



Varieties of eggplant, c. 1870.
Chromolithograph by H. Briscoe.

GLOBAL STRATEGY FOR THE CONSERVATION AND USE OF EGGPLANTS

ECPGR/Global Trust
seminar June 2025
Svein Ø. Solberg

METHODOLOGY

- Databases review
 - Current collections (reported to Genesys and WIEWS)



- Additional collections (not in Genesys and VIEWS)
 - Relationship between production and conservation
 - Conservation by biological status
 - Conservation of crop wild relatives
- Survey and webinars with collection holders around the world
 - General information on the collections
 - Conservation priorities and collection gaps
 - Maintenance and documentation





CO-AUTHORS

Maarten van Zonneveld, World Vegetable Center

Mohamed T. Rakha, Kafrelsheikh University, Egypt

Dalia I. Taher, Horticulture Research Institute, Egypt

Jaime Prohens, Instituto de Conservación y Mejora de la Agrodiversidad Valenciana, Spain

Robert Jarret, USDA, USA

Willem van Dooijeweert, Centre for Genetic Resources, The Netherlands

Peter Giovannini, Global Crop Diversity Trust





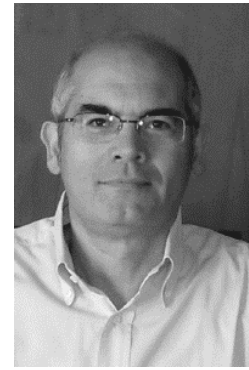
Najla Mezghani,
Banque Nationale
de Gènes, Tunisia



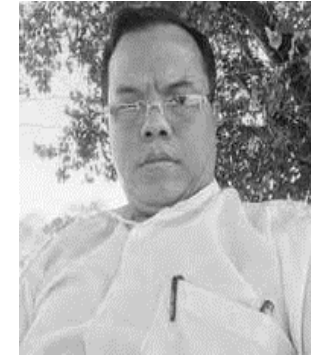
Chithra Devi Pandey,
ICAR-National
Bureau of Plant
Genetic Resources,
India



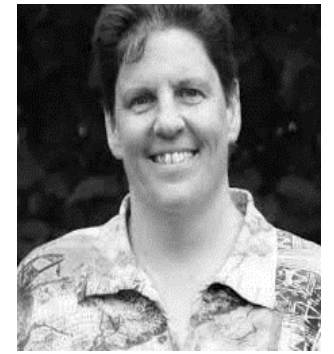
Beate Schierscher,
Agroscope,
Switzerland



