Introduction to GGCE

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GRIN-Global Workshop for European Genebanks

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CROP TRUST

Genebank operations

Management

Acquisition **Distribution**

Acquisition:

- Collection
- Donation

Management:

- Monitoring (health, quantity, quality)
- Multiplication/Regeneration
- Characterization
- Safety duplication

Distribution:

- Internal
- External: National/International

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IT for genebank data and operations

Central genebank database

- Data is in one place
- Data is available to all staff
- Validity: Enforces data constraints
- Security: Access controls
- Safety: Data is backed up

Genebank information system

- Provides support to operations
- Manage and maintain all data about every plant genetic resource in the genebank
- Make available current and accurate data to curators, technicians and users
- Data across all genebank activities are *immediately* recorded
- Assist curators and managers in prioritizing activities

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Why GRIN-Global **Community Edition?**

Our analysis of GG adoption in 2018 showed that genebanks are focusing on the *Public Website* and passport data, instead of using GG for management and tracking of individual accession inventories and their status. CT is also not a convenient tool for use in daily operations (e.g. lacking barcoding support, too much Excel integration).

We need a **next-generation** solution that provides user-friendly tools to technicians, while maintaining database compatibility with GG.

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Aging architecture of GG

Hosting: GG architecture did not change since it was designed 10 years ago. GG requires a Windows Server and IIS to run.
We wanted a system that can be deployed on Windows, Linux and macOS servers, with automated database upgrade scripts.

Users: CT is only available on Windows and requires installation of extra software components (MSSQL Express, ...)
The system must be accessible from PCs, tablets and mobile phones. The system must provide intuitive and tailored user interfaces for day-to-day genebank operations.

Support **for developers**: GG does not offer intuitive API for developing extensions.
The system must provide intuitive business logic endpoints that help developers develop new features.

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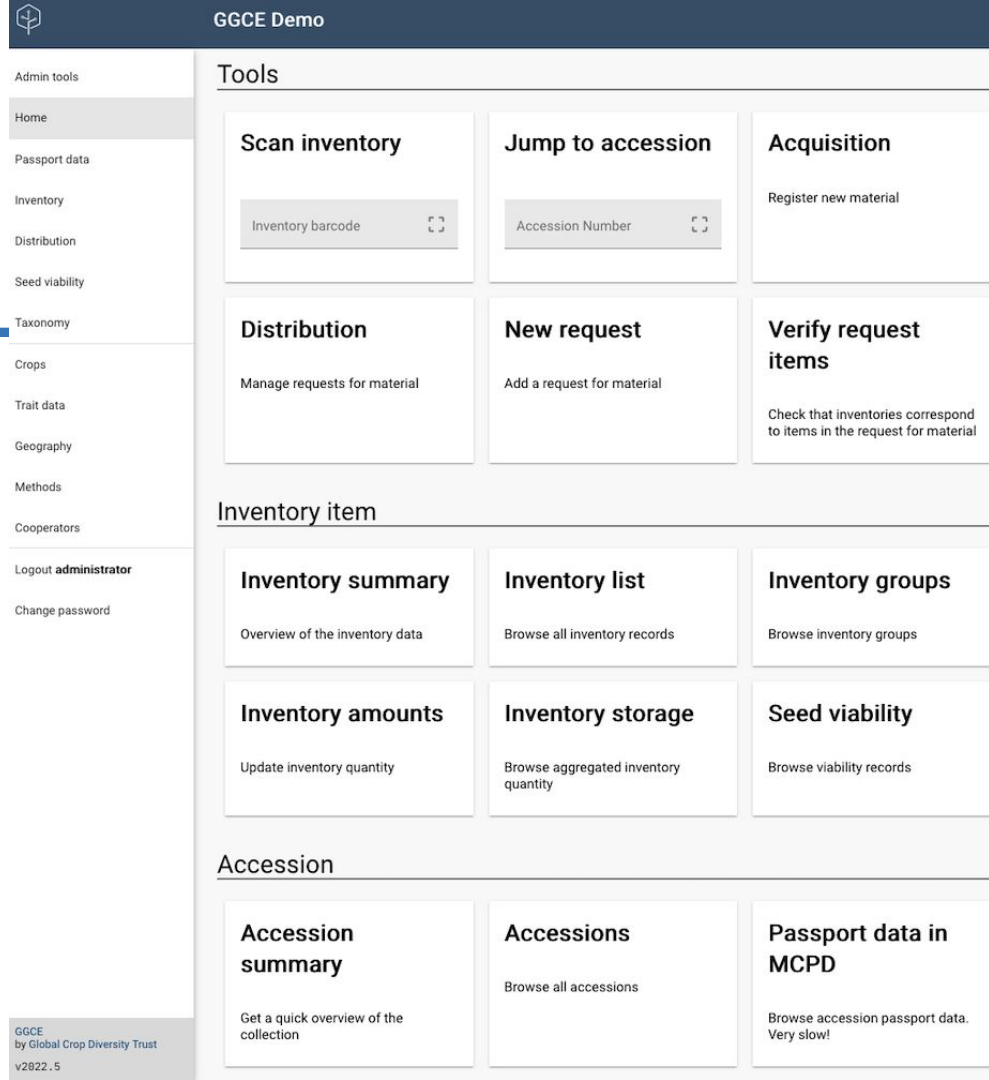
GGCE Vision

- GGCE aims to provide a complete genebank collection management solution.
- GGCE enables all genebank staff to **capture and make use of data across all genebank operations.**



GGCE Mission

- **Manage and maintain data of every plant genetic resource in the genebank collection**
  - Each sample/item in genebank PGR inventory is individually tracked.
- **Assists curators and managers in prioritizing activities**
  - Enable for scheduling and planning of when specific actions will be performed
  - Allows for anticipating periods of high/low activity
  - Avoid future backlogs
- **Make available current and accurate data to curators and technicians**
  - Enable informed decision making

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GGCE Objectives

- **Simple** to access and available in **your language**

Tablets

Personal computers

Cel. phones

Mobile devices

- Supports the use of different **IT gadgets**

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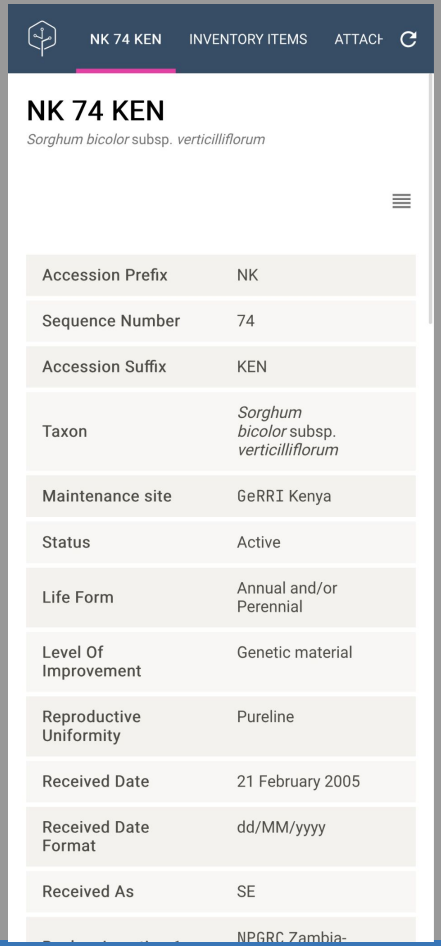

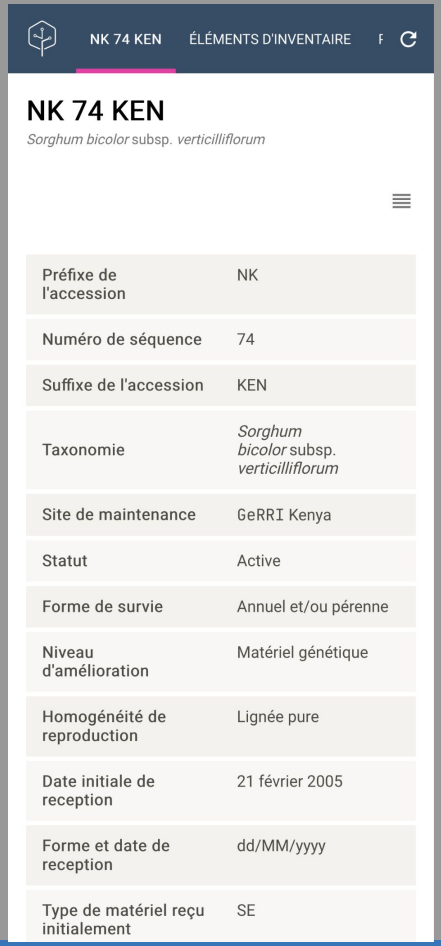

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GGCE is available in English, French, Arabic, Spanish and Chinese

GGCE and external systems

- **Assign DOI to genebank material**
  - Integration with Plant Treaty's **DOI Registration Service** to mint DOI for accessions
- **Standard passport data exchange format**
  - Export data in **MCPD**
  - Passport data can be directly uploaded from GGCE to Genesys
- **FAO WIEWS**
  - Retrieve institute information using FAO WIEWS APIs

