

Inventory



Revision Date

February 19, 2014

Table of Contents

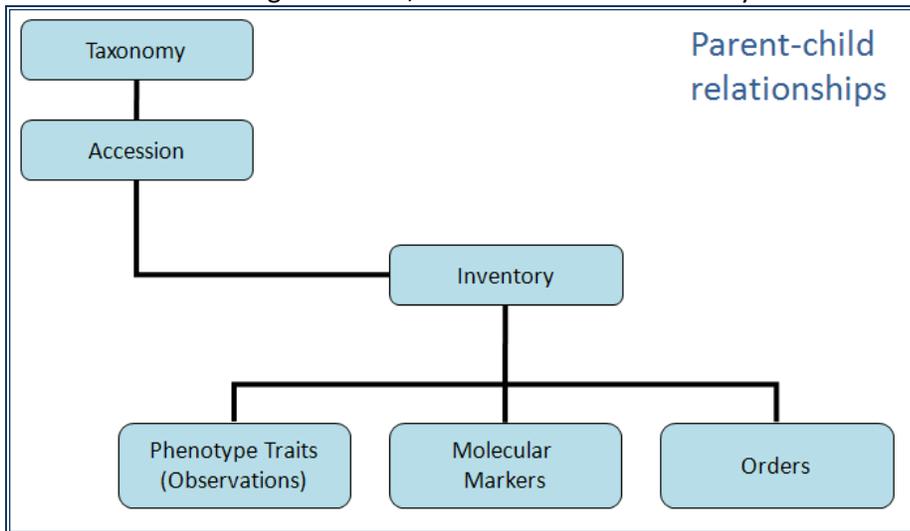
Inventory Overview	2
Prerequisite Data	3
Virtual (System-Generated) Inventory.....	3
What Determines Accession Availability?.....	3
Physical Germplasm	4
Schema Changes	4
Inventory Maintenance Policy	8
Is Auto Deducted?.....	11
Recording New Inventory	11
Inventory Actions	12
Inventory Quality Status	13
Viability Testing	13
Pathology Testing	14
Regenerating Inventory	14

Inventory Overview

A genebank’s goal is the long-term preservation of samples of all accessions maintained in its active collection. The physical stock for each accession is the inventory. Often an accession will have multiple inventory samples. For example, there may be different generations, storage types, locations, sites, etc.

Each Inventory Record has a Parent Accession Record

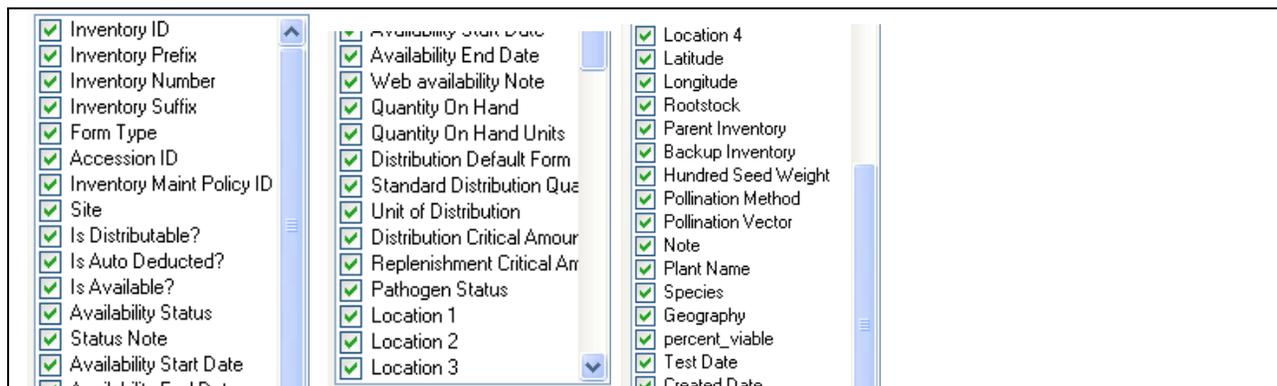
As indicated in the diagram below, in GRIN-Global an inventory record has a parent accession record.