Gaetano Laghetti,
Institute of
Biosciences and
BioResources, Italy



Htwe Min Thant,
Department of
Agricultural
Research, Myanmar



Ulrike Lohwasser,
IPK, Germany



Kunyaporn
Pipithsangchan,
DOA Genebank,
Thailand



Rebecca Stevens,
INRAE Centre for
Vegetable
Germplasm, France



Sonja Ivanovska,
Faculty of Agricultural
Sciences and Food,
Skopje, N. Makedonia

Yaw Kwateng,
CSIR-Plant Genetic
Resources Research
Institute,
Ghana

Mariusz Chojnowski,
The National Institute of
Horticultural Research,
Poland

Roman Krutko
Institute of Vegetable and
Melon Growing of NAAS,
Ukraine

RESULTS
DATABASES REVIEW:
ACCESSIONS OF EGGPLANTS

S. melongena (Brinjal eggplant, common eggplant, aubergine)

S. aethiopicum (Scarlet eggplant)

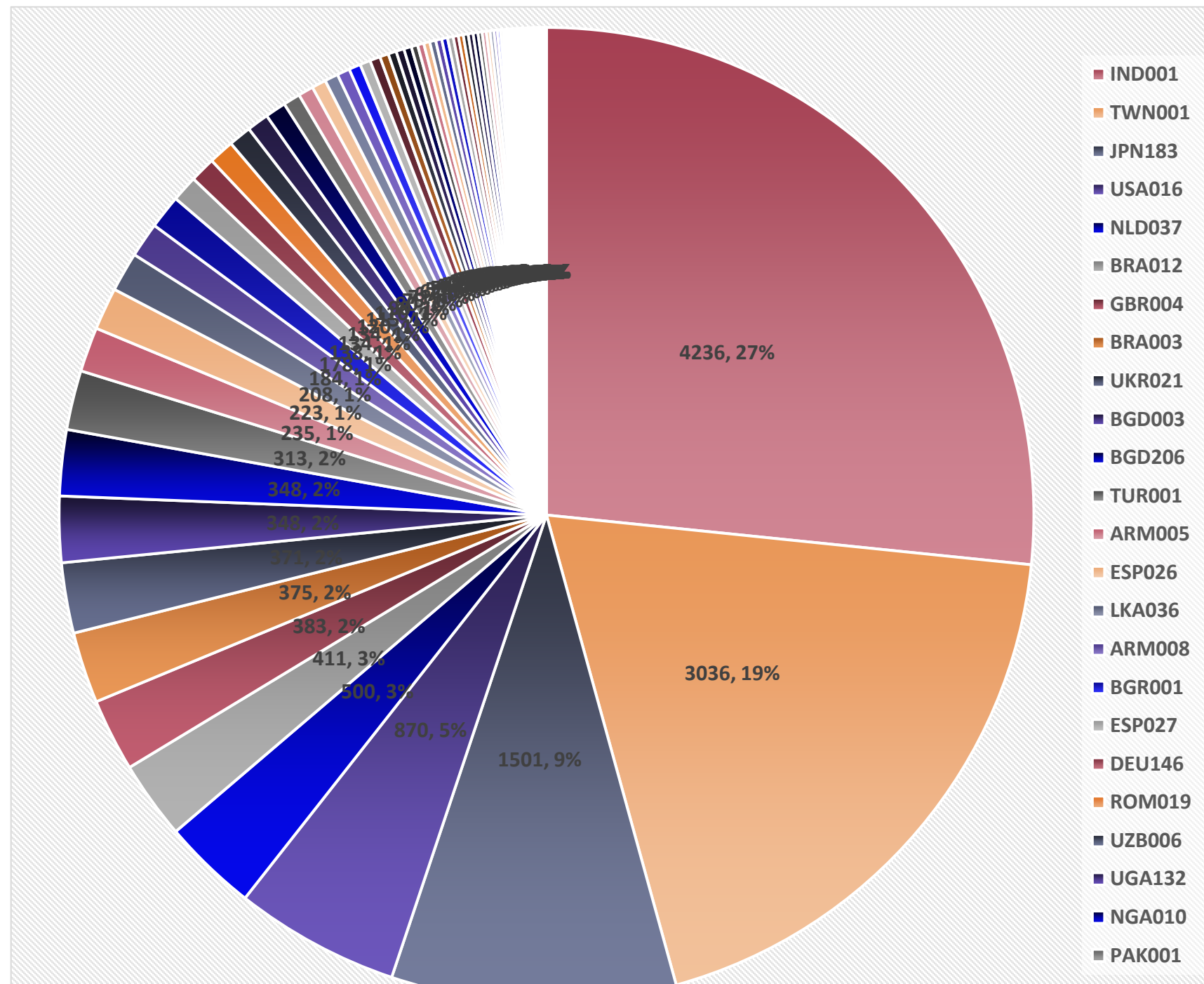
S. macrocarpon (Gboma eggplant)



A FEW LARGE EGGPLANT COLLECTIONS – MANY SMALL

- FAO WIEWS and Genesys:
 - 110 collection holders in 76 countries
 - 5 collections with 500 eggplant accessions or more
- 78% of the collections have less than 100 accessions
- 54% have less than 20 accessions.

EGGPLANT COLLECTIONS (GENESYS AND WIEWS)



SEVERAL COUNTRIES NOT IN GENESYS AND WIEWS

- Of the total number of 193 United Nation's recognized countries in the world, 123 have no current eggplant collections in Genesys or VIEWS.
- 60 countries not listed in the global databases but with potential eggplant collections in the countries
- Most of these countries are developing countries in Africa and Asia
- China, Iran and Indonesia, three major producing countries in the world, are not in Genesys and WIEWS
- The eggplant collections of Australia, Republic of Korea, Uruguay, South Africa, and the Russian VIR collection of eggplant is not in the global databases.