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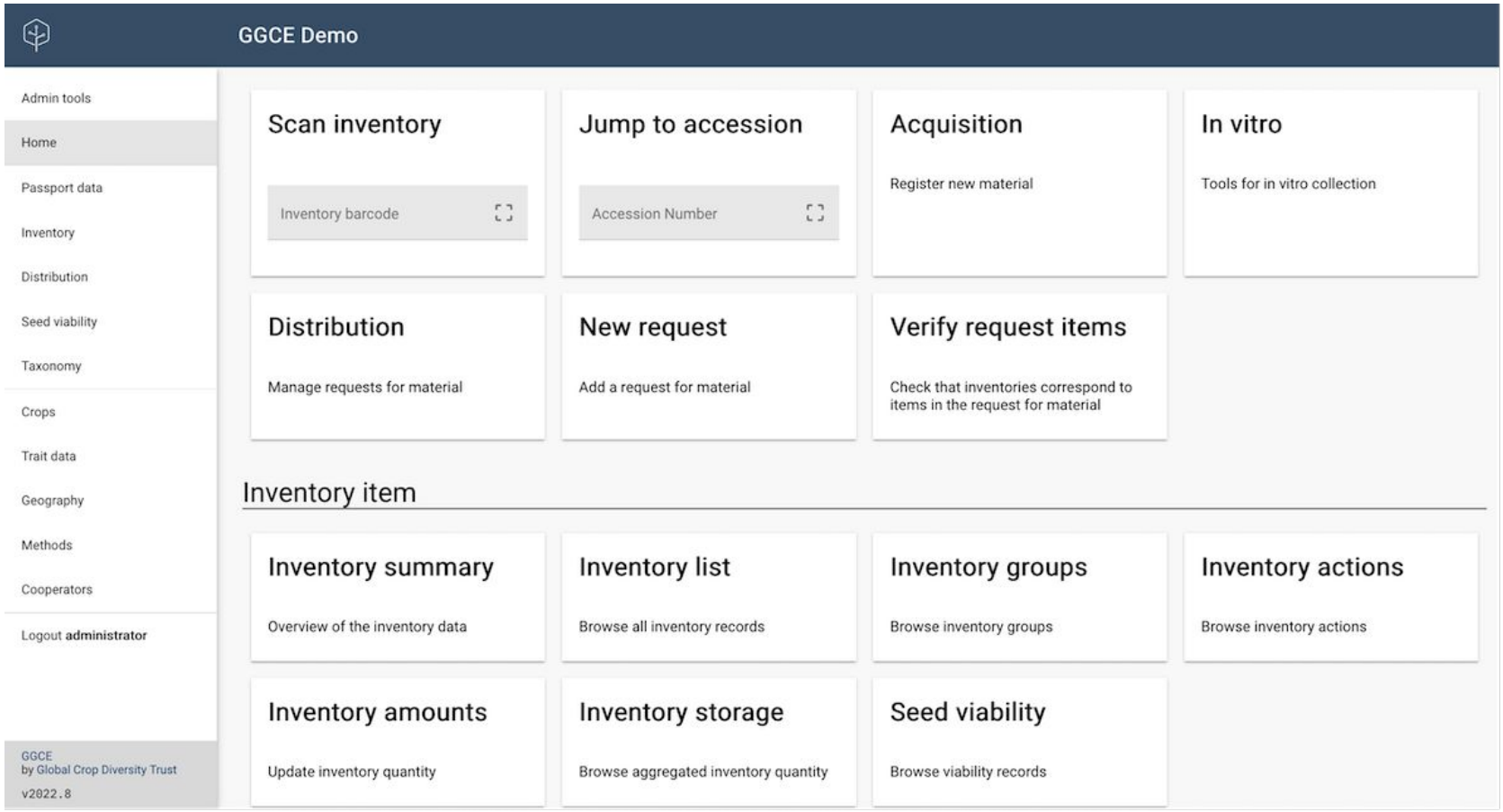
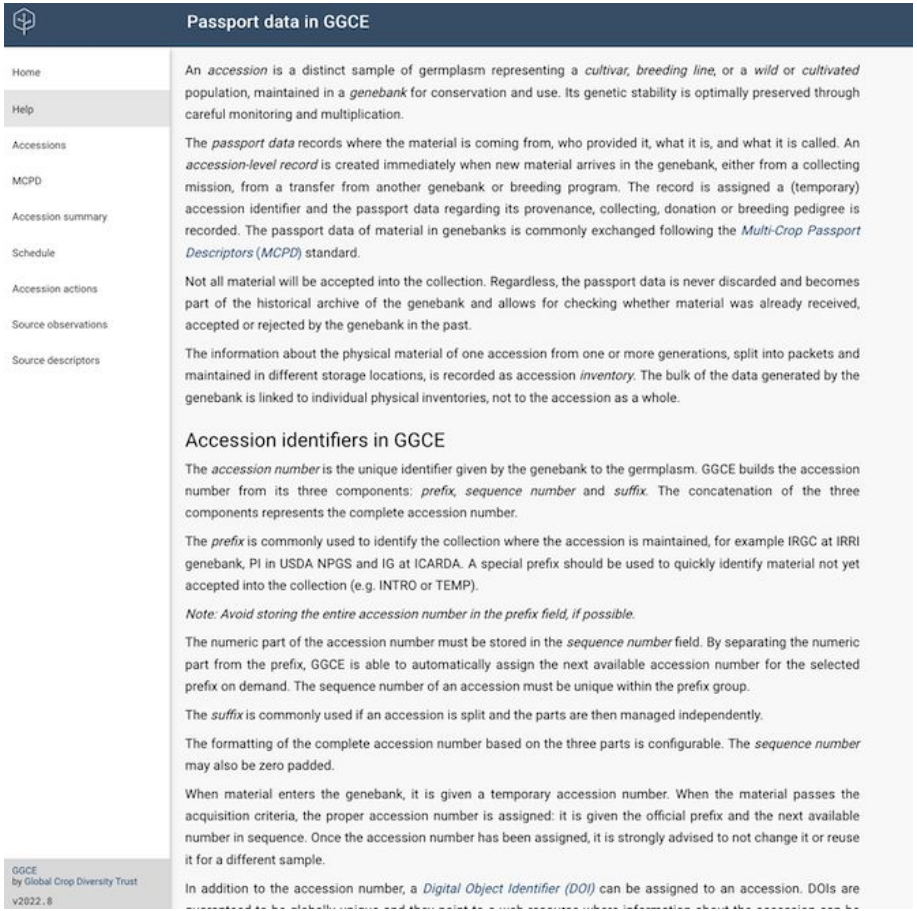
GGCE

GRIN GLOBAL COMMUNITY EDITION


GGCE Demo
Admin tools
Home
Passport data
Inventory
Distribution
Seed viability
Taxonomy
Crops
Trait data
Geography
Methods
Cooperators
Logout administrator
GGCE
by Global Crop Diversity Trust
v2022.8
Scan inventory
Inventory barcode
Jump to accession
Accession Number
Acquisition
Register new material
In vitro
Tools for in vitro collection
Distribution
Manage requests for material
New request
Add a request for material
Verify request items
Check that inventories correspond to items in the request for material
Inventory item
Inventory summary
Overview of the inventory data
Inventory list
Browse all inventory records
Inventory groups
Browse inventory groups
Inventory actions
Browse inventory actions
Inventory amounts
Update inventory quantity
Inventory storage
Browse aggregated inventory quantity
Seed viability
Browse viability records

Dashboard



Passport data in GGCE

Home
Help
Accessions
MCPD
Accession summary
Schedule
Accession actions
Source observations
Source descriptors

GGCE
by Global Crop Diversity Trust
v2022.8

An *accession* is a distinct sample of germplasm representing a *cultivar, breeding line,* or a *wild* or *cultivated* population, maintained in a *genebank* for conservation and use. Its genetic stability is optimally preserved through careful monitoring and multiplication.

The *passport data* records where the material is coming from, who provided it, what it is, and what it is called. An *accession-level record* is created immediately when new material arrives in the genebank, either from a collecting mission, from a transfer from another genebank or breeding program. The record is assigned a (temporary) accession identifier and the passport data regarding its provenance, collecting, donation or breeding pedigree is recorded. The passport data of material in genebanks is commonly exchanged following the *Multi-Crop Passport Descriptors* (*MCPD*) standard.

Not all material will be accepted into the collection. Regardless, the passport data is never discarded and becomes part of the historical archive of the genebank and allows for checking whether material was already received, accepted or rejected by the genebank in the past.

The information about the physical material of one accession from one or more generations, split into packets and maintained in different storage locations, is recorded as accession *inventory*. The bulk of the data generated by the genebank is linked to individual physical inventories, not to the accession as a whole.

Accession identifiers in GGCE

The *accession number* is the unique identifier given by the genebank to the germplasm. GGCE builds the accession number from its three components: *prefix, sequence number* and *suffix*. The concatenation of the three components represents the complete accession number.

The *prefix* is commonly used to identify the collection where the accession is maintained, for example IRGC at IRRI genebank, PI in USDA NPGS and IG at ICARDA. A special prefix should be used to quickly identify material not yet accepted into the collection (e.g. INTRO or TEMP).

Note: Avoid storing the entire accession number in the prefix field, if possible.

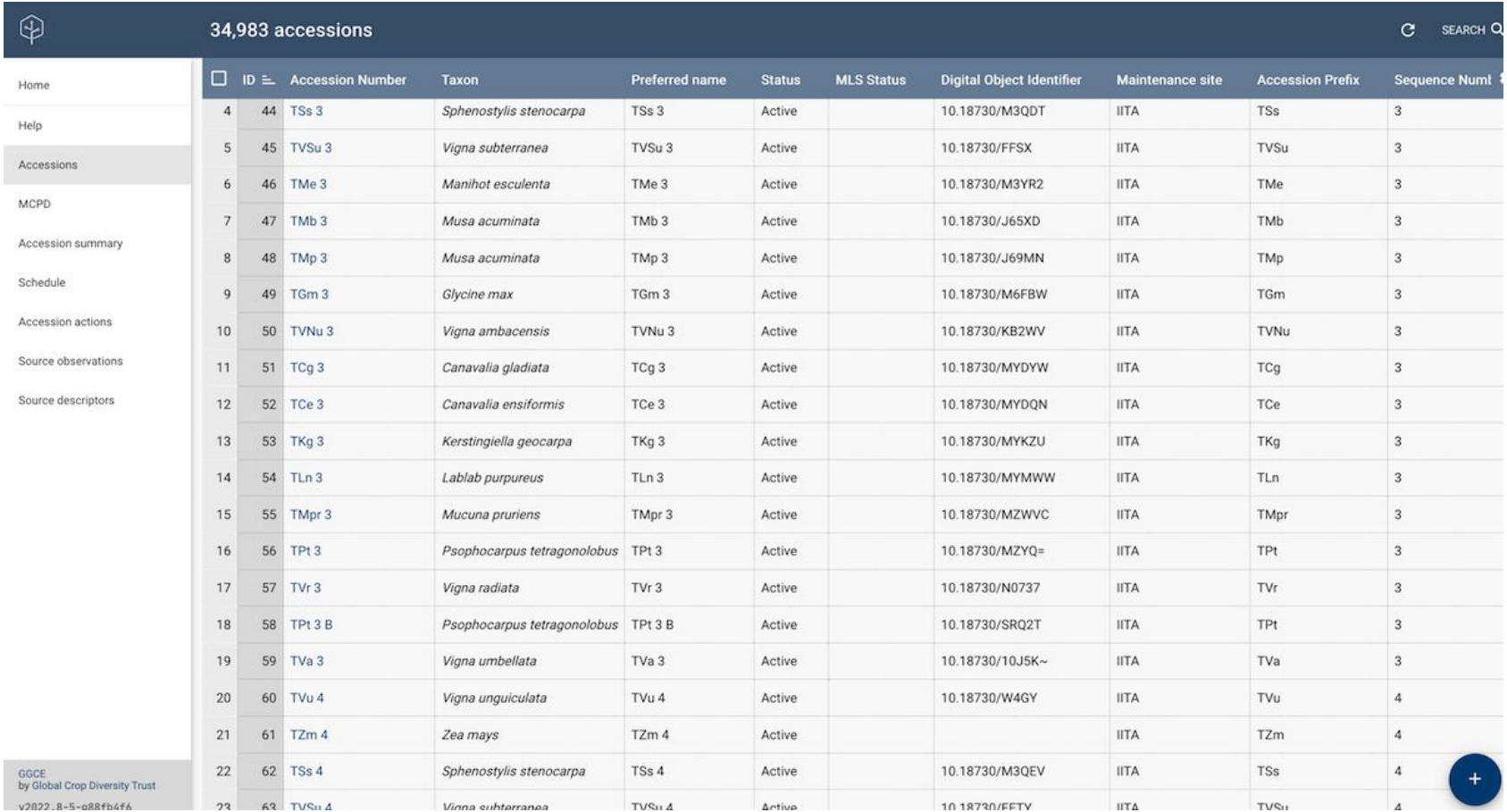
The numeric part of the accession number must be stored in the *sequence number* field. By separating the numeric part from the prefix, GGCE is able to automatically assign the next available accession number for the selected prefix on demand. The sequence number of an accession must be unique within the prefix group.