Reading from top down, the diagram is showing the dependencies and parent-child hierarchy among the data. For example, in order to input an accession, the database must first have the relevant taxonomic data. If the accession’s taxon is *Helianthus tuberosus*, that taxon must be in the database first. When inputting the accession information, the GG user does not input the taxon, but rather selects the taxon *Helianthus tuberosus* from a list of taxons. This ensures that the taxonomic data is consistent and avoids typographical errors.

If the taxon is not in the database, then someone responsible for managing the organization’s taxonomy must first add the taxonomy name(s) to their GRIN-Global database before the accession can be added.

The following graphic shows a partial list of the fields that comprise the **get_inventory** “Inventory” data view:



Prerequisite Data

In order to input inventory, you must first have an accession to which the inventory relates. When inputting a new inventory record, there are five required fields:

- accession (the taxonomy and passport information is stored in the parent accession table and its related children tables)
- inventory prefix (in some organizations, because of their organizational requirements, you may be required to input an input number and/or a suffix as well)
- inventory type (In GRIN-Global, the Code Group used to store the inventory type is called GERMPASM –FORM) For example, some of the germplasm form codes include BD (Budwood), CT (Cutting), PL (Plant), SC (Scion), and SD Seed. (Each organization can edit the code list to meet their organizational needs.)
- [inventory maintenance policy](#) (a method for assigning a name to a rule for handling orders. For example, the rule can indicate how many units (propagules) the genebank site will distribute for an order of a given taxon and germplasm form.)
- availability status –must be one of the INVENTORY_AVAILABILITY_STATUS Code Group values in the Code Value table.

Virtual (System-Generated) Inventory

In addition to the physical inventory, GRIN-Global maintains a system-generated inventory record for each accession. This software-generated inventory record is not physical inventory. In GRIN-Global these system-generated inventory records are always denoted with a ** for their Inventory Type (as contrasted with Seed, In-vitro, etc.). These system-generated inventory records are used by GG so that child records can be associated generally to the accession rather than to specific physical inventory.

What Determines Accession Availability?

In the GRIN-Global Public Website, germplasm requestors can search for germplasm in the system. The Public Website is designed to show germplasm accessions and observations related to the accessions. On the Public Website, the accessions will be listed with either “Add to Cart” or “Not Available” indicators.

<input type="checkbox"/>	Group By: Plant ID	Plant Name	Taxonomy	Origin	Material	Maintained By	Availability	
<input type="checkbox"/>	PI 595504	TRHRG 116	Solanum stoloniferum	Mexico	In-vitro Tuber	NR6	Add to Cart	
<input type="checkbox"/>	Q 26535	TRHRG 005	Solanum stoloniferum	Mexico		NR6	Not Available	
<input type="checkbox"/>	Q 26536	TRHRG 006	Solanum stoloniferum	Mexico		NR6	Not Available	

The accession is considered available when it has a related inventory record with two fields selected – **Is available?** and **Is distributable?**. (The germplasm requestor doesn’t see these fields on the Public Website – in the Curator Tool, the genebank personnel responsible for the inventory edits the inventory records. In order for the germplasm to be listed on the Public Website as available, both fields must be selected (Value = “Y”). In the Curator Tool, in Edit mode, selecting these fields (checking the box) inputs a “Y” value in the field; an unchecked box contains an “N.”



The Order Wizard will automatically highlight inventory to fill the order. As mentioned, the inventory must have both fields (**Is Distributable?** and **Is Auto Deducted?**) set to “Y.” What happens when there are potentially multiple inventory that could fill the order? The database software uses its internal rules to highlight one of the possible inventory choices. A user can easily override that choice and select another from the list. In the Order Wizard’s Inventory Picker window, the user can select a different row in the grid, or input information in the three boxes at the top: (**Accession Number**, **Accession Name**, or **Taxonomy**).