CONSERVED ACCESSIONS (Y-AXIS) VS. AREA OF CULTIVATION (X-AXIS)

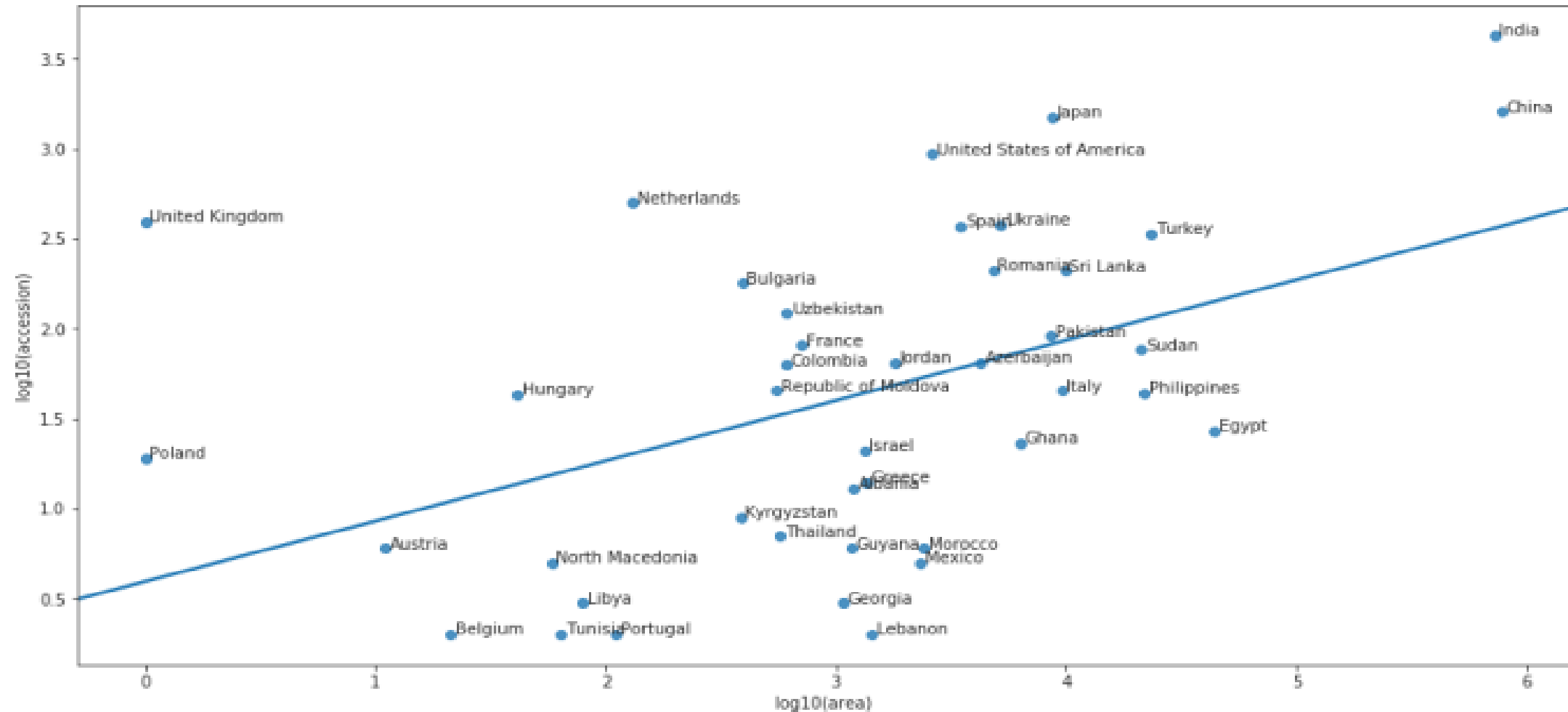


Figure 2.1. Number of conserved eggplant accession in selected countries (y-axis) versus production area of eggplant in the same countries (x-axis). Values were log10-transformed for clearer separation of countries on the graph. $R^2 = 0.22$.