The *suffix* is commonly used if an accession is split and the parts are then managed independently.

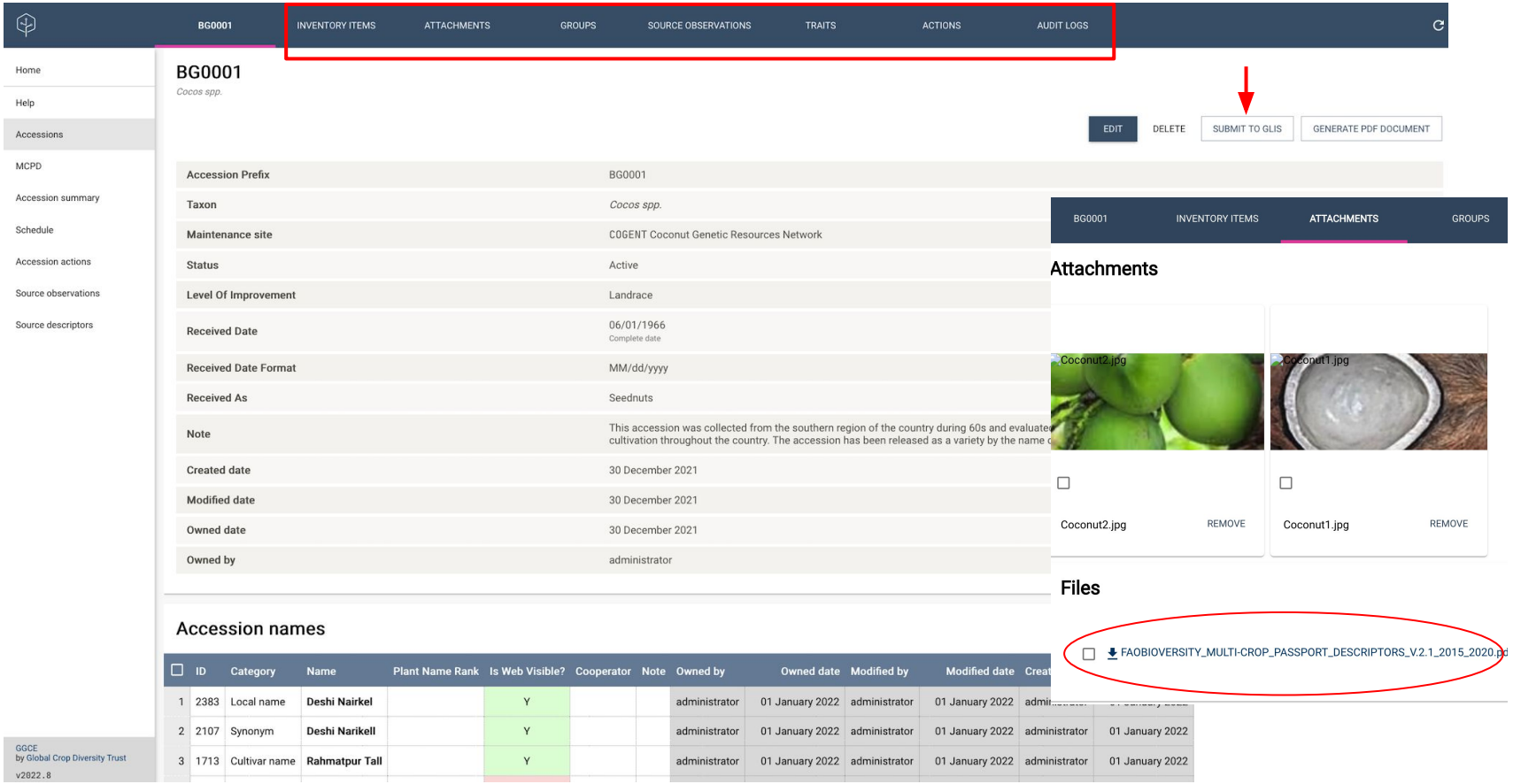
The formatting of the complete accession number based on the three parts is configurable. The *sequence number* may also be zero padded.

When material enters the genebank, it is given a temporary accession number. When the material passes the acquisition criteria, the proper accession number is assigned: it is given the official prefix and the next available number in sequence. Once the accession number has been assigned, it is strongly advised to not change it or reuse it for a different sample.

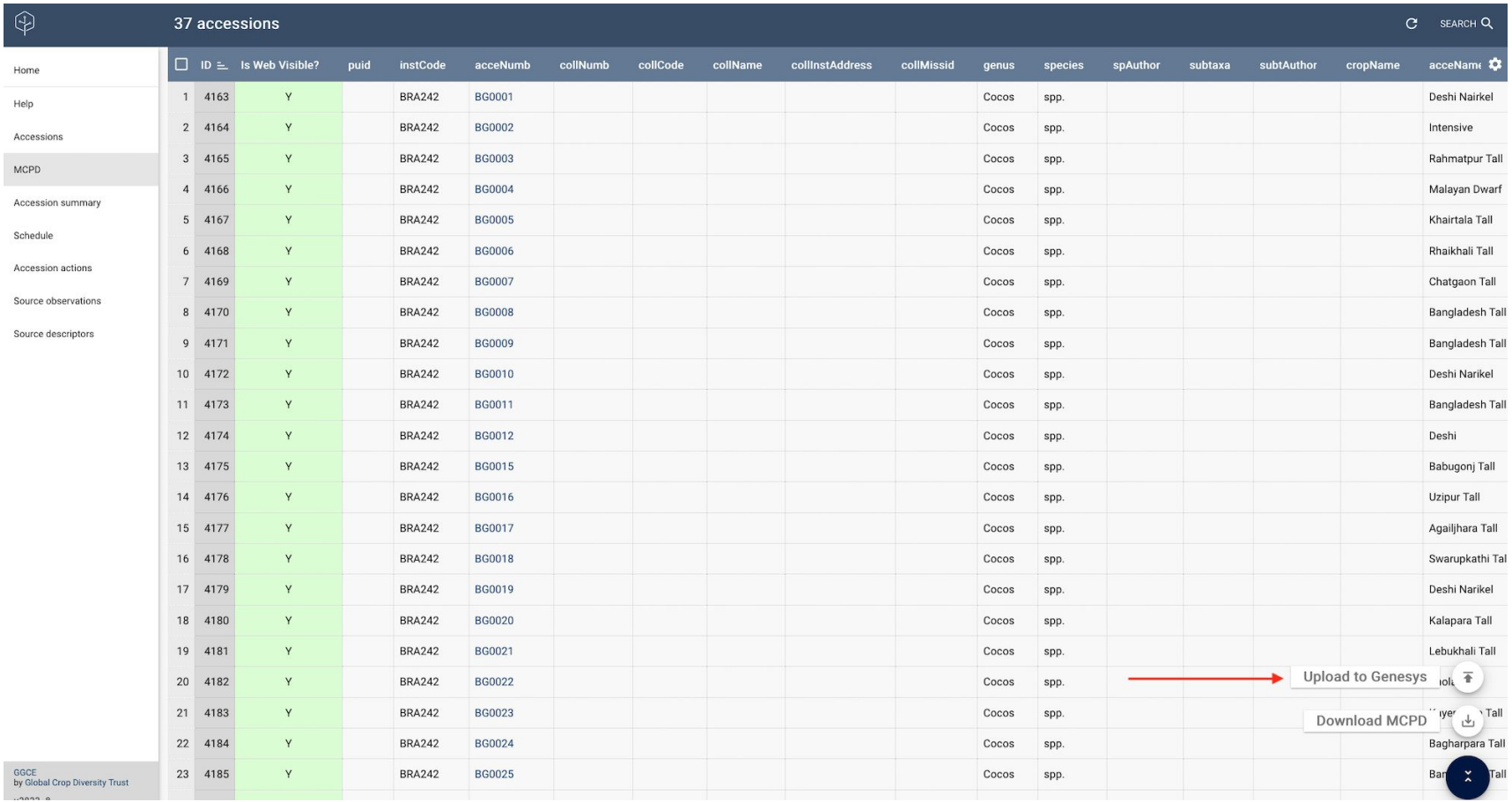
In addition to the accession number, a *Digital Object Identifier (DOI)* can be assigned to an accession. DOIs are



	ID	Accession Number	Taxon	Preferred name	Status	MLS Status	Digital Object Identifier	Maintenance site	Accession Prefix	Sequence Numl
4	44	TSs 3	*Sphenostylis stenocarpa*	TSs 3	Active		10.18730/M3QDT	IITA	TSs	3
5	45	TVSu 3	*Vigna subterranea*	TVSu 3	Active		10.18730/FFSX	IITA	TVSu	3
6	46	TMe 3	*Manihot esculenta*	TMe 3	Active		10.18730/M3YR2	IITA	TMe	3
7	47	TMb 3	*Musa acuminata*	TMb 3	Active		10.18730/J65XD	IITA	TMb	3
8	48	TMp 3	*Musa acuminata*	TMp 3	Active		10.18730/J69MN	IITA	TMp	3
9	49	TGm 3	*Glycine max*	TGm 3	Active		10.18730/M6FBW	IITA	TGm	3
10	50	TVNu 3	*Vigna ambacensis*	TVNu 3	Active		10.18730/KB2WV	IITA	TVNu	3
11	51	TCg 3	*Canavalia gladiata*	TCg 3	Active		10.18730/MYDYW	IITA	TCg	3
12	52	TCe 3	*Canavalia ensiformis*	TCe 3	Active		10.18730/MYDQN	IITA	TCe	3
13	53	TKg 3	*Kerstingiella geocarpa*	TKg 3	Active		10.18730/MYKZU	IITA	TKg	3
14	54	TLn 3	*Lablab purpureus*	TLn 3	Active		10.18730/MYMWW	IITA	TLn	3
15	55	TMpr 3	*Mucuna pruriens*	TMpr 3	Active		10.18730/MZWVC	IITA	TMpr	3
16	56	TPt 3	*Psophocarpus tetragonolobus*	TPt 3	Active		10.18730/MZYQ=	IITA	TPt	3
17	57	TVr 3	*Vigna radiata*	TVr 3	Active		10.18730/N0737	IITA	TVr	3
18	58	TPt 3 B	*Psophocarpus tetragonolobus*	TPt 3 B	Active		10.18730/SRQ2T	IITA	TPt	3
19	59	TVa 3	*Vigna umbellata*	TVa 3	Active		10.18730/10J5K~	IITA	TVa	3
20	60	TVu 4	*Vigna unguiculata*	TVu 4	Active		10.18730/W4GY	IITA	TVu	4
21	61	TZm 4	*Zea mays*	TZm 4	Active			IITA	TZm	4
22	62	TSs 4	*Sphenostylis stenocarpa*	TSs 4	Active		10.18730/M3QEV	IITA	TSs	4



