# Viability testing with GGCE

*14 July 2022* Matija Obreza

CROP

# 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?

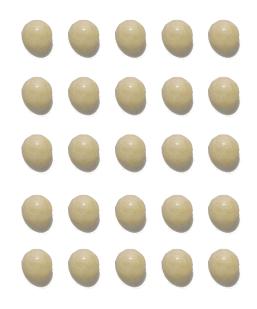
- One sample
- Two replicates
- Each replicate with 25 seed
- Multiple observations
- Final results

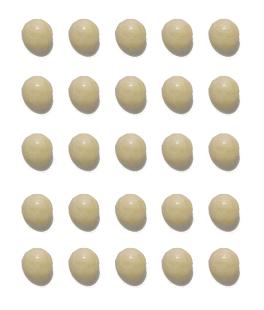






Replicate 2







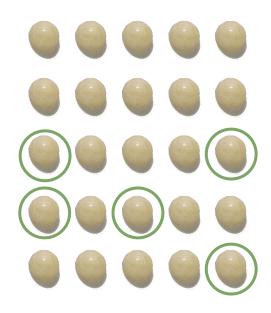
Two replicates with 25 seed each

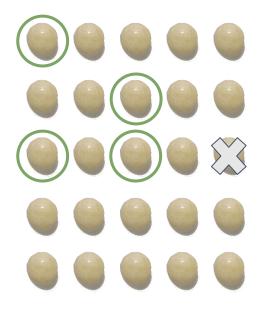


Replicate 1



Replicate 2





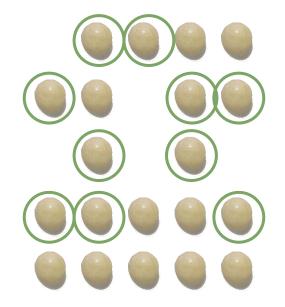


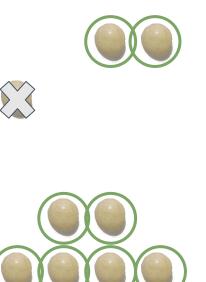
First observation after X days



CROP TPUST Replicate 1

# 0





Time lapse of replicate 1



Replicate 1

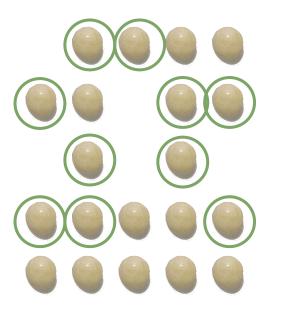
Normal: 4 Dead: 1

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. CANCEL

**CROP TRUST** Recording the first observation



Replicate 1



Normal: 10 Dead: 0 Record observations

Observation barcode 8.1

63

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

	Count Number	Normal Count	Abnormal Count	Estimated Dormant Cc 🌻
1	2	10		
2	1	4	1	

Next observation



Replicate 2	1
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Normal: 8 Dead: 2

#### Record observations

Observation barcode

53

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

	Count Number	Normal Count	Abnormal Count	Estimated Dormant Cc 🌻
1	3	8	2	
2	2	10		
3	1	4	1	

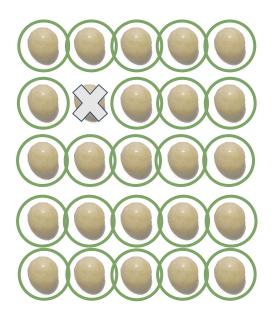


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Next observation



CROP TRUST Replicate 2



did the counting
Tested Count*
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 24
Normal Count 24 normal_count – The number of propagules in the inventory sample that were coun
Normal Count 24 normal_count – The number of propagules in the inventory sample that were coun and displayed normal germination.

Observations of replicate two

Diventory viability	/		ਲ
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	<b>0</b> = 0 + 0		
REMOVE GENERATE LABELS	FINISH TEST		
D Counting Cooperator	eplication Number	Tested Count	Cou 🌣
1 36 Administrator SYSTEM	1	25	11 minutes a
2 35 Administrator SYSTEM	1	25	16 minutes a

1

2

Wrapping up

Administrator SYSTEM

Administrator SYSTEM

CROP TRUST

3 34

4 38

25 18 minutes ag

25 6 seconds ag

Replication Number     1       Tested Count     25       Count Date     12 minutes ago       Normal Count 1     22 (83)       Abnormal Count 1     0 (Na)       Dada Count 1     0 (Na)       Dada Count 1     0 (Na)       Endipt Count 1     0 (Na)       Inferted Count 1     0 (Na)       Tested Count 1     0 (Na)       Dommant Count 1     0 (Na)       Tested Domant Count 1     0 (Na)       Tested Domant Count 1     0 (Na)       Tested Domant Count 1     0 (Na)       Tz Positive Count 1     0 (Na)       Tz Positive Count 1     0 (Na)       Tested Count 2     0 (Na)       Tested Count 2     0 (Na)       Dommant Count 2     0 (Na)       Date Count 3     0 (Na)       Date Count 4     0 (Na)       Date Count 5     0 (Na)       Date Count 2     0 (Na)       Date Count 2     0 (Na)       Date Count 2     0 (Na)       Interset Count 2     0 (Na)       Date Count 2     0 (Na)       Count 2     0 (Na)       Date Coun		
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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%)	Abnormal Count 2	1 (4%)
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Estimated Dormant Count 2         0 (0%)           Treated Dormant Count 2         0 (0%)	Hard Count 2	0 (0%)
Treated Dormant Count 2 0 (0%)	Dormant Count 2	0 (0%)
	Estimated Dormant Count 2	0 (0%)
Confirmed Dormant Count 2 0 (0%)		
	Treated Dormant Count 2	0 (0%)

