



Viability testing with GGCE

14 July 2022

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Viability testing



When do you test seed viability?

Post harvest: Initial seed viability

- Is seed of sufficient quality **before storage**?

Conservation: Monitoring seed viability

- Is seed still of sufficient quality?
- Repeat monitoring **every X years** in long-term storage

Procedure



What is your SoP?

Prepare for testing

1. Determine material to be tested
2. Obtain sample for testing

Test viability of the sample

1. Prepare material for test (according to SoP)
2. Monitor test sample and record progress
3. Finish test and record results

Example 2x25

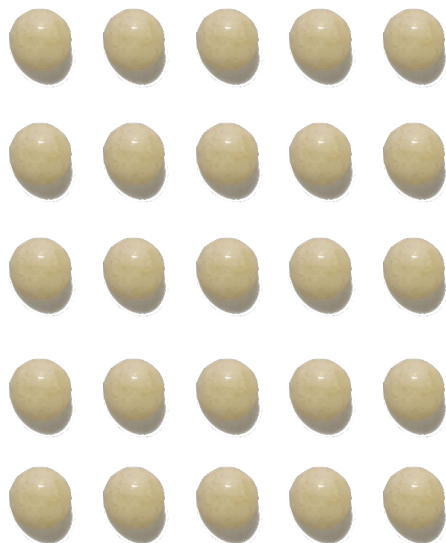


How to go about viability testing with GGCE?

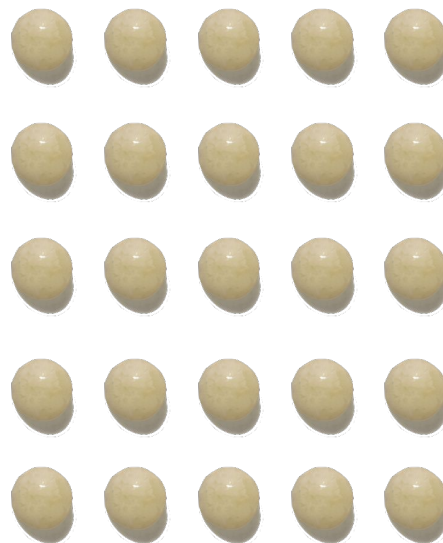
- One sample
- Two replicates
- Each replicate with 25 seed
- Multiple observations
- Final results