Accessions: Details and attachments



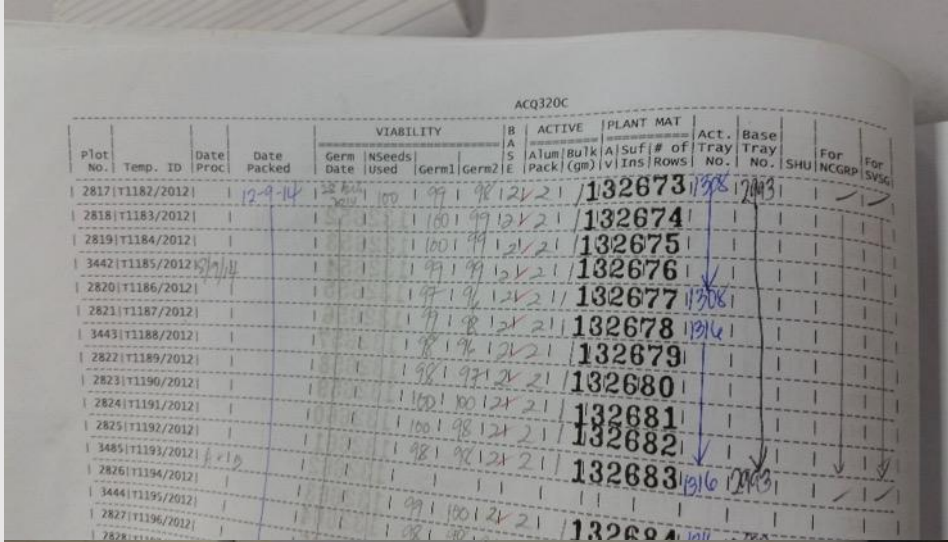
	ID	Is Web Visible?	puid	instCode	acceNumb	collNumb	collCode	collName	collInstAddress	collMissid	genus	species	spAuthor	subtaxa	subtAuthor	cropName	acceName
1	4163	Y		BRA242	BG0001						Cocos	spp.					Deshi Nairkel
2	4164	Y		BRA242	BG0002						Cocos	spp.					Intensive
3	4165	Y		BRA242	BG0003						Cocos	spp.					Rahmatpur Tall
4	4166	Y		BRA242	BG0004						Cocos	spp.					Malayan Dwarf
5	4167	Y		BRA242	BG0005						Cocos	spp.					Khairtala Tall
6	4168	Y		BRA242	BG0006						Cocos	spp.					Rhaikhali Tall
7	4169	Y		BRA242	BG0007						Cocos	spp.					Chatgaon Tall
8	4170	Y		BRA242	BG0008						Cocos	spp.					Bangladesh Tall
9	4171	Y		BRA242	BG0009						Cocos	spp.					Bangladesh Tall
10	4172	Y		BRA242	BG0010						Cocos	spp.					Deshi Narikel
11	4173	Y		BRA242	BG0011						Cocos	spp.					Bangladesh Tall
12	4174	Y		BRA242	BG0012						Cocos	spp.					Deshi
13	4175	Y		BRA242	BG0015						Cocos	spp.					Babugonj Tall
14	4176	Y		BRA242	BG0016						Cocos	spp.					Uzipur Tall
15	4177	Y		BRA242	BG0017						Cocos	spp.					Agailjhara Tall
16	4178	Y		BRA242	BG0018						Cocos	spp.					Swarupkathi Tal
17	4179	Y		BRA242	BG0019						Cocos	spp.					Deshi Narikel
18	4180	Y		BRA242	BG0020						Cocos	spp.					Kalapara Tall
19	4181	Y		BRA242	BG0021						Cocos	spp.					Lebukhali Tall
20	4182	Y		BRA242	BG0022						Cocos	spp.					
21	4183	Y		BRA242	BG0023						Cocos	spp.					Tall
22	4184	Y		BRA242	BG0024						Cocos	spp.					Bagharpara Tall
23	4185	Y		BRA242	BG0025						Cocos	spp.					Tall

Accessions: Passport data

One accession: Many samples

Sample tracking

- Data across operations is linked directly to the specific sample that is being managed
- Every sample in the collection must have a unique identification number



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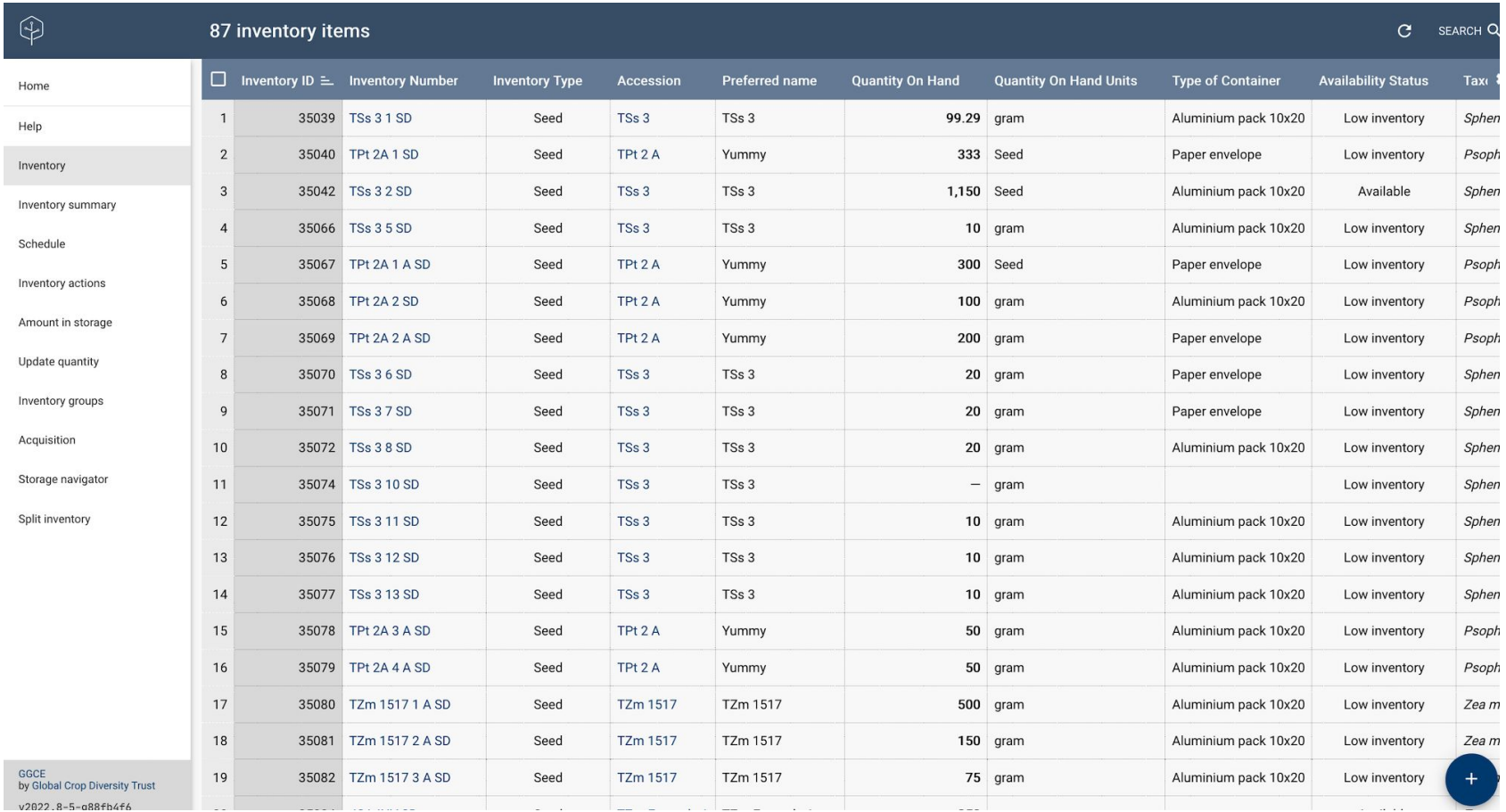

	Inventory ID	Inventory Number	Inventory Type	Accession	Preferred name	Quantity On Hand	Quantity On Hand Units	Type of Container	Availability Status	Taxo
1	35039	TSs 3 1 SD	Seed	TSs 3	TSs 3	99.29	gram	Aluminium pack 10x20	Low inventory	*Sphen*
2	35040	TPt 2A 1 SD	Seed	TPt 2 A	Yummy	333	Seed	Paper envelope	Low inventory	*Psoph*
3	35042	TSs 3 2 SD	Seed	TSs 3	TSs 3	1,150	Seed	Aluminium pack 10x20	Available	*Sphen*
4	35066	TSs 3 5 SD	Seed	TSs 3	TSs 3	10	gram	Aluminium pack 10x20	Low inventory	*Sphen*
5	35067	TPt 2A 1 A SD	Seed	TPt 2 A	Yummy	300	Seed	Paper envelope	Low inventory	*Psoph*
6	35068	TPt 2A 2 SD	Seed	TPt 2 A	Yummy	100	gram	Aluminium pack 10x20	Low inventory	*Psoph*
7	35069	TPt 2A 2 A SD	Seed	TPt 2 A	Yummy	200	gram	Paper envelope	Low inventory	*Psoph*
8	35070	TSs 3 6 SD	Seed	TSs 3	TSs 3	20	gram	Paper envelope	Low inventory	*Sphen*
9	35071	TSs 3 7 SD	Seed	TSs 3	TSs 3	20	gram	Paper envelope	Low inventory	*Sphen*
10	35072	TSs 3 8 SD	Seed	TSs 3	TSs 3	20	gram	Aluminium pack 10x20	Low inventory	*Sphen*
11	35074	TSs 3 10 SD	Seed	TSs 3	TSs 3	–	gram		Low inventory	*Sphen*
12	35075	TSs 3 11 SD	Seed	TSs 3	TSs 3	10	gram	Aluminium pack 10x20	Low inventory	*Sphen*
13	35076	TSs 3 12 SD	Seed	TSs 3	TSs 3	10	gram	Aluminium pack 10x20	Low inventory	*Sphen*
14	35077	TSs 3 13 SD	Seed	TSs 3	TSs 3	10	gram	Aluminium pack 10x20	Low inventory	*Sphen*
15	35078	TPt 2A 3 A SD	Seed	TPt 2 A	Yummy	50	gram	Aluminium pack 10x20	Low inventory	*Psoph*
16	35079	TPt 2A 4 A SD	Seed	TPt 2 A	Yummy	50	gram	Aluminium pack 10x20	Low inventory	*Psoph*
17	35080	TZm 1517 1 A SD	Seed	TZm 1517	TZm 1517	500	gram	Aluminium pack 10x20	Low inventory	*Zea m*
18	35081	TZm 1517 2 A SD	Seed	TZm 1517	TZm 1517	150	gram	Aluminium pack 10x20	Low inventory	*Zea m*
19	35082	TZm 1517 3 A SD	Seed	TZm 1517	TZm 1517	75	gram	Aluminium pack 10x20	Low inventory	