Species	Biological status	Number of accessions	% of total
<u><i>S. melongena</i> (Brinjal eggplant)</u>			
	Wild	13	0.1
	Landrace	1300	10.3
	Breeding material	272	2.1
	Cultivars	484	3.8
	Others	757	6.0
	No info (unknown)	9839	77.8
	<i>Total Brinjal eggplant</i>	<i>12665</i>	<i>100</i>
<u><i>S. aethiopicum</i> (Scarlet eggplant)</u>			
	Wild	81	8.1
	Landrace	119	11.9
	Breeding material	3	0.3
	Cultivars	23	2.3
	Others	67	6.7
	No info (unknown)	711	70.8
	<i>Total Scarlet eggplant</i>	<i>1004</i>	<i>100</i>
<u><i>S. macrocarpon</i> (Gboma eggplant)</u>			
	Wild	20	9.6
	Landrace	41	19.7
	Breeding material	0	0
	Cultivars	0	0
	Others	3	1.4
	No info (unknown)	144	69.2
	<i>Total Gboma eggplant</i>	<i>208</i>	<i>100</i>

Data from Genesys and WIEWS

More than 70% of the eggplant accessions have no information on biological status (SAMPSTAT)

CROP WILD RELATIVES



Genepools following the Harlan and de Wet CWR Inventory but with two additional taxa from the **CWR Priority Checklist** (Vincent, et al. 2013).

In bold are the 18 taxa included in the CWR Priority Checklist.

Crop Wild Relative taxon	Number of accessions	Geographical distribution	Confirmed traits and references, or comments
<u>Primary genepool (GP1)</u>			
<i>S. insanum</i> L. ^A	79	E & S Asia	Bacterial wilt tolerance (Namisy et al
<u>Secondary genepool (GP2)</u>			
<i>S. adoense</i> Hochst. ex A. Braun ^B	3	E Africa	Synonym of <i>S. anguivi</i> Lam.
<i>S. agnewiorum</i> Voronts.	1	E Africa	
<i>S. aldabrense</i> C.H. Wright ^B	1	E Africa	Synonym of <i>S. anguivi</i> Lam.
<i>S. aureitomentosum</i> Bitter	0	E & C Africa	
<i>S. campylacanthum</i> Hochst. Ex. A. Rich. ^C	59	E & S Africa	Whitefly resistance (Taher et al. 2020
<i>S. cerasiferum</i> Dunal	60	Africa	
<i>S. deflexicarpum</i> C.Y. Wu & S.C. Huang	0	China	
<i>S. glabratum</i> Dunal	0	E Africa	
<i>S. hovei</i> Dunal	0	India	
<i>S. incanum</i> L.	423	C & W Asia, E & N Africa	Drought tolerance (Knapp et al. 2013) Verticillium wilt tolerance (Frery et a
<i>S. lichtensteinii</i> Willd.	2	S Africa	Drought tolerance (Plazas et al. 2016)
<i>S. linnaeanum</i> Hepper & P.M. L. Jaeger	21	E & S Africa	Salinity and fungal wilt tolerance (Liu 2015).
<i>S. litoraneum</i> A.E. Gon	0	S Africa	
<i>S. malindiense</i> Voronts.	1	E Africa	
<i>S. rigidum</i> Lam.	0	W Africa	
<i>S. sodomeodes</i> Kuntze	1	S Africa	
<i>S. taitense</i> Vatke	0	E Africa	
<i>S. torreanum</i> A.E. Gon	1	S Africa	
<i>S. umtuma</i> Voronts. & S. Knapp	0	S Africa	
<i>S. usambarensense</i> Bitter & Dammer	1	E Africa	
<i>S. vicinum</i> A.R. Bean	1	Australia	
<u>Tertiary genepool</u>			