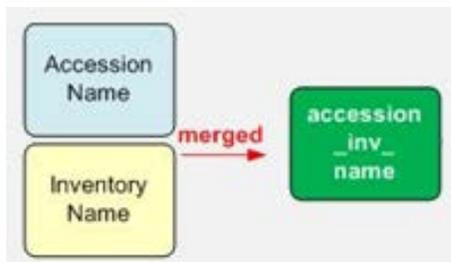
	Inventory Prefix	Inventory Number	Inventory Suffix	Inventory Type	Site	Inventory Maintenance Policy	Is Distributable?	Is Available
	Mar	11121301	rei	**	DBMU	SYSTEM	N	N
▶	Mar	11121301	rei	SD	DBMU	MAR	Y	Y
	Mar	11121301	rei	TC	DBMU	MAR	Y	Y
	Mar	11121301	rei2	SD	DBMU	MAR	Y	Y

Physical Germplasm

The Inventory tables store data about physical germplasm –what form the germplasm is stored, where it is stored, quantities on hand, etc. The GRIN-Global database has approximately 10 inventory related tables and the Curator Tool has approximately the same number of Inventory dataviews. Each table serves a particular function. For instance, the **Inventory Maintenance Policy** table stores the rules for how inventory is distributed and the **Inventory Viability** table stores data about viability.

Schema Changes

Beginning with GG Release 1.5., the schema takes advantage of the fact that every accession always has at least one associated inventory record. In 1.5, the inventory and accession *name* tables are merged into one table. (In 1.0, there was an accession_name table as well as an inventory_name table.) Beginning with 1.5, the two name tables have been merged since a “Name” record can be associated with either the system generated inventory record, hence applying to the accession in general, or can be associated with a specific inventory record.



The table names that incorporate both accession and inventory as part of their name such as accession_inv_name can relate to either an accession by its system-generated inventory record or to real, physical inventory records

Default System-Generated Inventory Records

By design, every Accession record has at least one system-generated inventory record associated with it. When a user creates an accession record, this default inventory record is automatically generated.

These default inventory records are always designated with a ** indicator for the **Inventory Type** field:

Inventory ID	Inventory Prefix	Inventory Number	Inventory Suffix	Inventory Type	Accession	Inventory Maintenance Policy	Inventory Maintenance Site
1046743	PI	537000	.01	PL	PI 537000	Malus	GEN
1046744	PI	537000	.02	PL	PI 537000	Malus	GEN
2207057	NSSL	366612	51	BD	PI 537000	CRYO	NSSL
2451162	PI	537000	.03	PL	PI 537000	Malus	GEN
2451164	PI	537000	.04	PL	PI 537000	Malus	GEN
2626982	PI	537000	.05	PL	PI 537000	Malus	GEN
2626983	PI	537000	.06	PL	PI 537000	Malus	GEN
4431936	PI	537000		**	PI 537000	SYSTEM	GEN

Required Fields

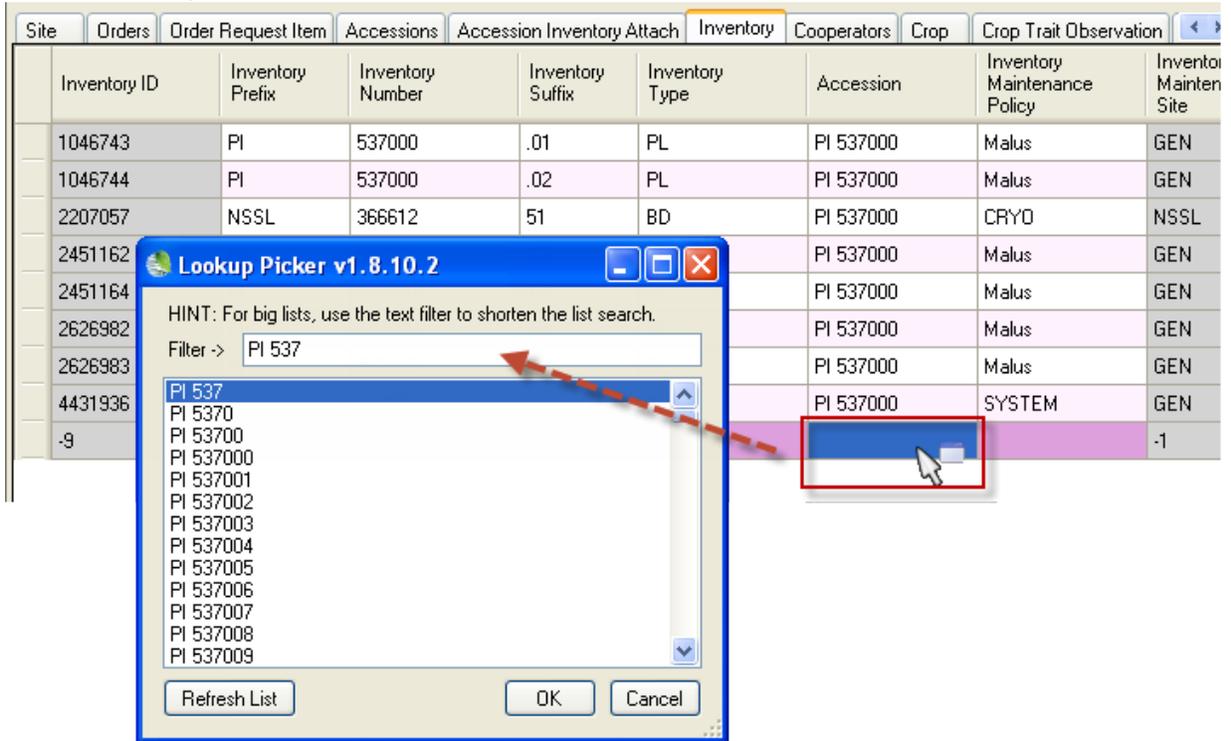
Although the **Inventory** dataview has many fields, only a few are required. (Records can be saved only if their required fields are filled.) In Edit mode it is easy to determine what fields are required since they are displayed with a violet color. The different colors provide a visual clue: required fields are violet, gray fields cannot be edited (in the current dataview), and fields that allow editing, but which are not required, are blue.