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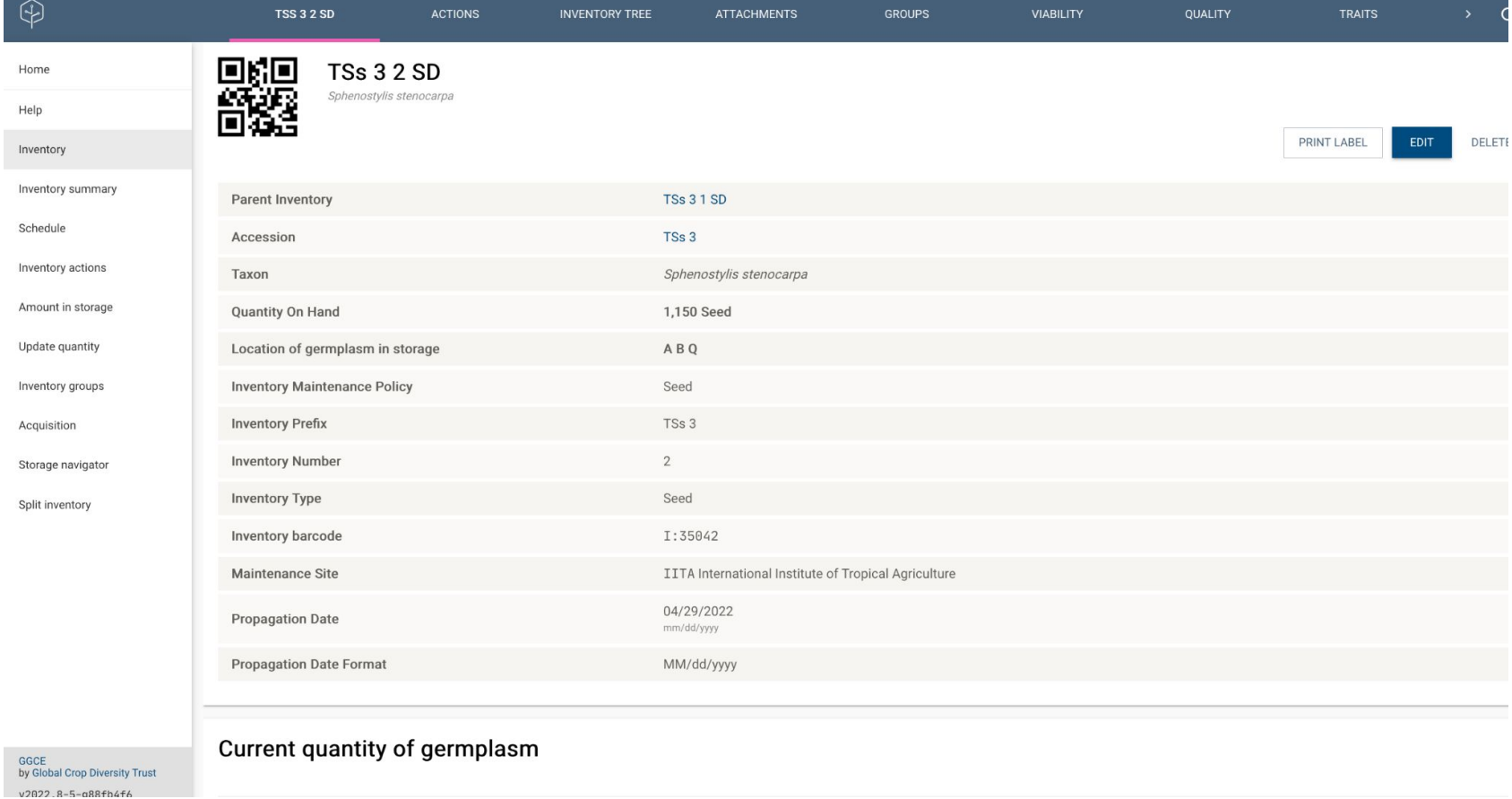
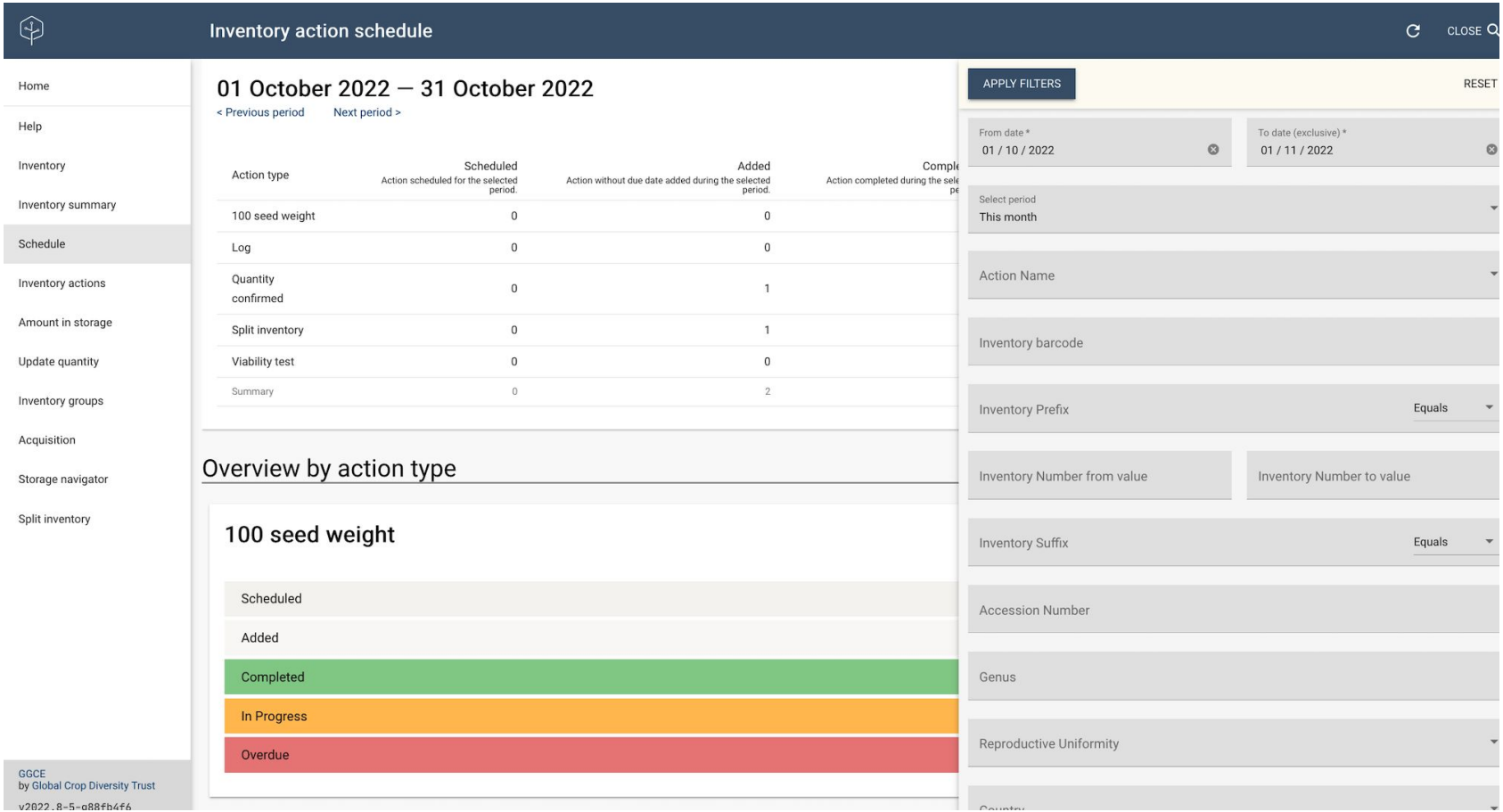
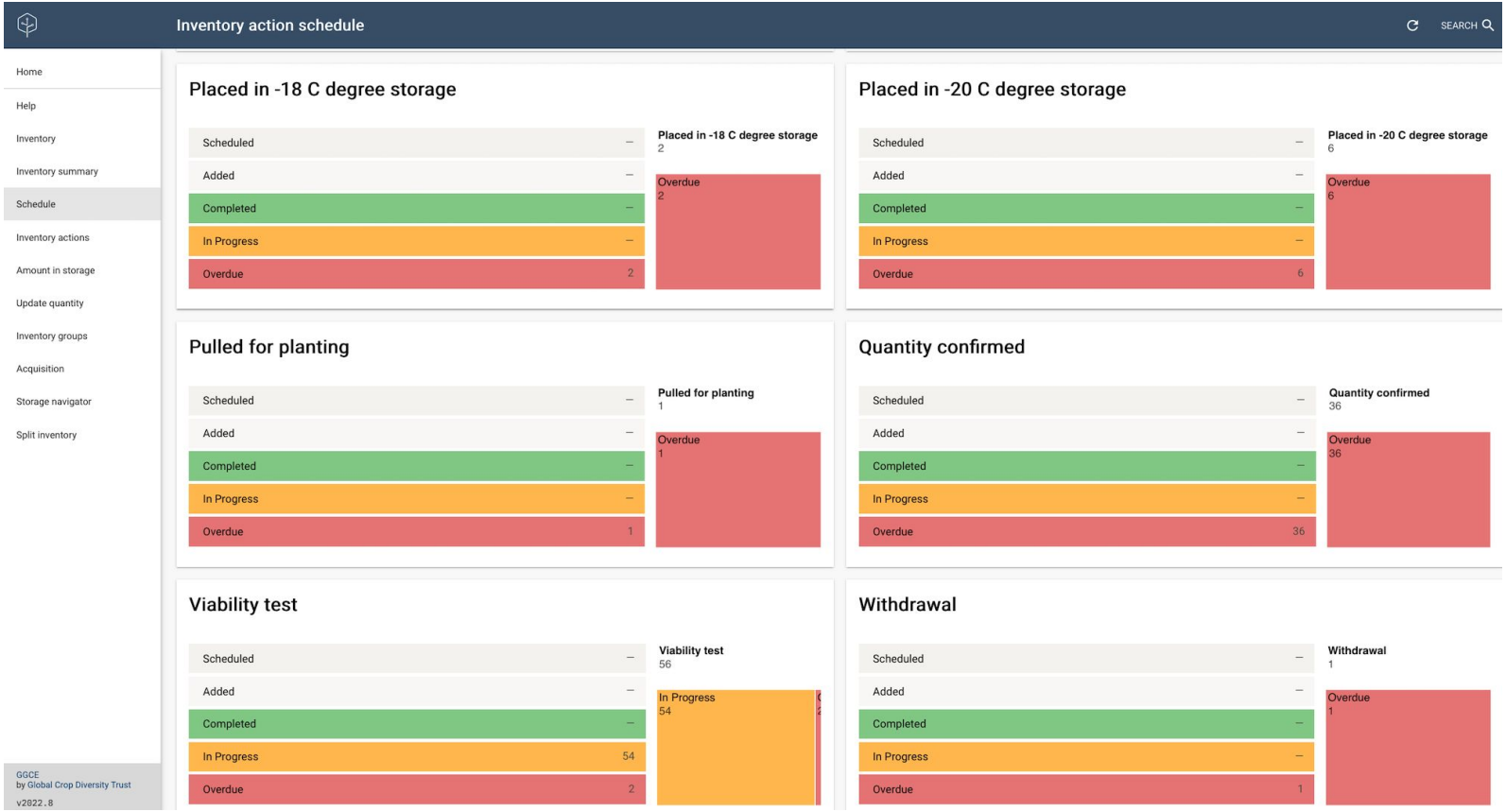
Inventory


