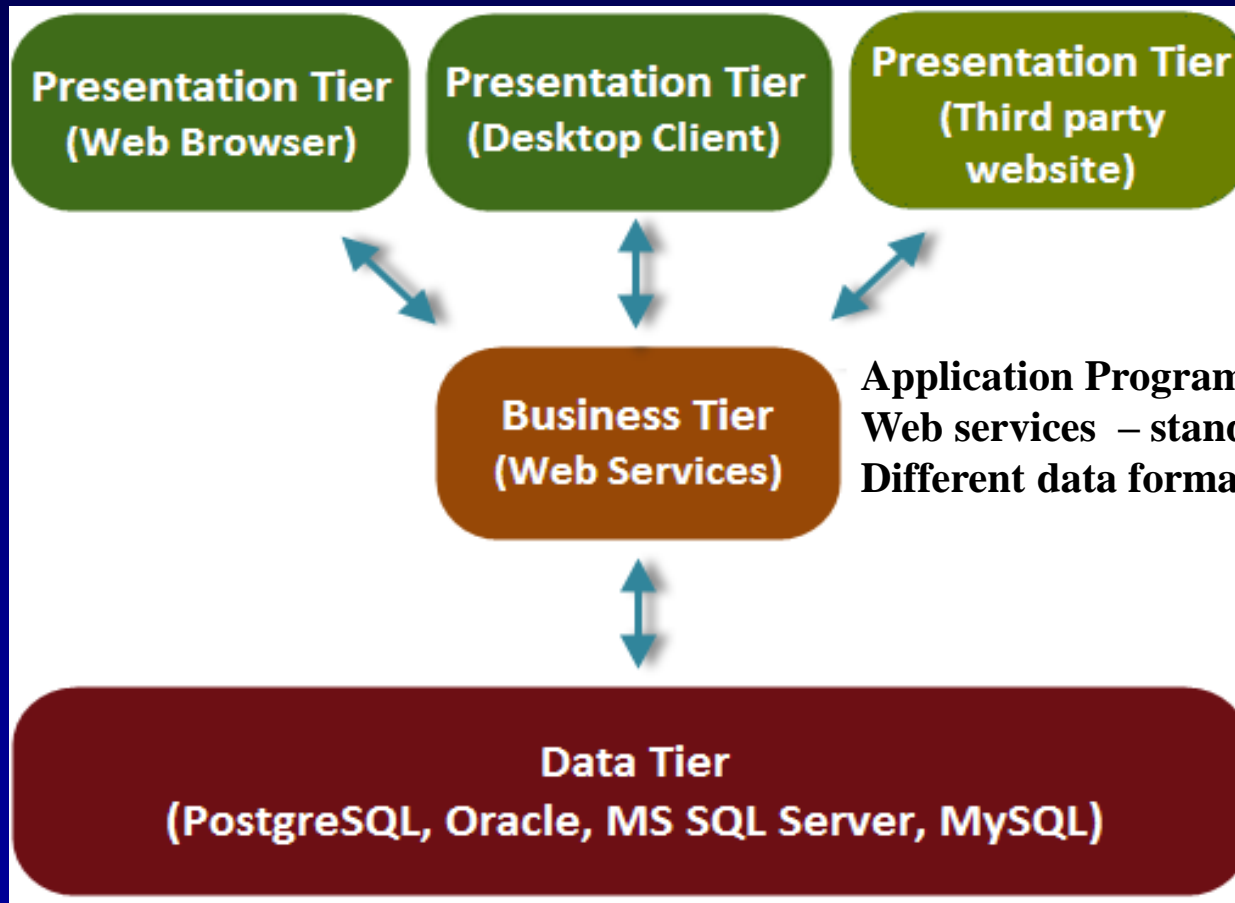
USDA/ARS

- Plant Introduction Research Unit, Ames, IA
- Database Management Unit (DBMU), Beltsville, MD
- National Germplasm Repository, Corvallis, OR
- Subtropical Horticulture Research Station, Miami, FL
- National Small Grains Germplasm Research Facility, Aberdeen, ID