Required:

- Accession ID
- Inventory Prefix, Number, and Suffix must be a unique combination
- Form Type
- inventory Maintenance Policy
- Availability Status

Accession ID

Since every inventory record has a parent accession record, an accession ID must be selected from the accession lookup list:



Inventory Prefix, Number, Suffix, and Inventory Type

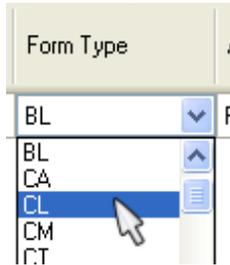
Each inventory record must have a unique key – that is, the combination of the **Inventory Prefix**, **Number**, **Suffix**, and **Inventory Type** must be unique in the database. Sites create their own naming conventions to satisfy their operational needs. Note that the Inventory Name (Prefix, Number, and Suffix) does not need to match the Accession Name (and usually doesn't).

Examples of Inventory Names (from National Plant Germplasm System (NPGS) Sites)

Accession	Inventory
PI 597892	PI 597892 91ncai01 SD – the suffix, 91ncai01 is used by this site in a very site-specific manner. Without going into all of the details, the first two digits in the suffix represent the year the material was received or grown or bulk created; the last two digits, “01,” indicate that this is the first increase lot of the year 1991. The two letters are the germplasm form code – SD is the code used by NPGS for seed.
GMAL 274	GMAL 274 .a SG – the G is for Geneva, MAL for Malus. The 274 was a number assigned in a numeric order as the new variety came in. Suffixes with an .a or .b were germinated from an original seed lot. A .01 or .02 etc., indicates a clone (a tree number). The two letters are the code for the germplasm form type– SG is seedling.
PI 554670	CVAC 799 .000 SD and CVAC 799.001 PL – the site has two inventory forms for this accession, seed (SD) and plant (PL).