TSS 3 2 SD
ACTIONS
INVENTORY TREE
ATTACHMENTS
GROUPS
VIABILITY
QUALITY
TRAITS
Home
Help
Inventory
Inventory summary
Schedule
Inventory actions
Amount in storage
Update quantity
Inventory groups
Acquisition
Storage navigator
Split inventory
GGCE
by Global Crop Diversity Trust
v2022.8-5-g88fb4f6
TSs 3 2 SD
Sphenostylis stenocarpa
PRINT LABEL
EDIT
DELETE
Parent Inventory
TSs 3 1 SD
Accession
TSs 3
Taxon
Sphenostylis stenocarpa
Quantity On Hand
1,150 Seed
Location of germplasm in storage
A B Q
Inventory Maintenance Policy
Seed
Inventory Prefix
TSs 3
Inventory Number
2
Inventory Type
Seed
Inventory barcode
I:35042
Maintenance Site
IITA International Institute of Tropical Agriculture
Propagation Date
04/29/2022
mm/dd/yyyy
Propagation Date Format
MM/dd/yyyy
Current quantity of germplasm


Inventory action schedule
CLOSE
Home
Help
Inventory
Inventory summary
Schedule
Inventory actions
Amount in storage
Update quantity
Inventory groups
Acquisition
Storage navigator
Split inventory
GGCE
by Global Crop Diversity Trust
v2022.8-5-g88fb4f6
01 October 2022 — 31 October 2022
< Previous period
Next period >
Action type
Scheduled
Action scheduled for the selected period.
Added
Action without due date added during the selected period.
100 seed weight 0 0
Log 0 0
Quantity confirmed 0 1
Split inventory 0 1
Viability test 0 0
Summary 0 2
Overview by action type
100 seed weight
Scheduled
Added
Completed
In Progress
Overdue
APPLY FILTERS
RESET
From date *
01 / 10 / 2022
To date (exclusive) *
01 / 11 / 2022
Select period
This month
Action Name
Inventory barcode
Inventory Prefix
Equals
Inventory Number from value
Inventory Number to value
Inventory Suffix
Equals
Accession Number
Genus
Reproductive Uniformity

Schedule


Inventory action schedule
SEARCH
Home
Help
Inventory
Inventory summary
Schedule
Inventory actions
Amount in storage
Update quantity
Inventory groups
Acquisition
Storage navigator
Split inventory
GGCE
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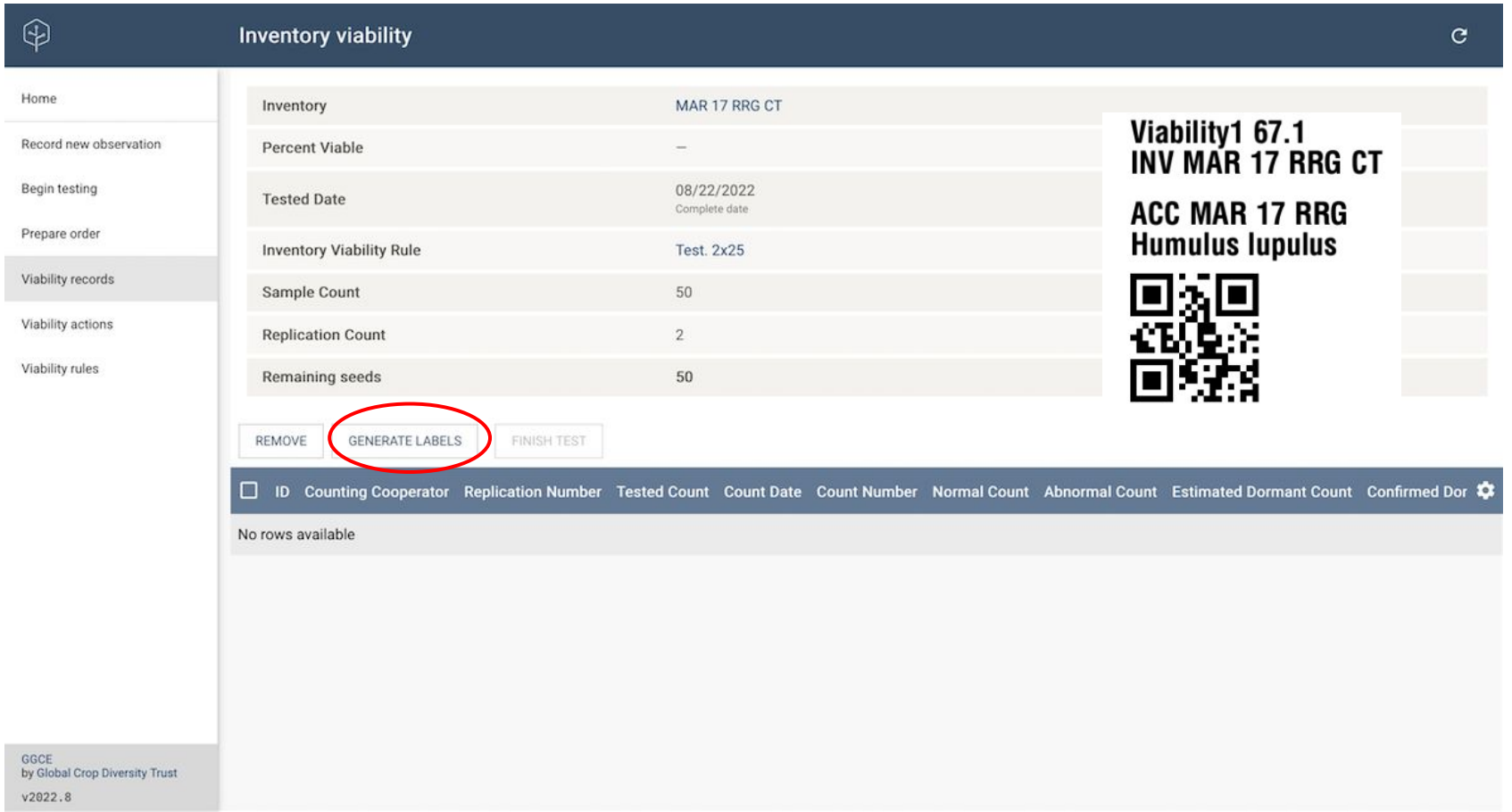
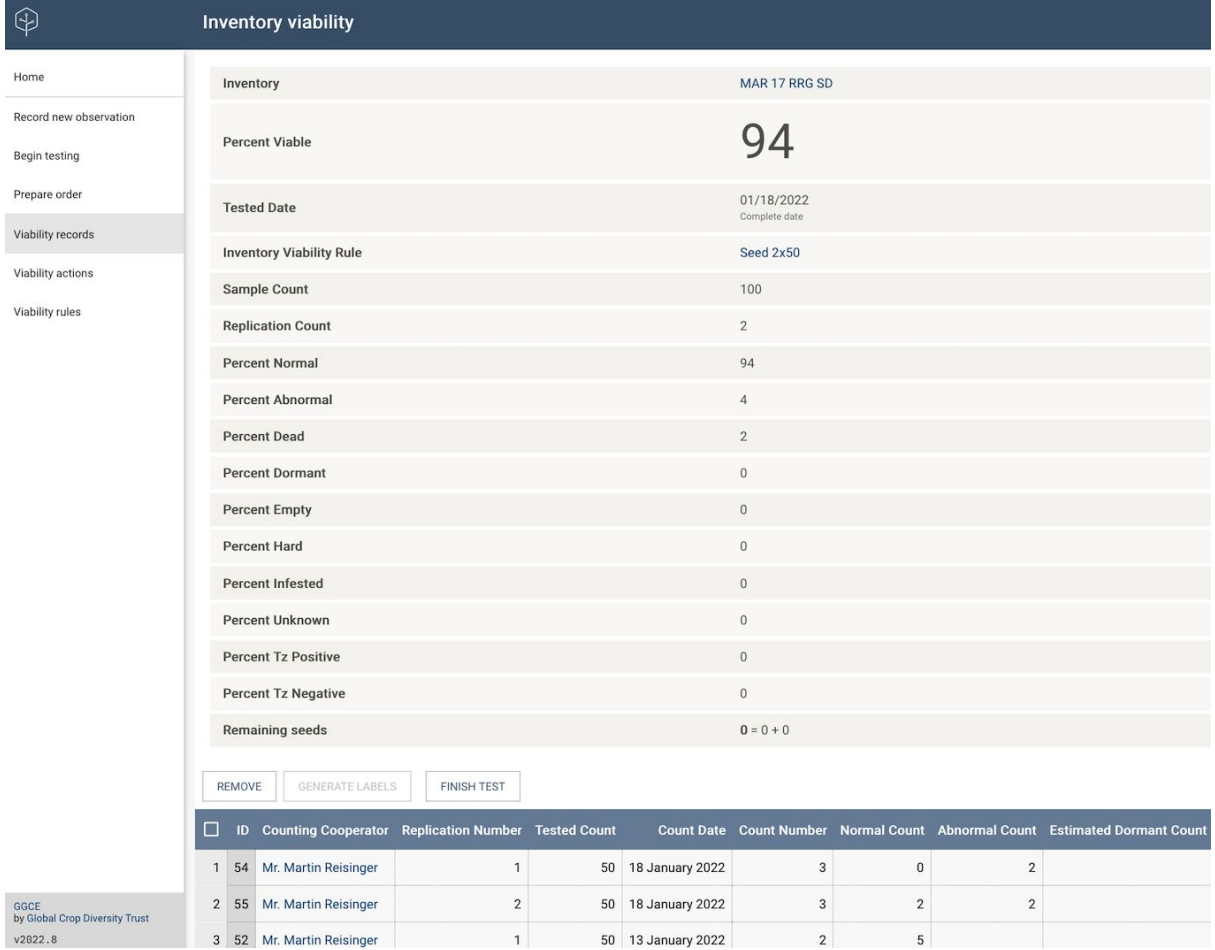
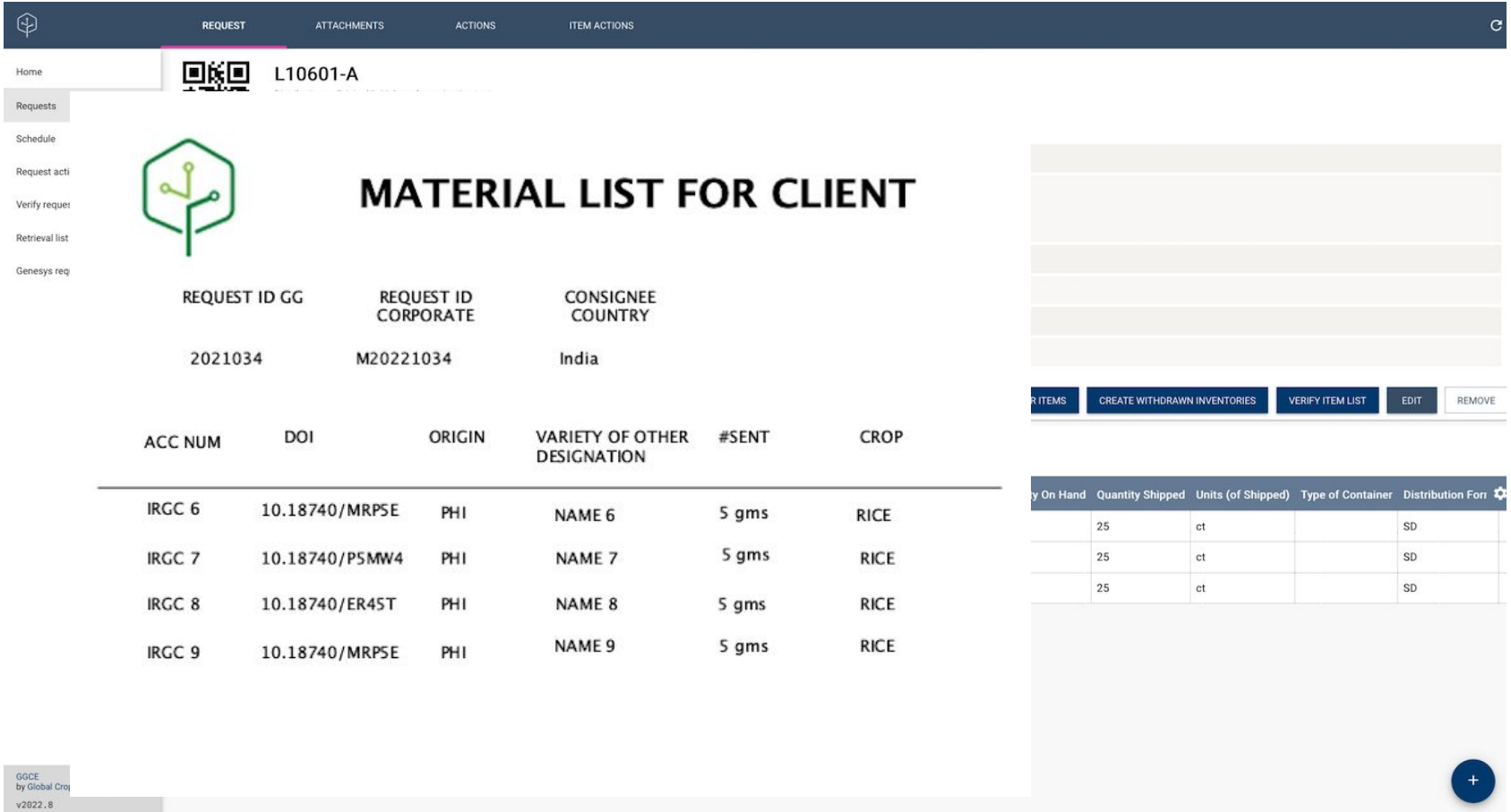
v2022.8
Placed in -18 C degree storage
Scheduled –
Added –
Completed –
In Progress –
Overdue 2
Placed in -18 C degree storage
2
Overdue
2
Placed in -20 C degree storage
Scheduled –
Added –
Completed –
In Progress –
Overdue 6
Placed in -20 C degree storage
6
Overdue
6
Pulled for planting
Scheduled –
Added –
Completed –
In Progress –
Overdue 1
Pulled for planting
1
Overdue
1
Quantity confirmed
Scheduled –
Added –
Completed –
In Progress –
Overdue 36
Quantity confirmed
36
Overdue
36
Viability test
Scheduled –
Added –
Completed –
In Progress 54
Overdue 2
Viability test
56
In Progress
54
Withdrawal
Scheduled –
Added –
Completed –
In Progress –
Overdue 1
Withdrawal
1
Overdue
1