Replicate 1

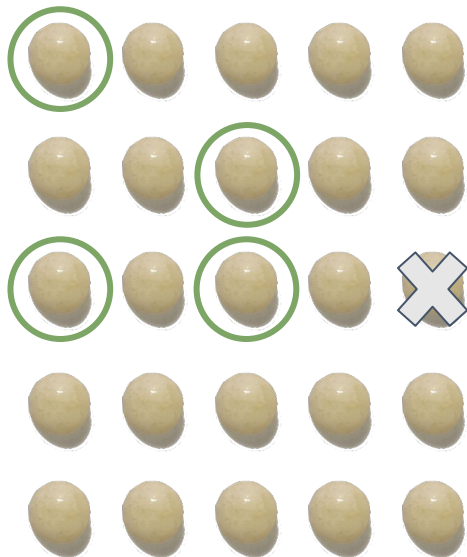


Replicate 2

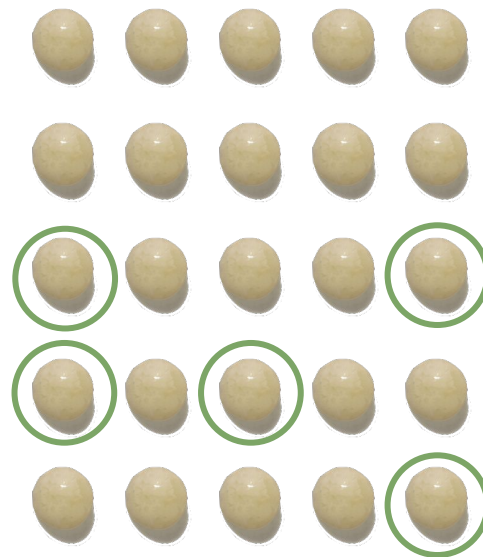




Replicate 1

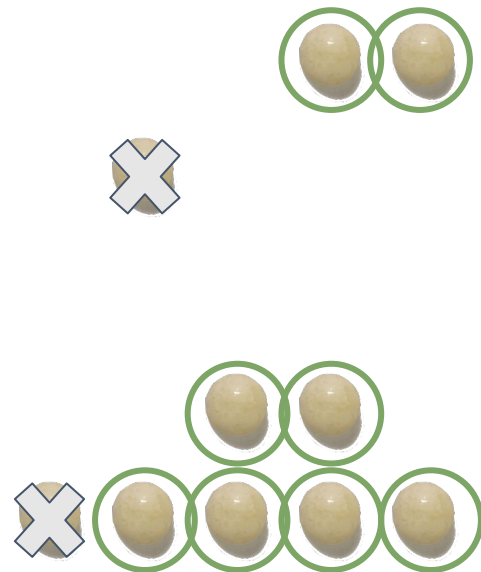
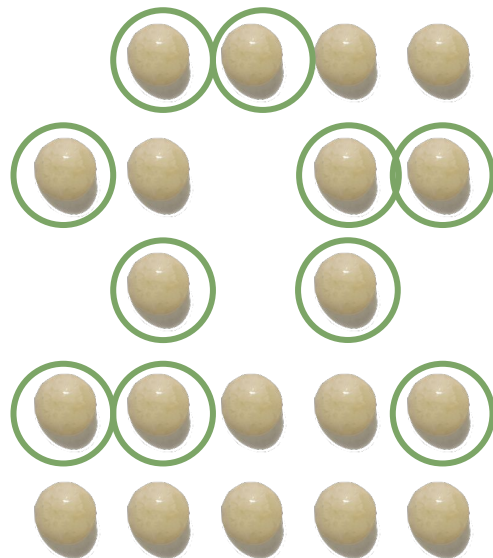
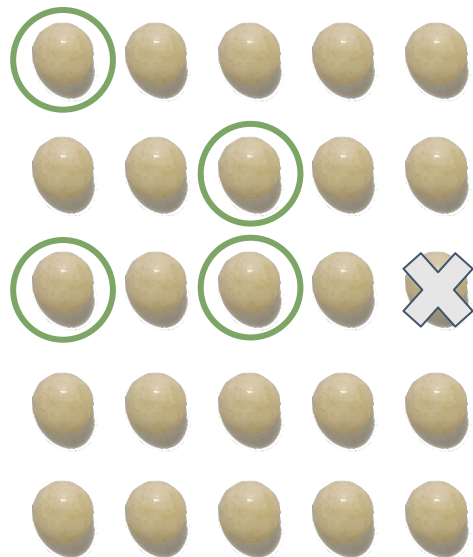


Replicate 2



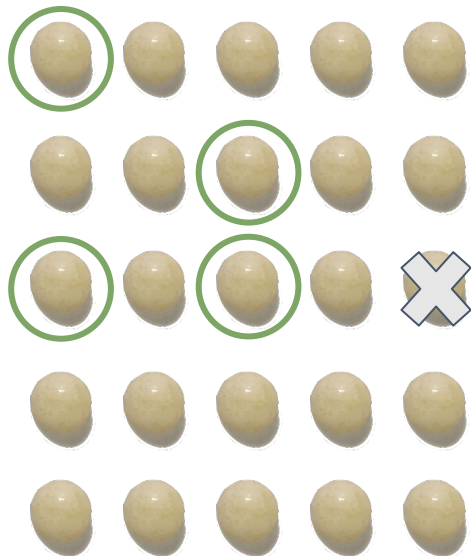


Replicate 1





Replicate 1



Normal: 4
Dead: 1

Record observations

Obs
802

M
Ze

Add observation

Counting Cooperator
Administrator SYSTEM

USA

Tested Count *
25

replication_count – Total number of propagules used in this replicate.

Remaining seeds
25

The number of remaining propagules in this test that are not yet scored

Current observation

Normal Count
4

normal_count – The number of propagules in the inventory sample that were counted and displayed normal germination.

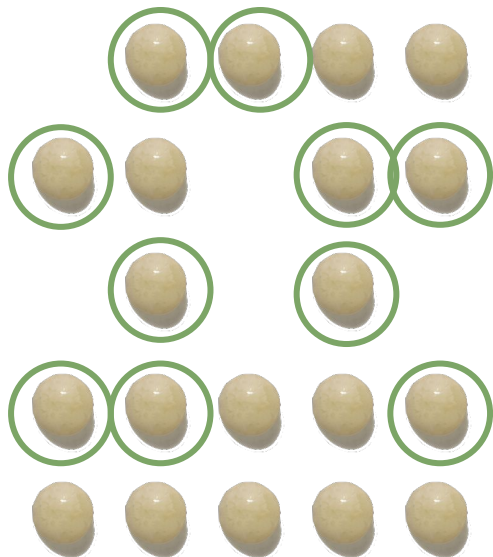
Abnormal Count
1

abnormal_count – Number of propagules in the inventory sample that were counted and displayed abnormal germination.