Bioversity International

Technical Steering Committee

3. GRIN-Global – architecture



Application Program Interface (API)
Web services – standard protocols (HTTP)
Different data formats (XML, TXT, CSV)

3. GRIN-Global – components



Very ambitious project

- **Support for different database platforms (My SQL, MS SQL, Postgre SQL, Oracle)**
- **IIS Web Server - API web services (Web page)**
- **GRIN-Global Tools (Updater, Curator Tool, Admin Tool, Search Tool, Web page)**

3. GRIN-Global – installation



Installation types:

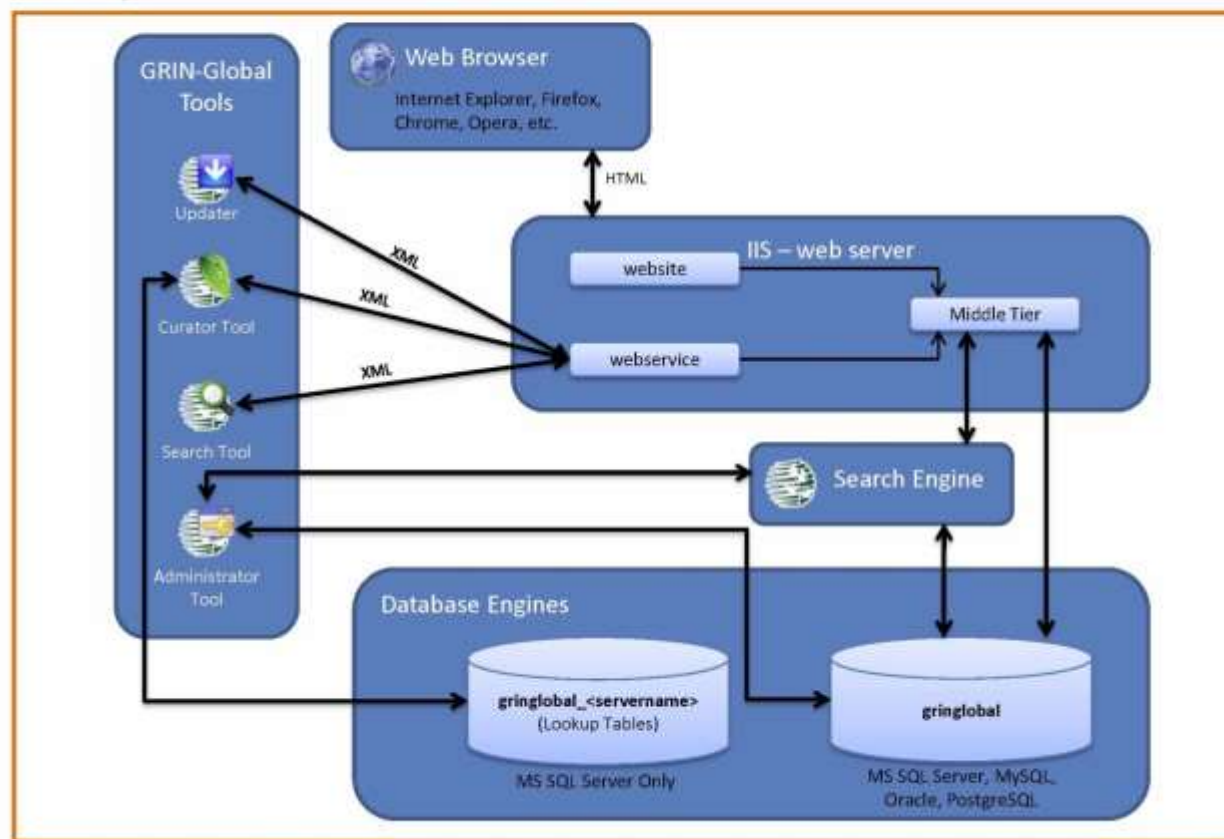
1. Local PC (one user)

**all components installed - IIS web service,
database engine, administrator, client and search tools,
webpage (using MS products involved in OS XP,
Vista, Win7)**