Tertiary genepool

<i>S. aculeatissimum</i> Jacq.	210	Africa	Frost tolerance (Rotino et al. 2014)
<i>S. anguivi</i> Lam. ^D	232	Africa	
<i>S. anomalum</i> Thonn.	57	W & C Africa	
<i>S. asperolanatum</i> Ruiz & Pav. ^E	41	S America	
<i>S. burchellii</i> Dunal	0	S Africa	
<i>S. capense</i> L.	5	S Africa	
<i>S. catombelense</i> Peyr.	5	E & S Africa	
<i>S. cinereum</i> R. Br.	4	Australia	
<i>S. coagulans</i> Forssk. ^F	27	E & N Africa, W Asia	
<i>S. cumingii</i> Dunal. ^B	0	E Asia	Synonym of <i>S. undatum</i> Lam.
<i>S. cyaneopurpureum</i> De Wild.	4	E & C Africa	
<i>S. dasyphyllum</i> Schumach.	61	Africa	Whitefly resistance (Plazas et al. 2016 al. 2020)
<i>S. forskalii</i> Dunal	0	Africa	
<i>S. goetzei</i> Dammer	2	E & S Africa	
<i>S. grandiflorum</i> Ruiz & Pav. ^G	184	S America	
<i>S. hastifolium</i> Hochst. ex Dunal	11	E Africa	
<i>S. humile</i> Lam. ^H	6	S Africa	
<i>S. inaequiradians</i> Werderm.	0	E Africa	
<i>S. lamprocarpum</i> Bitter	0	E Africa	
<i>S. lidii</i> Sunding	2	S Europe	
<i>S. macracanthum</i> A. Rich.	4	E Africa	
<i>S. macrocarpon</i> L.	208	Africa	Good rootstock traits (USDA 2011)
<i>S. marginatum</i> L. f.	21	E Africa	
<i>S. mauense</i> Bitter	7	E Africa	
<i>S. melanospermum</i> F. Muell.	0	Australia	
<i>S. nigriviolaecum</i> Bitter	3	S Europe, E Africa	
<i>S. platacanthum</i> Dunal	0	Yemen	

IN THE GLOBAL EX SITU CONSERVATION
SYSTEM, THERE ARE ONLY 79 WILD
ACCESSIONS OF THE SPECIES *S. INSANUM*
(THAT IS IN THE PRIMARY GENEPOOL OF
BRINJAL EGGPLANT)

THERE ARE SPECIES FROM THE CWR
PRIORITY CHECKLIST WITH NO OR VERY
FEW ACCESSIONS IN THE GLOBAL EX SITU
CONSERVATION SYSTEM