SAVE CANCEL



Replicate 1



Normal: 10
Dead: 0

Record observations

Observation barcode
8.1

IG1 1 SD
Lens culinaris subsp. *culinaris*

Inventory	IG1 1 SD
Accession	IG 1
Quantity On Hand	2,000 Seed
Inventory Type	Seed
Inventory Viability Rule	2x25
Remaining seeds	10

[VIEW TEST](#) [ADD OBSERVATION](#)

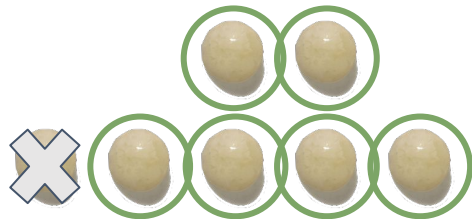
<input type="checkbox"/>	Count Number	Normal Count	Abnormal Count	Estimated Dormant Cc	⚙
<input type="checkbox"/>	1	2	10		
<input type="checkbox"/>	2	1	4	1	




Replicate 1



Normal: 8
Dead: 2




Observation barcode 

IG1 1 SD

Lens culinaris subsp. *culinaris*

Inventory	IG1 1 SD
Accession	IG 1
Quantity On Hand	2,000 Seed
Inventory Type	Seed
Inventory Viability Rule	2x25
Remaining seeds	0

[VIEW TEST](#) [ADD OBSERVATION](#)

<input type="checkbox"/>	Count Number	Normal Count	Abnormal Count	Estimated Dormant Cc	
	1	3	8	2	
	2	2	10		
	3	1	4	1	



Replicate 2



Record observations

Add observation

customer_congregation_id - Link the record to the supervisor table, the person who did the counting

Tested Count *

25

replication_count - Total number of propagules used in this replicate.

Remaining seeds

25

The number of remaining propagules in this test that are not yet scored

Current observation

Normal Count

24

normal_count - The number of propagules in the inventory sample that were counted and displayed normal germination.

Abnormal Count

1

abnormal_count - Number of propagules in the inventory sample that were counted and displayed abnormal germination.

Advanced

SAVE CANCEL

Inventory	IG1 1 SD
Percent Viable	—
Tested Date	6 hours ago mm/dd/yyyy
Inventory Viability Rule	2x25
Sample Count	50
Replication Count	2
Remaining seeds	0 = 0 + 0

REMOVE GENERATE LABELS FINISH TEST

ID	Counting Cooperator	Replication Number	Tested Count	Cou	⚙
1	36 Administrator SYSTEM	1	25	11 minutes ago	
2	35 Administrator SYSTEM	1	25	16 minutes ago	
3	34 Administrator SYSTEM	1	25	18 minutes ago	
4	38 Administrator SYSTEM	2	25	6 seconds ago	

Replication Number	1
Tested Count	25
Count Date	12 minutes ago
Normal Count 1	22 (88%)
Abnormal Count 1	3 (12%)
Unknown Count 1	0 (0%)
Dead Count 1	0 (0%)
Empty Count 1	0 (0%)
Infested Count 1	0 (0%)
Hard Count 1	0 (0%)
Dormant Count 1	0 (0%)
Estimated Dormant Count 1	0 (0%)
Treated Dormant Count 1	0 (0%)
Confirmed Dormant Count 1	0 (0%)
TZ Positive Count 1	0 (0%)
TZ Negative Count 1	0 (0%)

Replication Number	2
Tested Count	25
Count Date	36 seconds ago
Normal Count 2	24 (96%)
Abnormal Count 2	1 (4%)
Unknown Count 2	0 (0%)
Dead Count 2	0 (0%)
Empty Count 2	0 (0%)
Infested Count 2	0 (0%)
Hard Count 2	0 (0%)
Dormant Count 2	0 (0%)
Estimated Dormant Count 2	0 (0%)
Treated Dormant Count 2	0 (0%)
Confirmed Dormant Count 2	0 (0%)
TZ Positive Count 2	0 (0%)
TZ Negative Count 2	0 (0%)