3. GRIN-Global – installation



System Architecture Overview – One Computer



3. GRIN-Global – installation



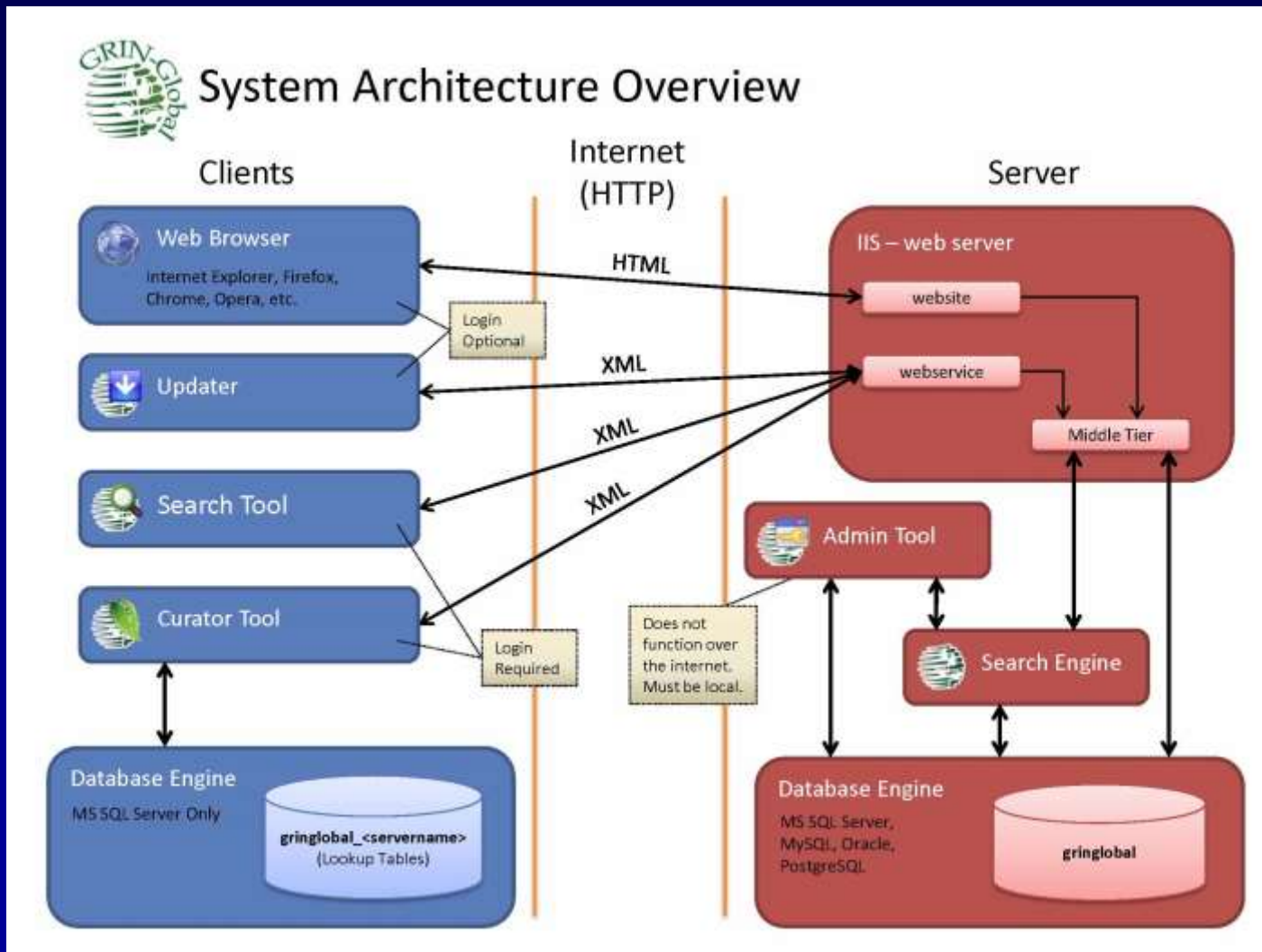
Installation types:

2. Web server (network, on-line access)

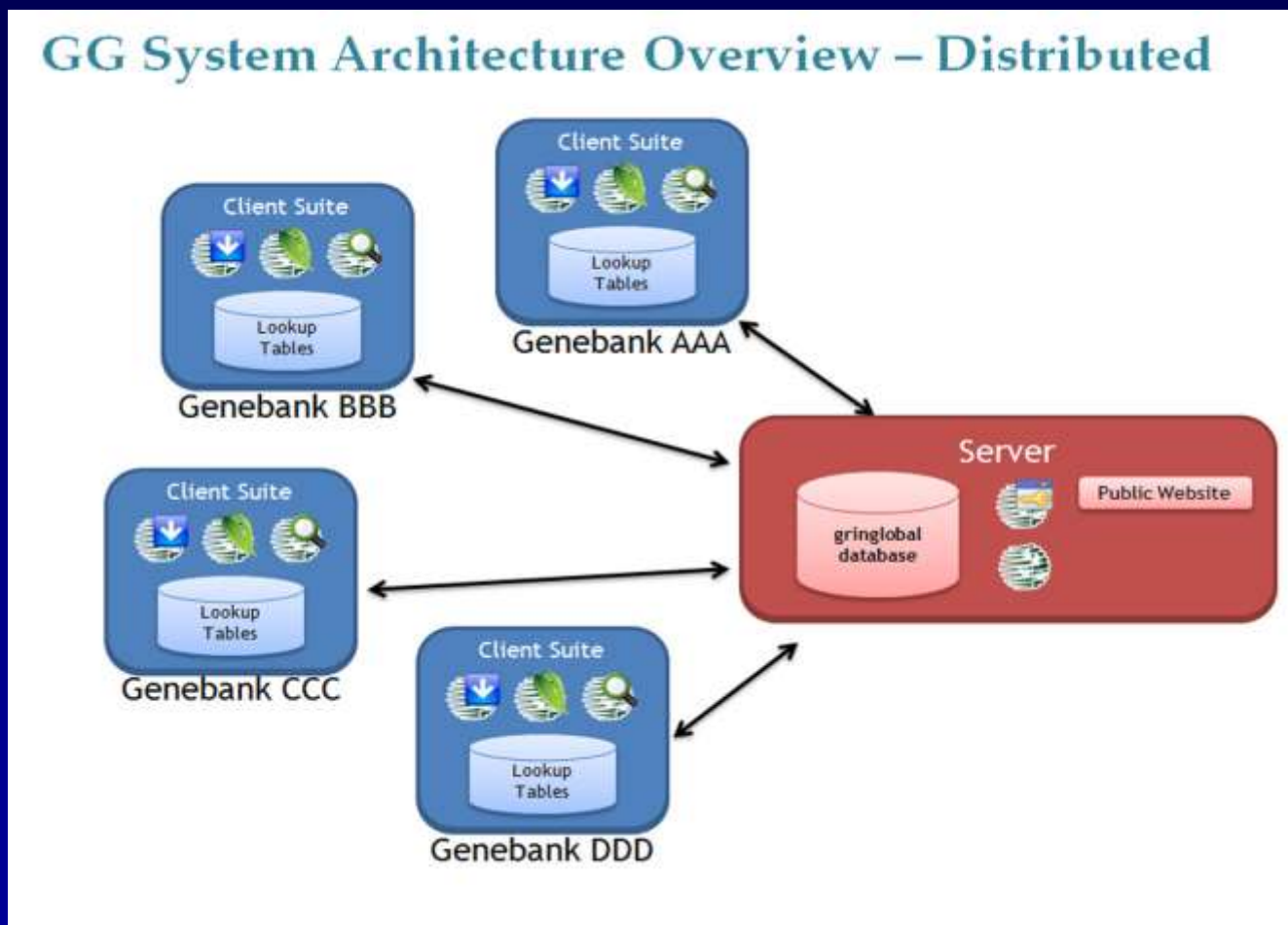
installation of selected components - IIS web service, database engine, web page and administrator tool

client services (client tool, search tool) are installed on local client machines, +database components (lookup tables)