Schedule

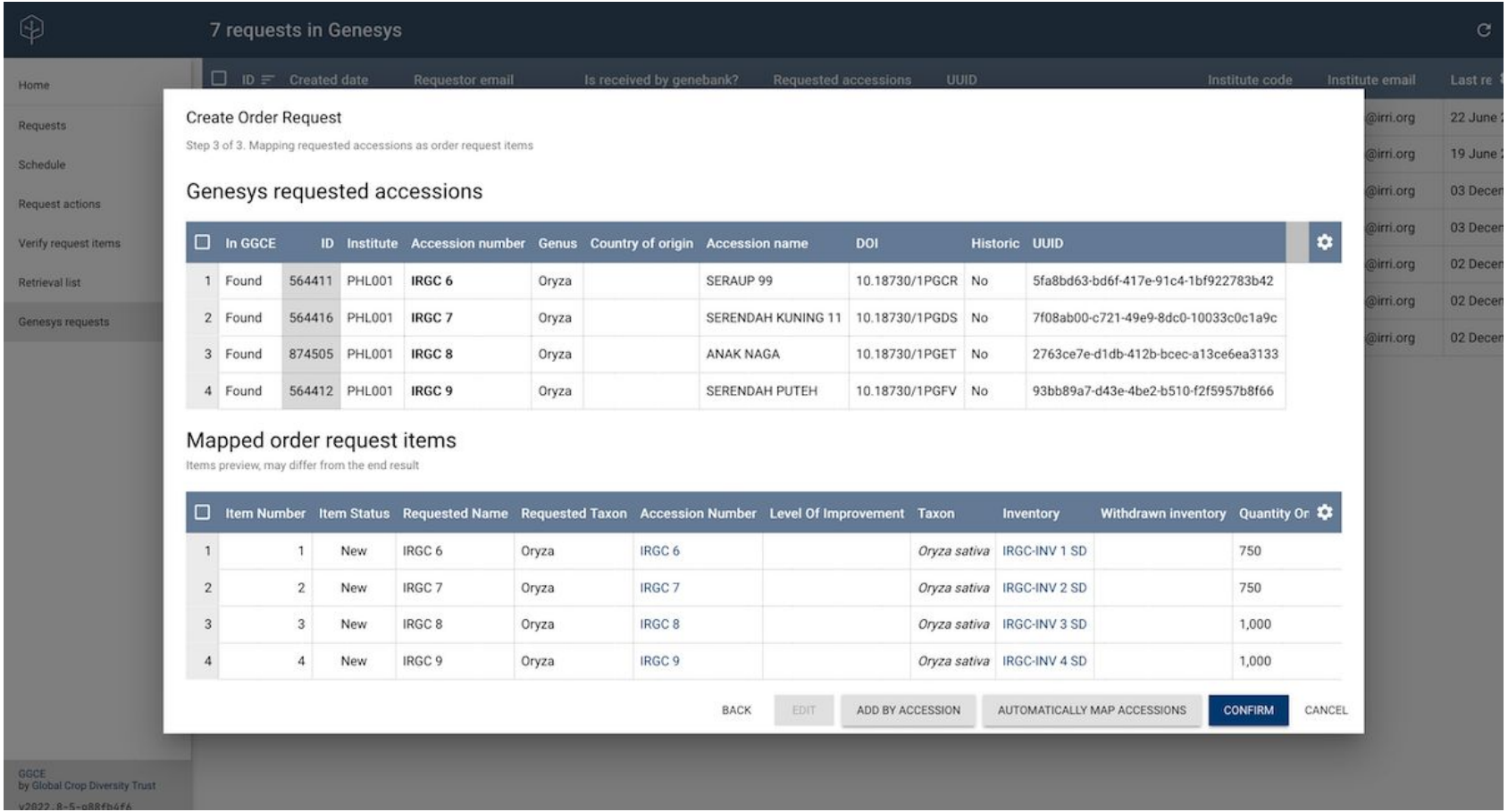

Inventory viability
Home
Record new observation
Begin testing
Prepare order
Viability records
Viability actions
Viability rules
GGCE
by Global Crop Diversity Trust
v2022.8
Inventory
MAR 17 RRG CT
Percent Viable
–
Tested Date
08/22/2022
Complete date
Inventory Viability Rule
Test. 2x25
Sample Count
50
Replication Count
2
Remaining seeds
50
Viability1 67.1
INV MAR 17 RRG CT
ACC MAR 17 RRG
Humulus lupulus
REMOVE
GENERATE LABELS
FINISH TEST
ID
Counting Cooperator
Replication Number
Tested Count
Count Date
Count Number
Normal Count
Abnormal Count
Estimated Dormant Count
Confirmed Dor
No rows available