SURVEY RESULTS

With focus on the conservation



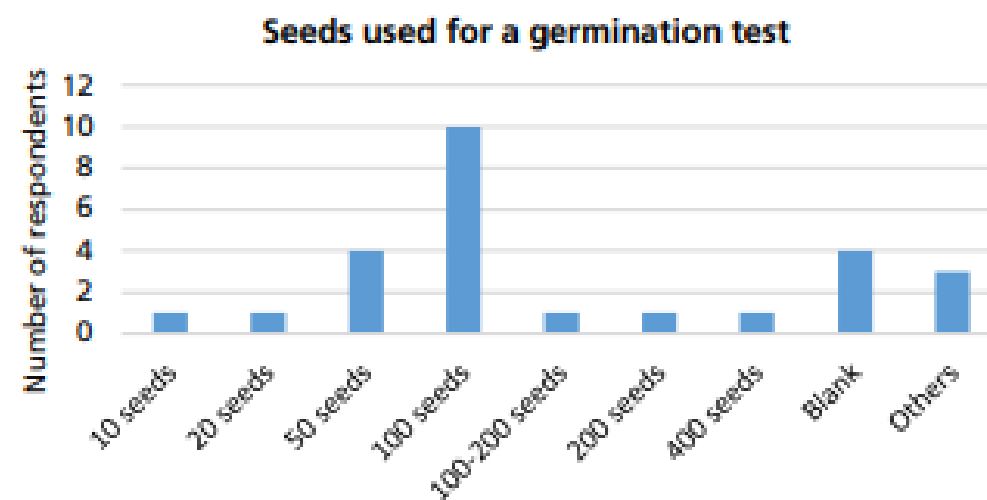
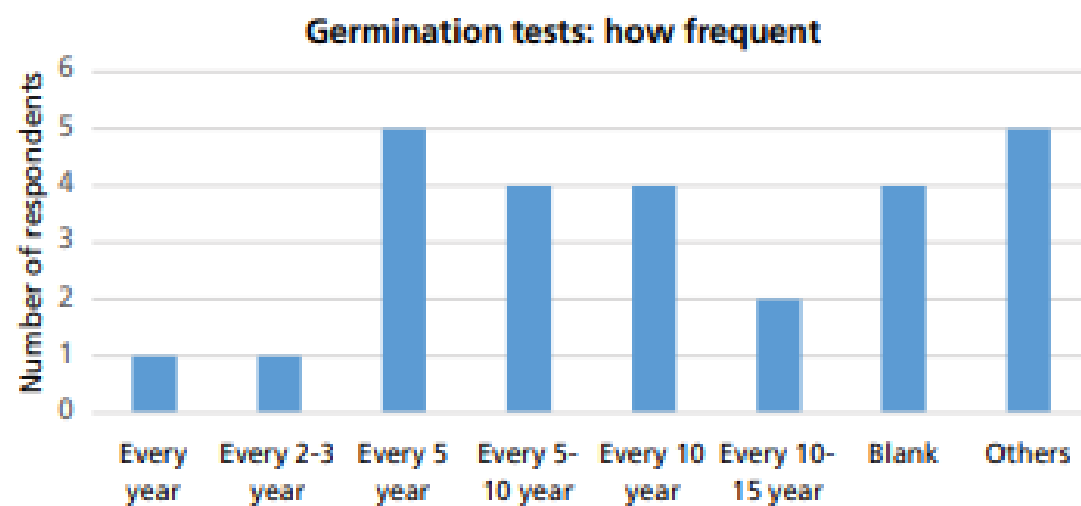


Figure 3.1. Respondents' answers to questions about the frequency of germination tests for eggplant seeds and the number of seeds per germination test.

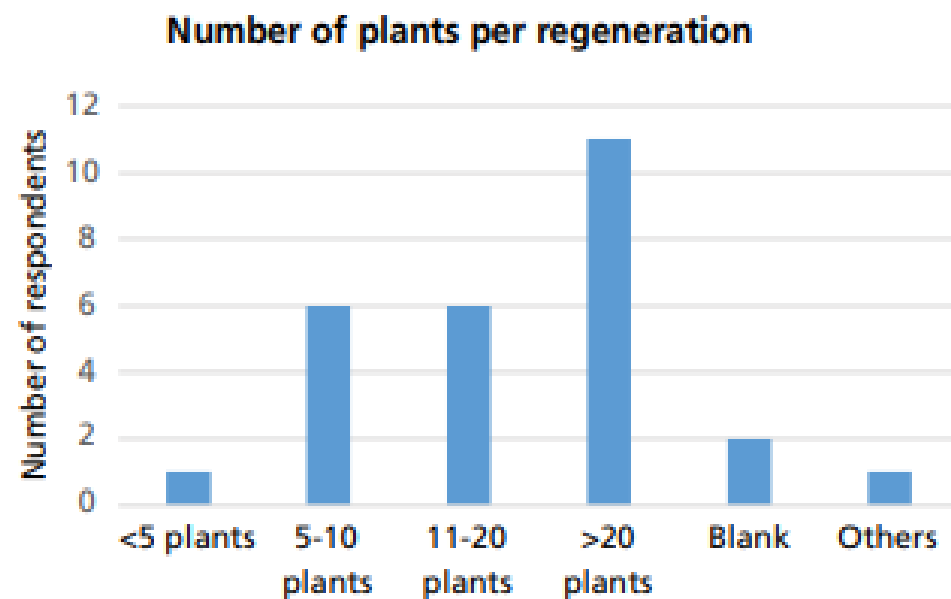


Figure 3.2. Respondents' answers to a question about the number of plants used to regenerate an accession.