3. GRIN-Global – installation




3. GRIN-Global – installation



3. GRIN-Global – tools



 Installation „Updater“ – user friendly installation (650 MB, re-installation)

 Client „Curator Tool“ – primary/internal user activities - collection curator, genebank staff - data recording, update, knowledge of data structure (Excel)

 „Search Tool“ – orientation and search in datasets

 Administration „Admin Tool“ – internal setup

 Presentation „Public Webpage“ – secondary/external users





3. Installation: Updater



The screenshot shows the GRIN-Global Updater v 2.0.1443.0 application window. The window title is "GRIN-Global Updater v 2.0.1443.0". The address bar shows the URL "http://test.grin-global.org/gringlobal/download/default.aspx". The main interface includes a "Download From Server" dropdown menu with the URL "http://test.grin-global.org/gringlobal/gui.asmx" and a "Use Offline..." button. Below this is a "Check For Server Updates" button. A Windows Start menu is overlaid on the application, showing the "All Programs" button and a list of installed programs. The "GRIN-Global" folder is selected, and its contents are displayed in a list:

- GRIN-Global Updater
- GRIN-Global Curator Tool
- GRIN-Global Search Tool
- GRIN-Global Website (Local)
- GRIN-Global Admin

Below the Start menu, a table displays the status of installed components:

Component	Installed Version	Latest Version	Size (MB)	Status	
GRIN-Global Curator Tool	2.0.3915	2.0.3915	4,94	Current	Uninstall

At the bottom of the application window, there is a "Download / Install" button and a status bar that reads "Checking for new version of GRIN-Global Client...Done".



3. Client / Curator Tool



- **Data processing (input, update, delete) in „Dataview“ regime, forms for data input available in selected data areas**
- **Existing option to correct data under Excel and by mouse “drag and drop” put the updated data set into database**
- **Full data integrity check – mandatory fields**
- **Detailed documentation available (Installation manuals, Data dictionary describing data structure, videos, etc.)**





3. Client / Curator Tool



GRIN-Global v2.0.3915.99662

File Help

Search... Accession Wizard Order Wizard

Show info from: Inst. ID: USDA_ARS

Tab 1 Root Folder

- [-] Rubus
 - [-] R 549298
 - [-] R 549299
 - [-] R 549300
 - [-] R 549301
 - [-] R 549302
 - [-] R 549303
 - [-] R 549304
 - [-] R 549305
 - [-] R 549306
 - [-] R 549307
 - [-] R 549308
 - [-] R 549309
 - [-] R 549310
 - [-] R 549311
 - [-] R 549312
 - [-] R 549313
 - [-] R 549314
 - [-] R 549315
 - [-] R 549316
 - [-] R 549317
 - [-] R 549318
 - [-] R 549319
 - [-] R 549320
 - [-] R 549321
 - [-] R 549322
 - [-] R 549323
 - [-] R 549324
 - [-] R 549325
 - [-] R 549326
 - [-] R 549327
 - [-] R 549328
 - [-] R 549329
 - [-] R 549330
 - [-] R 549331
 - [-] R 549332
 - [-] R 549333