Form Type

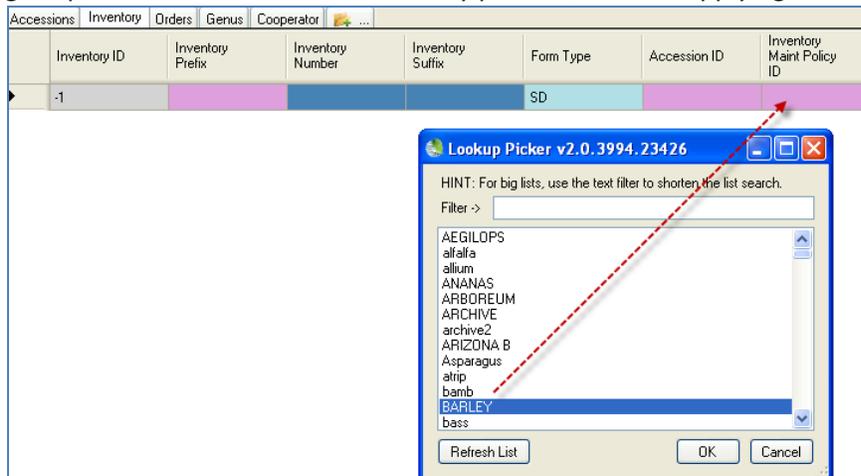
The **Form Type** is a dropdown field that gets its data from the code values stored in the **GERMPLASM_FORM** code group. In the case of a required field with a dropdown or a lookup window, you must select one of the entries. This ensures data integrity and prevents typos and other misspellings.



The GG administrator can add or edit the **GERMPLASM_FORM** code values to meet the needs of the organization. (The U.S. NPGS used two-letter codes in their GRIN system so the codes as shown here are a carry-over; however, an organization implementing GRIN-Global most likely will use more descriptive codes.)

Inventory Maintenance Policy

Inventory maintenance policies are created and used by the sites responsible for maintaining the germplasm. A site will often have many policies, used for applying to various taxa or germplasm types.



Therefore, collectively the organization may have many such policies. Policies can be shared across the organization, but remember that when a new inventory record is created, the **Curator** field in the **Inventory Maintenance Policy** record determines the owner of the inventory record when the Inventory Maintenance Policy is applied to a new inventory record. Therefore it is important that a site use the appropriate Inventory Maintenance Policy

Purpose of the Policies

Basically, an inventory maintenance policy determines how inventory will be processed for incoming germplasm orders that will use that inventory. The policy indicates the germplasm form to be distributed and other parameters. The policy sets defaults for a number of inventory columns that would be tedious to remember when entering individual inventories:

- the standard amount of germplasm to be distributed (the default units and type – e.g. 50 grams of seed)
- critical replenishment and distribution levels
- whether the inventory will be automatically deducted when an order is filled
- the curator – which in turn determines ownership for all inventory records created under the maintenance policy

When creating a new inventory record, the **Inventory Maintenance Policy** field is a required field. Since this is a required field for inventory records, the inventory maintenance policy must be created before the inventory record is created.

Impact on Orders

The **Inventory Maintenance Policy** is especially useful when orders are filled. The Order Wizard applies the fields in the policy for the inventory that is assigned to the order. When processing orders, genebank personnel can override the defaults specified by the policy “rule.” For example, a policy can be established to indicate “each order for Maize accessions will receive 50 seeds” or, alternatively by weight (“each order will receive 5 grams of seeds”).

An organization can create as many maintenance policy rules as needed for their unique situation, and assign each inventory maintenance policy a name in the **Inventory Maintenance Name** data view. Sites can copy an existing policy, modify it to suit their specific needs including the appropriate owner, and then save the policy under a new name.

Inventory policy records are added in the Curator Tool via the **Inventory Maintenance Policy** dataview .

Inventory Maint Policy ID	Maintenance Name	Form Type	Unit of Quantity On Hand	Web Availability Note	Is Auto Deducted?	Distribution Default Form
1	[Null]	[Null]	[Null]		<input type="checkbox"/>	[Null]

Alternatively, GRIN-Global administrators can use the Admin Tool’s Import Wizard to bulk load an organization’s Inventory Maintenance Names.



The **Inventory Maintenance Policy** determines the owner of the Inventory record. The owner of the **Inventory Maintenance Policy** owns the **Inventory** record.



Use a consistent naming convention when naming your policies. For example, begin with a prefix, such as your site’s code (examples: NC7-daucus, NC7-portulaca, NC7-quinoa...) One big advantage then is you can search for all of your policies by specifying the prefix in your search criteria:

Search Now! Limit: 500

Find: Default inventory_maint_policy

Matching: Any Word All Words List of Items

@inventory_maint_policy.maintenance_name LIKE 'nc7%'

Add To Query Clear Query

Accessions	Inventory	Inventory Maintenance Policy	Orders	Cooperators	Name Group	Accession
		nc7*				
Inventory Maint Policy ID	Maintenance Name	Form Type	Unit of Quantity On Hand	Web Availability Note		
199	NC7-mellilotus	SD	count			
200	NC7-null	SD	packet			
201	NC7-perilla	SD	count			
202	NC7-quinoa	SD	count			
203	NC7-sup.cults	SD	count			

Availability Status

The **Availability Status** field obtains its values from the **INVENTORY_AVAILABILITY_STATUS** Code Group. By searching this field, you can look for specific inventory situations, such as low inventory, young plants not available, etc.