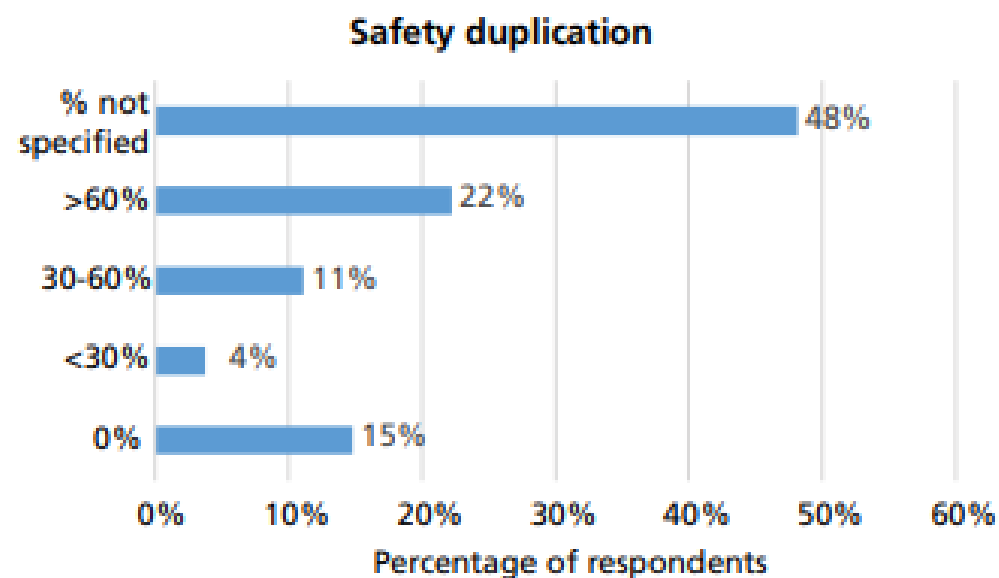
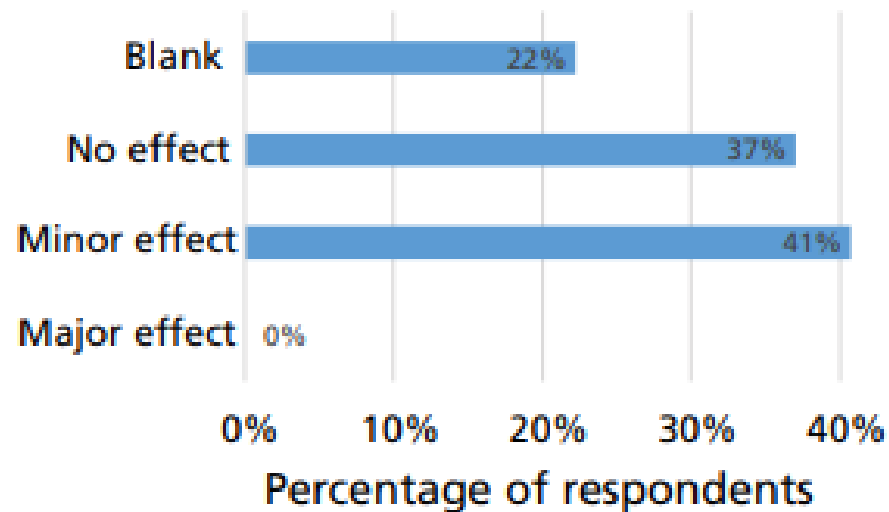


Figure 3.3. Respondents' answers to a question about the percentage of the eggplant collection that is safety duplicated.