Accession ID	Accession Probe	Accession Number	Accession Suffix	Taxon	Accession Name	Origin	Maintenance Site	Is Core?	Is Backed Up?	Backup Location 1	Backup Location 2	Status
431050	R	549324		Rubus negundo...	14121	Ecuador, Azuay	COR (USA008)	N	N			
431051	R	549325		Rubus sp.	14180	Ecuador, Loja	COR (USA008)	N	N			
431052	R	549326		Rubus sp.	14194	Ecuador, Azuay	COR (USA008)	N	N			
431053	R	549327		Rubus negundo...	14196	Ecuador, Azuay	COR (USA008)	Y	N			
431054	R	549328		Rubus sp.	14224	Ecuador	COR (USA008)	N	N			
431055	R	549329		Rubus urticolus	14225	Ecuador	COR (USA008)	Y	N			
431056	R	549330		Rubus sp.	14226	Ecuador, Tungurahua	COR (USA008)	N	N			
431057	R	549331		Rubus urticolus	14169	Ecuador, Zamora	COR (USA008)	Y	N			
431058	R	549332		Rubus urticolus	14222	Ecuador, Tungurahua	COR (USA008)	N	N			
431059	R	549333		Rubus urticolus	14236	Ecuador	COR (USA008)	Y	N			
431040	R	549314		Rubus flabundus	14139	Ecuador, Loja	COR (USA008)	N	N			
431041	R	549315		Rubus flabundus	14163	Ecuador, Cacha	COR (USA008)	Y	N			
431042	R	549316		Rubus roseus	14099	Ecuador, Napo	COR (USA008)	N	N			
431043	R	549317		Rubus roseus	14074	Ecuador, Imbabura	COR (USA008)	N	N			
431044	R	549318		Rubus roseus	14113	Ecuador, Azuay	COR (USA008)	Y	N			
431045	R	549319		Rubus roseus	14190	Ecuador, Loja	COR (USA008)	N	N			
431046	R	549320		Rubus roseus	14164	Ecuador, Zamora	COR (USA008)	N	N			
431047	R	549321		Rubus roseus	14199	Ecuador, Azuay	COR (USA008)	N	N			
431048	R	549322		Rubus sp.	14077	Ecuador, Imbabura	COR (USA008)	N	N			
431049	R	549323		Rubus sp.	14104	Ecuador, Azuay	COR (USA008)	N	N			
431030	R	549304		Rubus glaucus	None	Ecuador	COR (USA008)	Y	N			
431031	R	549305		Rubus glaucus	None	Ecuador	COR (USA008)	N	N			
431032	R	549306		Rubus glaucus	None	Ecuador	COR (USA008)	Y	Y	NSFL (USA005)		
431033	R	549307		Rubus glaucus	None	Ecuador	COR (USA008)	Y	N			
431034	R	549308		Rubus rubigenus	14030	Ecuador	COR (USA008)	Y	N			
431035	R	549309		Rubus rubigenus	14032	Ecuador	COR (USA008)	Y	N			
431036	R	549310		Rubus rubigenus	14060	Ecuador	COR (USA008)	Y	N			
431037	R	549311		Rubus roseus	None	Ecuador, Azuay	COR (USA008)	N	Y	NSFL (USA005)		
431038	R	549312		Rubus flabundus	14019	Ecuador, Cacha	COR (USA008)	N	N			
431039	R	549313		Rubus flabundus	14096	Ecuador, Cacha	COR (USA008)	Y	N			
431020	R	549334		Rubus bogotensis	14187	Ecuador	COR (USA008)	Y	N			

Data Editing: Edit Data Save Data Cancel

Refresh Data

Row Count = 48

Connected to: http://localhost/GRINGlobal/GUI.aspx





3. Search Tool



Search tool linked to Client tool

The screenshot displays the GRIN-Global Search v2.0.3915.39862 interface. A search window is open, showing search options and results. The search window has a title bar "GRIN-Global Search v2.0.3994.23426" and a search bar with a magnifying glass icon and the text "Search...". Below the search bar, there are tabs for "Basic Query" and "Advanced Query". The "Basic Query" tab is active, showing a "Search Now!" button, a "Limit" dropdown set to "1000", and a "Find:" section with radio buttons for "Accessions", "Inventory", "Orders", and "Cooperators". The "Accessions" radio button is selected. Below the "Find:" section, there is a "Matching" section with radio buttons for "Any Word" and "All Words". The "All Words" radio button is selected. To the right of the search options, there is an "Areas To Search" section with a list of checkboxes: "All Areas", "Accession Area", "Inventory Area", "Order Area", "Crop Trait Area", "Taxonomy Area", and "Other Areas". All checkboxes are checked. Below the search options, there are "Add To Query" and "Clear Query" buttons. At the bottom of the search window, there is a "Showing rows: 0 of 0" indicator and a "Connected to: http://localhost/GRINGlobal/GUI.aspx" status bar.