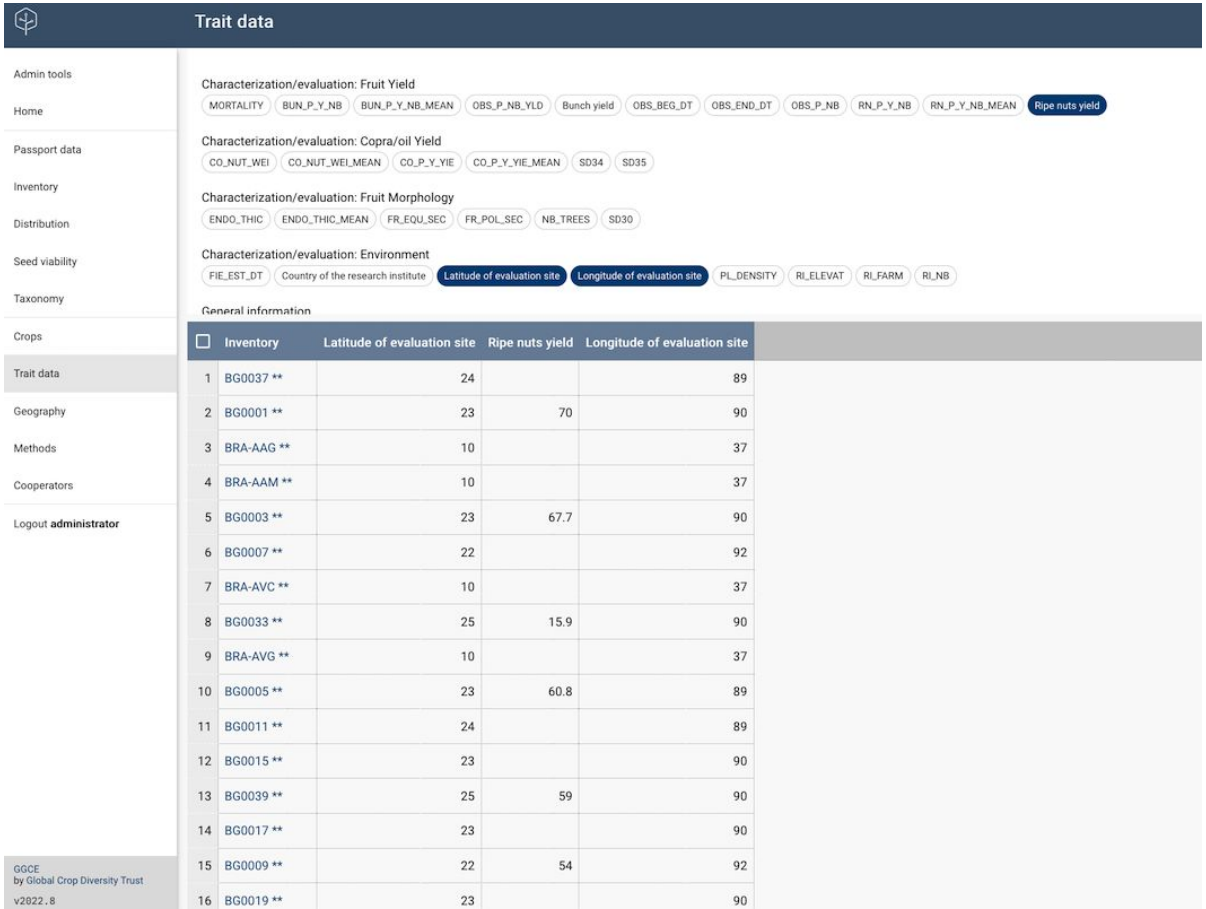
Seed viability: Result



Distribution: Management of the requests

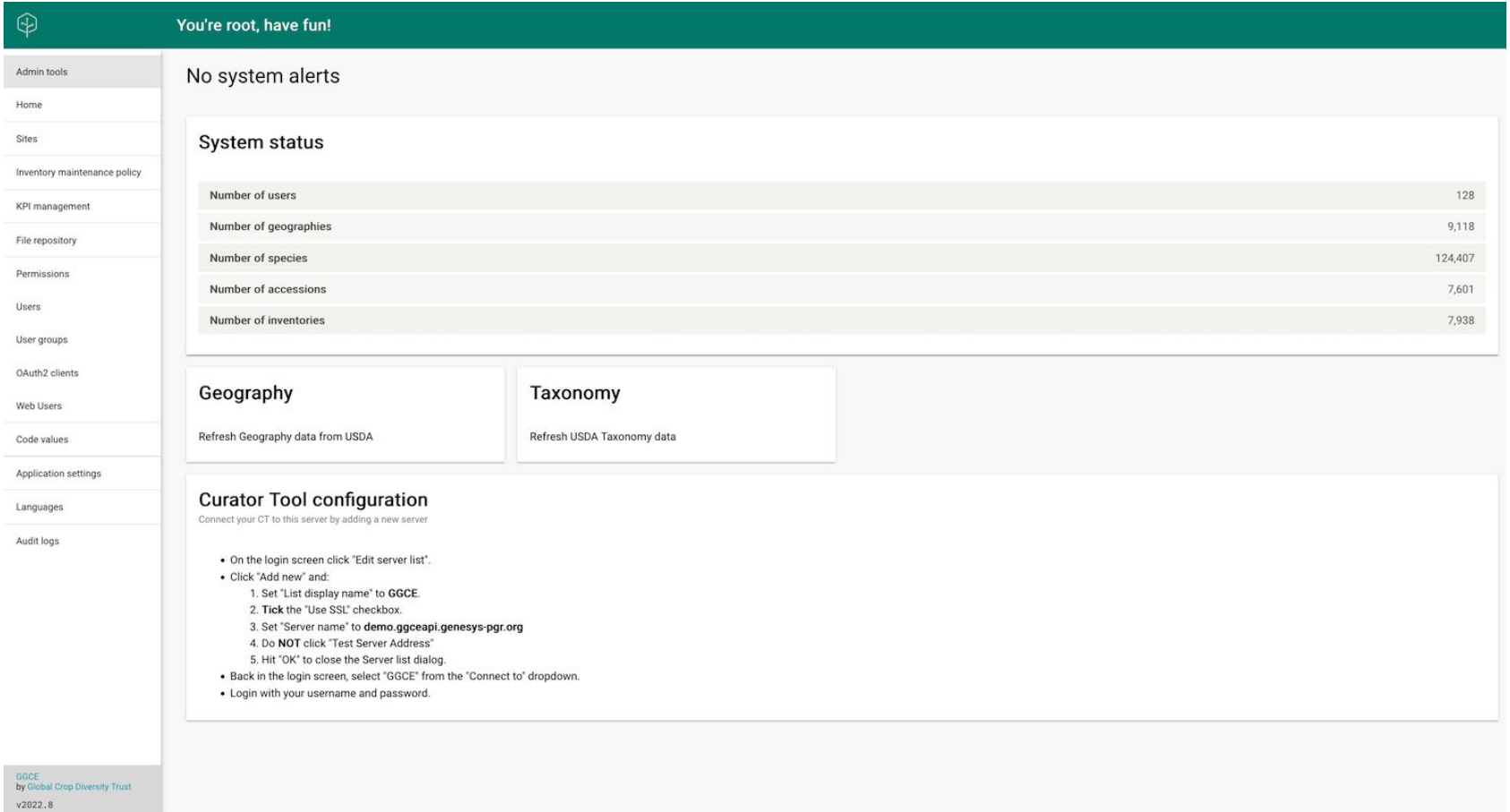


Genesys requests

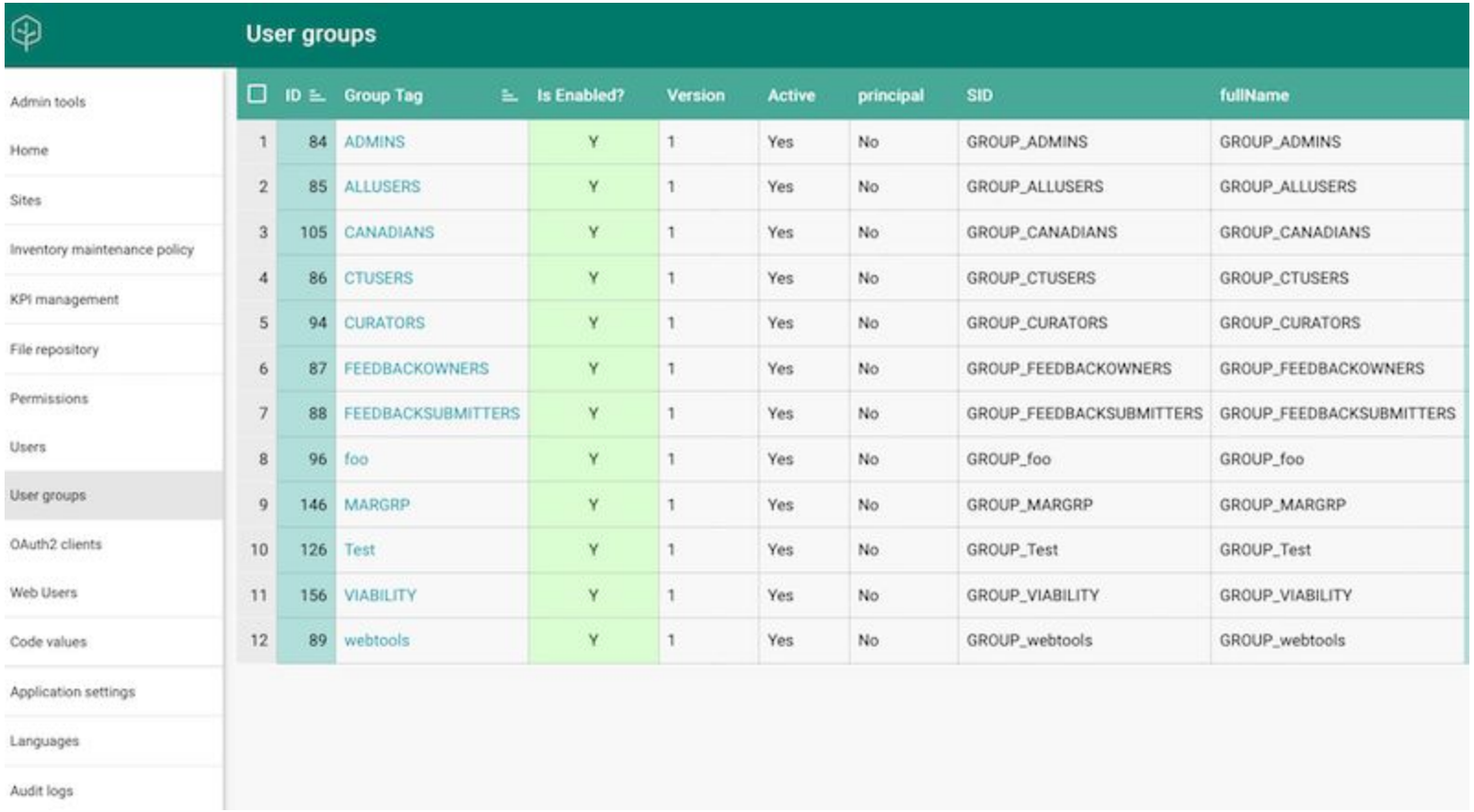


	Inventory	Latitude of evaluation site	Ripe nuts yield	Longitude of evaluation site
1	BG0037 **	24		89
2	BG0001 **	23	70	90
3	BRA-AAG **	10		37
4	BRA-AAM **	10		37
5	BG0003 **	23	67.7	90
6	BG0007 **	22		92
7	BRA-AVC **	10		37
8	BG0033 **	25	15.9	90
9	BRA-AVG **	10		37
10	BG0005 **	23	60.8	89
11	BG0011 **	24		89
12	BG0015 **	23		90
13	BG0039 **	25	59	90
14	BG0017 **	23		90
15	BG0009 **	22	54	92
16	BG0019 **	23		90

Trait data


You're root, have fun!
Admin tools
Home
Sites
Inventory maintenance policy
KPI management
File repository
Permissions
Users
User groups
OAuth2 clients
Web Users
Code values
Application settings
Languages
Audit logs
GGCE
by Global Crop Diversity Trust
v2022.8
No system alerts
System status
Number of users 128
Number of geographies 9,118
Number of species 124,407
Number of accessions 7,601
Number of inventories 7,938
Geography
Refresh Geography data from USDA
Taxonomy
Refresh USDA Taxonomy data
Curator Tool configuration
Connect your CT to this server by adding a new server
On the login screen click "Edit server list".
Click "Add new" and:
1. Set "List display name" to GGCE.
2. Tick the "Use SSL" checkbox.
3. Set "Server name" to demo.ggceapi.genesys-pgr.org
4. Do NOT click "Test Server Address"
5. Hit "OK" to close the Server list dialog.
Back in the login screen, select "GGCE" from the "Connect to" dropdown.
Login with your username and password.

Admin tools



Admin tools. User groups

GGCE adoption support

1. Assistance with adoption of GGCE
   a. Initial setup and configuration
   b. Data mapping and migration
      - From scratch: Institutions with non GRIN-Global database in place
      - GRIN-Global users
2. Training for curators, technicians and data managers
3. Regular meetings with users to share experiences and feedback
4. Participation in the development of new tools for technicians and curators

Contact us: helpdesk@genesys-pgr.org

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Production (2)	CIAT, WorldVeg
Testing (14)	AfricaRice, CIMMYT, CIP, IRRI, ILRI, IITA, ICRAF, ICRISAT,Tunisia, Nigeria, Ghana, Ethiopia, Zambia and Kenya
Evaluation (5)	Chile, Argentina, Uruguay, Cuba and ICC-COGENT

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GGCE adoption status

GG-CE documentation: https://gitlab.croptrust.org/grin-global/support/-/wikis/overview/Overview

GG-CE Support: helpdesk@genesys-pgr.org

Demo instance: https://demo.ggce.genesys-pgr.org

Resources

www.croptrust.org