Inventory	IG1 1 SD
Percent Viable	92
Tested Date	3 minutes ago mm/dd/yyyy
Vigor Rating	Good vigor
Inventory Viability Rule	2x25
Sample Count	50
Replication Count	2
Percent Normal	92
Percent Abnormal	8
Percent Dead	0
Percent Dormant	0
Percent Empty	0
Percent Hard	0
Percent Infested	0
Percent Unknown	0
Percent Tz Positive	0
Percent Tz Negative	0
Remaining seeds	0 = 0 + 0



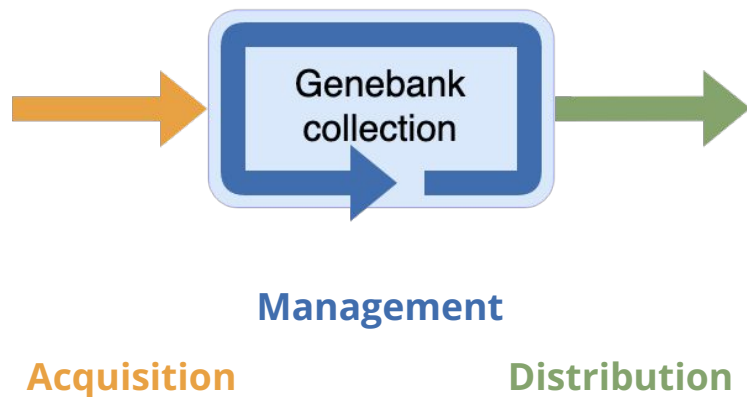
Wrapping up

Genebank collection management

Introduction to GGCE

Juan Carlos Alarcón

Genebank operations



Acquisition:

- Collection
- Donation

Management:

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

Distribution:

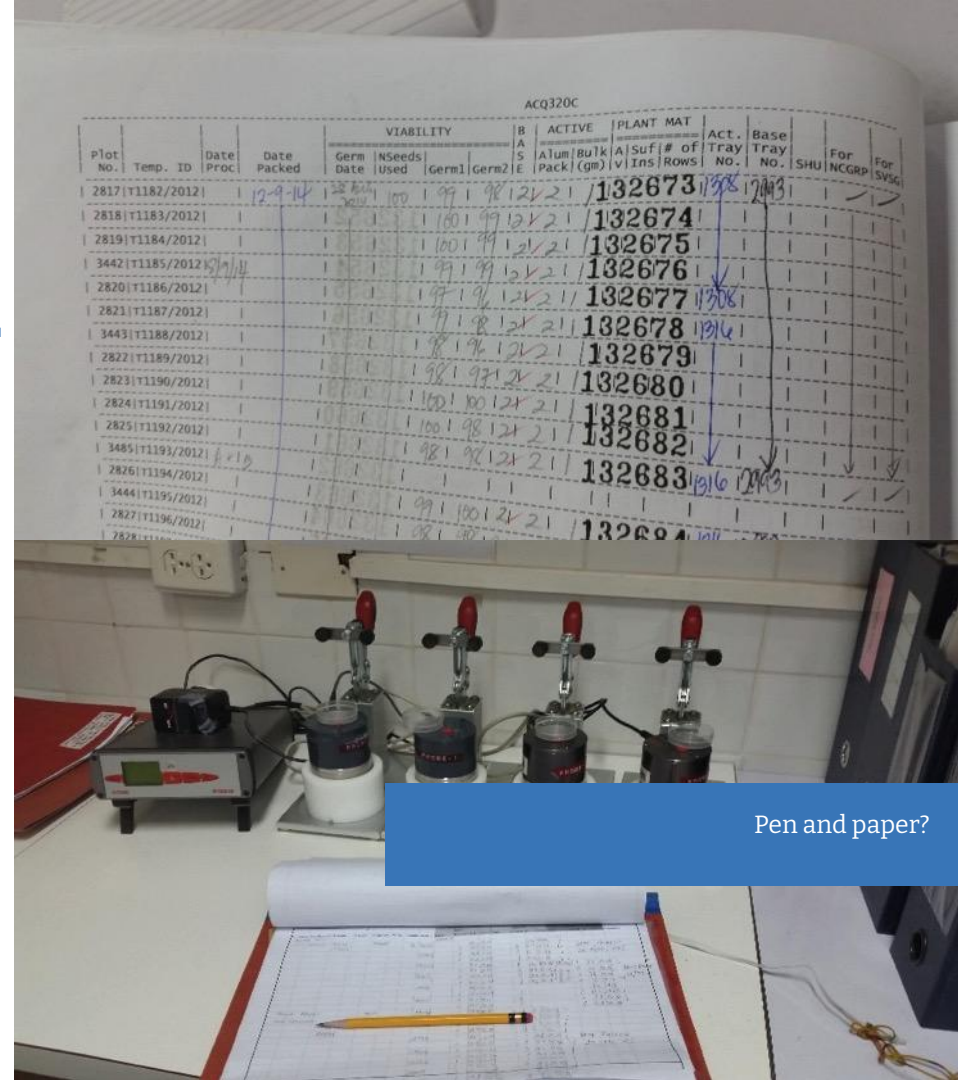
- Internal
- External: National/International