The background interface shows a table of search results with columns for "Accession ID", "Accession Prefix", "Accession Number", "Accession Suffix", and "Taxon". The table is currently empty, showing "Showing rows: 0 of 0".



3. Administration /Admin Tool



- **User environment administration (users, user groups, access rights, language)**
- **Administration of dataview – more than 300 dataview ready for utilization, in hierarchical order relevant to data area, open creation of new dataview)**
- **„Wizards“ modules for bulk data input**
- **Web page administration module**
- **Detailed documentation available (Administration manuals, User training manuals, videos, etc.)**



3. Administration /Admin Tool



GRIN-Global Admin v 2.1.1816.0 - [Dataviews - localhost\sqlserver - Administrator]

File View Tools Help

localhost\sqlserver > Dataviews

Name	Title	Category	Database Area
accession_lookup	Accession Lookup	Lookups	Lookup Table
accession_name_lookup	Accession Name Lookup	Lookups	Lookup Table
accession_source_lookup	Accession Source Lookup	Lookups	Lookup Table
all_dataview_field_descr...	Dataview Field Descriptions	System	Dataviews
all_dataview_field_titles	Dataview Field Titles	System	Dataviews
all_table_field_descriptions	Table Field Descriptions	System	System
all_table_field_titles	Table Field Titles	System	System
big_cooperator_lookup	Cooperator (Big) Lookup	Lookups	Lookup Table
citation_lookup	Citation Lookup	Lookups	Lookup Table
code_value_id_lookup	Code Value ID Lookup	Lookups	Lookup Table
code_value_lookup	Code Value Lookup	Lookups	Lookup Table
cooperator_group_lookup	Cooperator Group Lookup	Lookups	Lookup Table
cooperator_lookup	Cooperator Lookup	Lookups	Lookup Table
crop_lookup	Crop Lookup	Lookups	Lookup Table
crop_trait_code_lookup	Crop Trait Code Lookup	Lookups	Lookup Table
crop_trait_coded_name...	Crop Trait Coded Name Loo...	Lookups	Lookup Table
crop_trait_lookup	Crop Trait Lookup	Lookups	Lookup Table
feedback_form_lookup	Feedback Form Lookup	Lookups	Lookup Table
feedback_lookup	Feedback Lookup	Lookups	Lookup Table

446 items | Refreshed Dataviews at 3/3/2011 2:18:57 PM



3. GRIN-Global Webpage



The screenshot shows the GRIN-Global website interface. The main heading is "EVIGEZ (GRIN-Global Release 1.0)". Below the heading is a navigation bar with "Search", "Taxonomy", "View Cart", and "My Account". A language selector is set to "English".

The "Shopping Cart" section contains the following table:

Select	ID	Plant Name	Taxonomy	Distribution Amt	Distribution Unit	Form Distributed	Maintained by	
<input type="checkbox"/>	01C0100007	Pyšelka	Triticum aestivum	5	gram	Seed	SYS	Remove
<input type="checkbox"/>	01C0100013	Stupická Bastard	Triticum aestivum	5	gram	Seed	SYS	Remove

Below the table are buttons for "Search for more accessions", "Back to previous page", and "Checkout".

At the bottom of the page are logos for the Global Crop Diversity Trust, Bioversity International, and the USDA, along with a "View disclaimer" link.





3. G-G Data areas

- „Accession“ – passport, „lookup tables“
- „Observations“ – characterization and evaluation, all types of evaluation, image documentation, molecular data, links to literature sources...
- „Inventory“ – storage (uniform structure of tables for all genebank types) – specific dataviews allow to adjust field titles
- „Orders“ – ordering samples by „shopping cart“ procedure, SMTA generating
- Taxonomy – GRIN, separate database, valid records vs. synonyms



4. PGR Documentation in CR

Central documentation –network of 12 institutions – 2 modules:

- 1. User programme EVIGEZ – internal tool, collection curators, genebank staff, 3 data areas, off-line:
 - Passport – MCPD (Multi-crop Passport Descriptors) +add.
 - C&E – crop specific descriptor lists
 - Genebank Storage - Genebank Standards, ISO Database platform FoxPro – since 1994



- 2. PGR Web Catalogue EVIGEZ – external tool
wide public utilization, 2 data areas: passport, C&E
on-line search, NP PGR collections (since 1996)

<http://genbank.vurv.cz/genetic/resources/>

5. Difference G-G vs. EVIGEZ



Data structure in principle different.