Is Available?	Availability Status	Status Note	Availability Start Date
<input type="checkbox"/>	Removed from collection		
<input type="checkbox"/>	Removed from collection		
<input type="checkbox"/>	Low inventory	BASE	
<input type="checkbox"/>	Removed from collection		
<input type="checkbox"/>	Removed from collection		
<input checked="" type="checkbox"/>	Available		
<input type="checkbox"/>	Removed from collection		
<input type="checkbox"/>	No lot present		
<input type="checkbox"/>	Added to the distribution sample		
	<ul style="list-style-type: none"> Added to the distribution sample No definition code Avai Available to send In-Vitro backup plant Backup sample BKUP code No definition code CHEC Accession discontinued code CL Accession discontinued code CL 		

Is Auto Deducted?

This TRUE/FALSE flag indicates whether the **Quantity On Hand** amount is debited when the order item for this sample is shipped.

For information about other inventory fields, refer to the [online data dictionary](#).

Recording New Inventory

As mentioned in the [Inventory Prerequisites](#) section, when adding a new inventory record, there are required fields that must be supplied with data.

Each physical inventory should have its own record. Seed genebanks will most likely have multiple lots for one accession – each lot should have its own respective inventory record. The physical germplasm is identified with its PI number (the Accession identifier), date of harvest, the seed lot produced, the parental lot, and other information – this information is inputted into GRIN-Global via the inventory and the **accession_inv** dataviews. Clonal sites will typically create one inventory record for each clone, and assign each clone an inventory number.

Tax Species	Cooperators	Accessions	Crop	Crop Trait	Observations	Inv. Group Map	Inv. Viability	Inv. Maint. Policy	Inventory Viability Data
		Crop Trait Observation ID	Accession	Inventory	Crop	Crop Trait	Crop Trait Code Value	Crop Trait Value Code	
		7389338	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	BRIX			
		7389339	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	EATQUALITY	9 - Extremely high	1	
		7389340	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	FLESHCHAR			
		7389341	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	FLESHCOLOR	9 - Excellent (Mo...	1	
		7389342	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	FRTFLAVOR			
		7389343	DPRU 2380	DPRU 2380 0000A_2 PL	APRICOT	FRTLENGTH			
		7389344	DPRU 2380	DPRU 2380 0000A_2 PL					
		7389345	DPRU 2380	DPRU 2380 0000A_2 PL					
		7389347	DPRU 2380	DPRU 2380 0000A_2 PL					
		7389348	DPRU 2380	DPRU 2380 0000A_2 PL					
		7389351	DPRU 2382	DPRU 2382 0000A_2 PL					
		7389352	DPRU 2382	DPRU 2382 0000A_2 PL					
		7389353	DPRU 2382						
		7389354	DPRU 2382	DPRU 2382 0000A_2 PL					
		7389355	DPRU 2382	DPRU 2382 0000A_2 PL					

Inventory Actions

The **inventory_action** dataview refers to the actions performed on the inventory while it is at a repository. It includes initial receipt of the material, verification, transfer, back-up, regeneration, repackaging, etc. The inventory action records provide a history and a means for tracking any activities regarding the inventory lot. In some cases, the inventory action record may hold information about an event before the final results are obtained, such as a germination test or pathogen test.