0 (0%)

0 (0%)

TZ Positive Count 2

TZ Negative Count 2

Diventory viability	(
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	<b>0</b> = 0 + 0

C



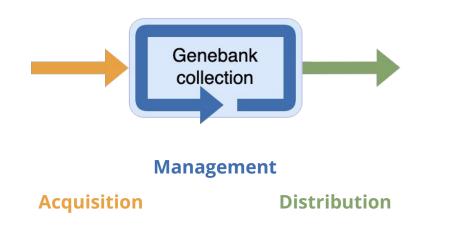
# Genebank collection management

*Introduction to GGCE* Juan Carlos Alarcón

DOD

# **Genebank operations**





#### **Acquisition:**

- Collection
- Donation

#### Management:

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

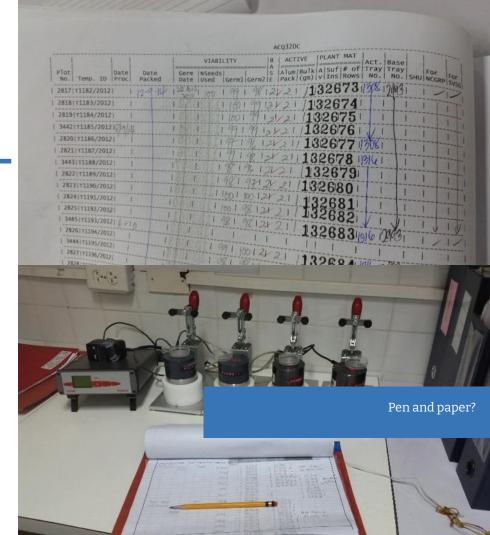
#### **Distribution:**

- 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





# 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 by Global Crop Diversit v2022.5

GGCE enables genebank staff to capture and make use of data across all genebank operations.

<b>\$</b>	GGCE Demo		
Admin tools	Tools		
Home Passport data	Scan inventory	Jump to accession	Acquisition
Inventory Distribution Seed viability	Inventory barcode 50	Accession Number 20	Register new material
Taxonomy Crops Trait data Geography	<b>Distribution</b> Manage requests for material	New request	Verify request items Check that inventories correspond to items in the request for material
Methods Cooperators	Inventory item		
Logout <b>administrator</b> Change password	Inventory summary Overview of the inventory data	Inventory list Browse all inventory records	Inventory groups
	Inventory amounts Update inventory quantity	Inventory storage Browse aggregated inventory quantity	Seed viability Browse viability records
	Accession		
GGCE by Global Crop Diversity Trust	Accession summary Get a quick overview of the collection	Accessions Browse all accessions	Passport data in MCPD Browse accession passport data. Very slow!



مر NK 74 KEN IN	VENTORY ITEMS ATTACH ${f C}$		MENTS D'INVENTAIRE F ${f C}$	с.	المخزون المرفقات م	عناصر NK 74 KEN	№ 74 К	EN 庫存 附件 GROI	o G
NK 74 KEN Sorghum bicolor subsp. verti	icilliflorum	NK 74 KEN Sorghum bicolor subsp. vertici	lliflorum		Sorgh	NK 74 KEN um bicolor subsp. verticilliflorum		N Ibsp. verticilliflorum	
	≡		≡	=					≡
Accession Prefix	NK	Préfixe de l'accession	NK		NK	بادئة عدد العينة	品系號碼開頭	NK	
Sequence Number	74	Numéro de séquence	74		74	رقم التسلسل	序號	74	
Accession Suffix	KEN	Suffixe de l'accession	KEN		KEN	لاحقة عدد المدخل	品系號買尾缀	KEN	
Taxon	Sorghum bicolor subsp. verticilliflorum	Taxonomie	Sorghum bicolor subsp. verticilliflorum		Sorghum bicolor subsp. verticilliflorum	تصنيف	分類群	Sorghum bicolor subsp. verticilliflorum	
Maintenance site	GeRRI Kenya	Site de maintenance	GeRRI Kenva		GeRRI Kenya	موقع الصيانة	維護站點	GeRRI Kenya	
Status	Active	Statut	Active		Active	الحالة	狀態	?? ACTIVE	
Life Form	Annual and/or Perennial	Forme de survie	Annuel et/ou pérenne	ĺ	حولية أومعمر أو الاثنان معاً	الشكل الحيوي	生活型	?? ANN-PER	
Level Of	Genetic material	Niveau	Matériel génétique		مادة وراثية	مستوى التحسين	改良階段	?? GENETIC	
Improvement		d'amélioration			سلالة نقية	تكاثر موحد	繁殖均勻性	?? PURELINE	
Reproductive Uniformity	Pureline	Homogénéité de reproduction	Lignée pure		۲۱ فبرایر ۲۰۰۵	تاريخ الاستلام	接收日期	21 2 2005	
Received Date	21 February 2005	Date initiale de	21 février 2005		dd/MM/yyyy	صيغة تاريخ الاستلام	接收日期格式	dd/MM/yyyy	
Received Date	dd/MM/yyyy	reception			SE	مستلمة على شكل	接收狀態	?? SE	
Format Received As	SE	Forme et date de reception	dd/MM/yyyy		NPGRC Zambia- NPGRC	موقع النسخ الاحتياطي 1	備份地點 1	NPGRC Zambia- NPGRC	
	NPGRC Zambia-	Type de matériel reçu initialement	SE	C	CSIR-PGRRI Ghana-	ممقع النسخة الاحتباطية	備役地影?	CSIR-PGRRI Ghana	1-

GGCE is available in English, **French**, **Arabic** and other languages

CROP TRUST

# 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