Different philosophy: link passport-C&E- storage-
taxonomy

Different coding – possibility to replace G-G coding,
but several tables don't correspond fully.

**GRIN Taxonomy – recommended for EURISCO vs.
used taxonomy**

Basic task: Data migration

5. Difference G-G vs. EVIGEZ



Examples of (solved?) problems:

ID Structure – text string vs. numeric

Table „Cooperators“ level of institution/person - donor, breeder, collector, any participant of action connected with PGR- recipient of sample, author of record... should be included in the lookup table before action
vs. FAO INSTCODE/ACRONYM codes

5. Difference G-G vs. EVIGEZ



Taxonomy structure – GRIN doesn't include all taxa; large species, hardly variety level; EVIGEZ is using variety level which includes a lot of morphology esp. in cereals. Solution -addition of synonyms at sub-species level. (Missing tool for bulk data addition).

Accession name, other number, donor number, collecting number, other designation – 1 separate table with categorization of „names“

Year of acquisition into collection vs. date of record input, „incomplete“ data format

5. Difference G-G vs. EVIGEZ

C&E data structure – EVIGEZ more or less O.K.

Storage data structure - applicable - deep analysis necessary

To be solved:

Storage reports and labels – specific (creation in Crystal Reports) – recommended print via Excel !



Missing EURISCO format generating tool

SMTA automatic generation into ordering part

5. G-G pros and cons

- **G-G table structure designed to small elements allowing adjustment of current system**
- ❖ **G-G primary users(clients) should be deeply informed on database structure and be experienced in Excel**

- **Data processing via dataview – ready „semi-products“**
- ❖ **Hard orientation in large list of dataview (more than 300) – sometimes it is not clear, if user works with „sharp“ data (dataview for update) or if he creates view to datasets**

- **First data input – migration of existing database – ready tools for bulk import - „Wizards“**
- ❖ **Not all Wizards available, demand of „manual“ work – manual data integrity check,...**



5. G-G pros and cons

- **Data input on line via available forms (more than 1 table)**
 - ❖ **Not all forms available, search in large „Lookup tables“ for mandatory fields – without previous implementation into Lookup table impossible to save record**

- **Multi-language versions – translation of field names and titles**
 - ❖ **Translation of all texts including system messages and explanations, changes during development**

- **Very good documentation available – manuals and detailed data dictionary, videos**
 - ❖ **All documentation in English – impossible to translate all texts of voluminous manuals**





5. G-G pros and cons

- **System flexibility**
- Existing structure should be adjusted to the new structure, requested also flexibility of users...
- Options for implementation of all necessary data types and aspects – particularly in C&E area and ordering mechanism
- Low speed of application on local machine
- Waiting for fully functional version G-G 2.0 – deadline postponed repeatedly
- Development of new OS interfere with G-G





5. G-G pros and cons

- **Comprehensive documentation system for genebank management on the current level of technologies, based on long-term experience and sophisticated design – freely available.**
- **Solution of innovation in PGR documentation (network of primary users, on-line access, implementation of all aspects of work with crop collections, all genebank types, web page, PGR ordering)**
- **Recommended particularly for newly starting genebanks and for smaller genebanks with limited means**





5. G-G pros and cons

- **GRIN-Global utilization in CGIAR Centres, Australian GB, South American countries**
- **US project for local G-G deployment - until 2018**
- **Result:**
GRIN-Global benefits predominate over disadvantages, therefore we decided to accept GRIN-Global as a new documentation system for Czech National PGR Programme



Thank you for your attention!