The dataview uses **INVENTORY_ACTION** codes which the GG administrator can edit or add as needed to meet an organization's practices. The Codes' **Titles** display in the dropdown for the Action Name:

Inventory Action ID	Inventory	Action Name	Action Date	Date Format	Quantity
782548	PI 435094 t80i SD	Received	09/01/1979	Complete date	
285878b	PI 435094 01 SD	Date sample placed in -18 C storage.	09/01/1979	Complete date	
3186232	PI 435094 01i SD	Planted	2001	Year only	
3186233	PI 435094 01i SD	Harvested	2001	Year only	
3212364	PI 435094 79o SD	Receive date of a previous NPGS site	09/01/1979	Complete date	
3213100	PI 435094 79o SD	Transferred to our station	04/18/2004	Complete date	18.63730
-18	PI 435094 79o SD	Backed Up		[Null]	

Examples of Inventory Actions

Inventory	Action Name	Action Date
PI 435094 79o SD	Receive date of a previous NPGS site	09/01/1979
PI 435094 79o SD	Inventory seed counts on this date	03/24/2000
PI 435094 79o SD	Grams on hand at this date	03/24/2000
PI 435094 79o SD	Transferred to our station	04/18/2004

Inventory	Action Name	Action Date
Ames 19293 92ncai01 SD	Harvested	10/8/1992 1:37 AM
Ames 19293 92ncai01 SD	Stored by storage or curatorial staff	9/23/1994 5:05 PM
Ames 19293 92ncai01 SD	Pulled for planting	5/11/1998 4:40 PM
Ames 19293 92ncai01 SD	Image obtained with scanner	5/18/1998 5:45 AM
Ames 19293 92ncai01 SD	Sample bulked with another to a new lot	3/21/2000 1:28 PM

Inventory Action ID	Inventory	Action Name	Action Date	Date Format	Quantity	Units	Form
3361952	PI 503568 08ncai01 SD	Planted	05/16/2008	Complete date	120.00000	count	SD
3384867	PI 503568 08ncai01 SD	Count of plants in regeneration plot	06/20/2008	Complete date	107.00000	count	PL
3411962	PI 503568 08ncai01 SD	Count of plants in regeneration plot	07/03/2008	Complete date	91.00000	count	PL
3423705	PI 503568 08ncai01 SD	Harvested	10/16/2008	Complete date	1.00000	packet	SD
3558597	PI 503568 08ncai01 SD	Image obtained with scanner	09/02/2009	Complete date	4.00000	count	ER
3561134	PI 503568 08ncai01 SD	Image obtained with scanner	09/15/2009	Complete date			SD
3564379	PI 503568 08ncai01 SD	Number sampled in a balanced sample	09/09/2009	Complete date	13.00000	count	ER
3564380	PI 503568 08ncai01 SD	Number Sampled Unequally	09/11/2009	Complete date	13.00000	count	ER
3564381	PI 503568 08ncai01 SD	Cleared for seed storage	09/25/2009	Complete date			
3604212	PI 503568 08ncai01 SD	Stored by storage or curatorial staff	12/21/2009	Complete date	1435.00000	count	SD
3604213	PI 503568 08ncai01 SD	Date lot made available	12/21/2009	Complete date	1435.00000	count	SD
3605112	PI 503568 08ncai01 SD	Date distribution increase from germ.	12/24/2009	Complete date	1435.00000	count	SD



Besides the inventory actions dataview, there is also an **accession_action** dataview which generally displays data pertaining to actions performed on an accession. Accession actions in GRIN (Classic) were created not only for actions done on an accession as a whole, but to keep information on how the accession was being handled, treated, documented, etc. The **accession_action** data evolved from the inactivation process where there is a need to document that the accession died, include details, but not display the details to the public. In the NPGS, the use of accessions actions has also been used to document the passport review process which is difficult to do in one sitting, but can be done over time. The actions can be used to indicate what has and has not been reviewed.

Inventory Quality Status

The **Inventory Quality** dataview uses the pathogen tests table containing the results for an inventory sample. These results can be either individual test results or summary results from a group of tests.

There are five primary drop downs used by the **Inventory Quality** dataview. These dropdowns use codes stored in the Code Groups (maintained by the GG administrator):

- PATHOLOGY_TEST_TYPE
- PATHOLOGY_TEST
- GERMPASM_FORM
- PATHOLOGY_TEST_RESULT
- PATHOLOGY_TEST_SCORE_TYPE

If any pathology-test related codes are not in the database, contact the GG administrator to include them.