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



Pen and paper?

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

GRIN-Global



GRIN-Global database is used by many national, regional and international genebanks to house genebank data in a common data format.

- Organized and documented data structures
- Shared (data) vocabulary with other genebanks
- Opportunity to engage with other genebanks in sharing knowledge
- Exchange of experiences and tools for data management



Introduction to GGCE

- **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

GGCE Objectives



- **Simple** to access on any device and available in **your language**



Tablets



Personal computers



Cel. phones



Mobile devices

- Supports the use of different **IT gadgets** in genebank operations



GGCE Mission



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

Tools

Scan inventory

Inventory barcode

Jump to accession

Accession Number

Acquisition

Register new material

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 amounts

Update inventory quantity

Inventory storage

Browse aggregated inventory quantity

Seed viability

Browse viability records

Accession

Accession summary

Get a quick overview of the collection

Accessions

Browse all accessions

Passport data in MCPD

Browse accession passport data. Very slow!



NK 74 KEN

Sorghum bicolor subsp. *verticilliflorum*

Accession Prefix	NK
Sequence Number	74
Accession Suffix	KEN
Taxon	<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i>
Maintenance site	GeRRI Kenya
Status	Active
Life Form	Annual and/or Perennial
Level Of Improvement	Genetic material
Reproductive Uniformity	Pureline
Received Date	21 February 2005
Received Date Format	dd/MM/yyyy
Received As	SE
	NPGRG, Zambia-



NK 74 KEN

Sorghum bicolor subsp. *verticilliflorum*

Préfixe de l'accession	NK
Numéro de séquence	74
Suffixe de l'accession	KEN
Taxonomie	<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i>
Site de maintenance	GeRRI Kenya
Statut	Active
Forme de survie	Annuel et/ou pérenne
Niveau d'amélioration	Matériel génétique
Homogénéité de reproduction	Lignée pure
Date initiale de réception	21 février 2005
Forme et date de réception	dd/MM/yyyy
Type de matériel reçu initialement	SE



NK 74 KEN

Sorghum bicolor subsp. *verticilliflorum*

بادئة عدد العينة	NK
رقم التسلسل	74
لاحقة عدد المدخل	KEN
تصنيف	<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i>
موقع الصيانة	GeRRI Kenya
الحالة	Active
الشكل الحيوي	حولية أو معمر أو الاثنان معاً
مستوى التحسين	مادة وراثية
تكاثر موحد	سلالة نقية
تاريخ الاستلام	٢١ فبراير ٢٠٠٥
صيغة تاريخ الاستلام	dd/MM/yyyy
مستلمة على شكل	SE
موقع النسخ الاحتياطي 1	NPGRG Zambia-NPGRG
موقع النسخة الاحتياطية	CSIR-PGRRI Ghana-



NK 74 KEN

Sorghum bicolor subsp. *verticilliflorum*

品系號碼開頭	NK
序號	74
品系號實尾綴	KEN
分類群	<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i>
維護站點	GeRRI Kenya
狀態	?? ACTIVE
生活型	?? ANN-PER
改良階段	?? GENETIC
繁殖均勻性	?? PURELINE
接收日期	21 2 2005
接收日期格式	dd/MM/yyyy
接收狀態	?? SE
備份地點 1	NPGRG Zambia-NPGRG
備份地點 2	CSIR-PGRRI Ghana-

Introduction to GGCE



Why is Crop Trust investing in one **genebank information system**?

- Initial **design and implementation** of an information system requires significant investment
 - Training resources (documentation, user manuals, videos)
 - System hosting and configuration
 - Data migration
- **Maintenance** and **continuous evolution** of an existing system
 - Requires further resources
 - Avoids falling behind current technologies and requiring a new implementation



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



www.croptrust.org