Viability Testing

The **Inventory Viability** dataview accesses the table of the results of seed germination tests and any other tests of viability. Actual test procedures are contained in the method table. There are three related dataviews in the Curator Tool: **Inventory Viability**, **Viability Rule**, and **Viability Data**. Eventually

the “data” dataview will be aggregated by the Viability dataview, but at the present time these dataviews are unrelated. (A trigger needs to be created.)

[tbd -jesse]

Viability testing is done when? ... in other words, what determines when (what guidelines are being followed?)

Pathology Testing

Pathology testing is done when? ... in other words, what determines when (what guidelines are being followed?)

Regenerating Inventory

In planning for seed regeneration, site manager/curators consider population size, method of pollination, compatibility factors, presence of seed-borne pathogens or pests, susceptibility to indigenous pests, and risks of gene flow or other factors that complicate efforts to maintain germplasm true-to-type.

There are multiple steps in GRIN-Global to be followed when a genebank regenerates their inventory. The first step of course is to determine what inventory is low.

Search for Low Inventory

Search for your inventory maintenance polices and low amounts of germplasm:

Example:

```
@inventory_maint_policy.maintenance_name LIKE 'nc7%' AND  
@inventory.is_distributable = 'Y' AND  
@inventory.is_available = 'N' AND  
@inventory.availability_status_code = 'LOW'
```

Add Low Inventory Items to the Order Wizard

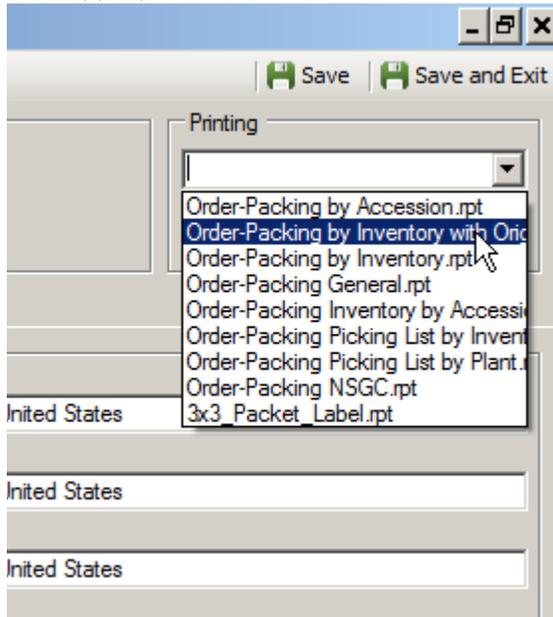
Drag the search results to a spreadsheet. Use whatever criteria you consider necessary and prioritize the inventory which you intend to increase. One way to prioritize is to add a **Priority** column in your spreadsheet and then use a scale to manually rate the priority.

Create regeneration orders. One method is to drag records from the spreadsheet into the Order Wizard – start a new order; use the red + button, indicate a recipient, change the **Order Type** to

Replenishment/regrow:

Order					Actions	Web Orders
Ordered Date	Owner Site	Order Type	Original Order	Final Recipient		
1/3/2014	DBMU	Replenishment/reg				
Local Number		Completed Date	Order Obtained Via	Requestor		
Intended Use		Intended Use Note		Ship To		
[Null]						

Select an appropriate Order List from the **Print** dropdown:



Click the **Shipped All Remaining Items...**

Establish New Inventory Records

Drag the order request Items from the Order Wizard into Excel – clear out **Location** and the **Suffix** fields and assign the new inventory a new suffix name corresponding with your site’s naming conventions.

([Examples](#))

Inventory that results from regeneration efforts needs to reflect its parent inventory:

Get Genetic Observation		Accession Source		Inventory		Inventory Maintenance Policy		Inventory Action		Orders	Order Request Item	Cooperators	Crop	Citation	A
Inventor ID	Inventory Prefix	Inventory Number	Inventory Suffix	Inventory Type	Accession	Inventory Maintenance Policy	Inventory Maintenance Site	Is Distributable?	Is Auto Deducted?	Is Available?	Parent Inventory				
28155...	PI	503568	08ncal01	SD	PI 503568	NC7-maize.pop	NC7	Y	Y	Y	PI 503568 86ncab01 SD				