Pest and diseases: effects on conservation



Pests and disease: effects on the distribution

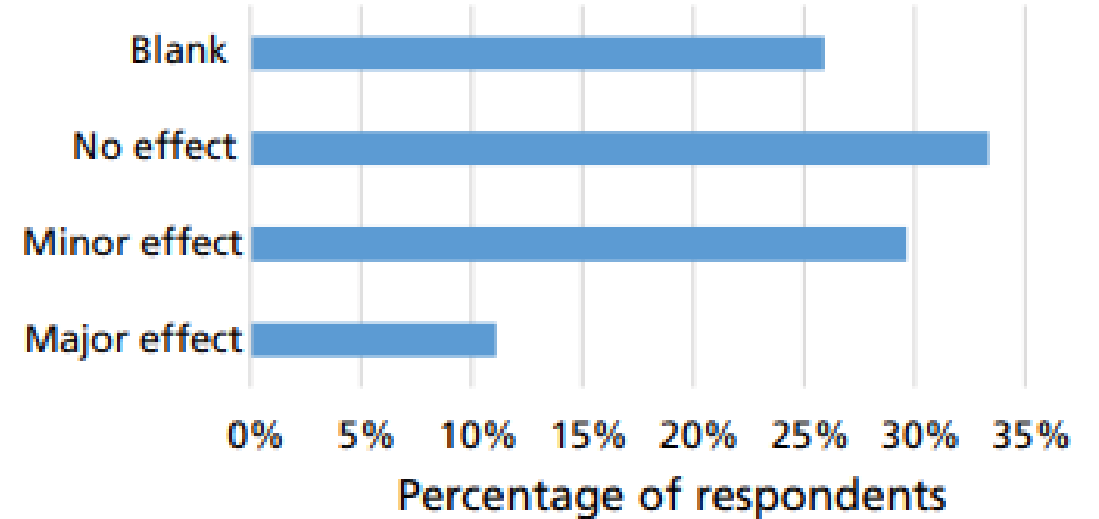


Figure 3.4. Respondents' perceptions of the effects of pests and diseases on conservation and distribution, respectively.

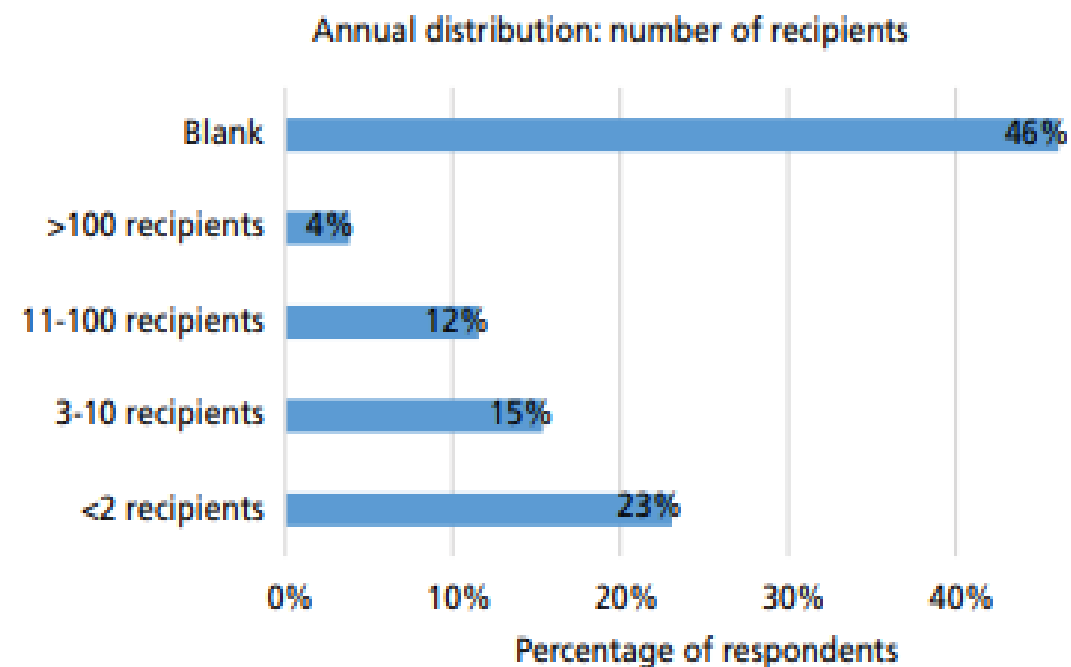
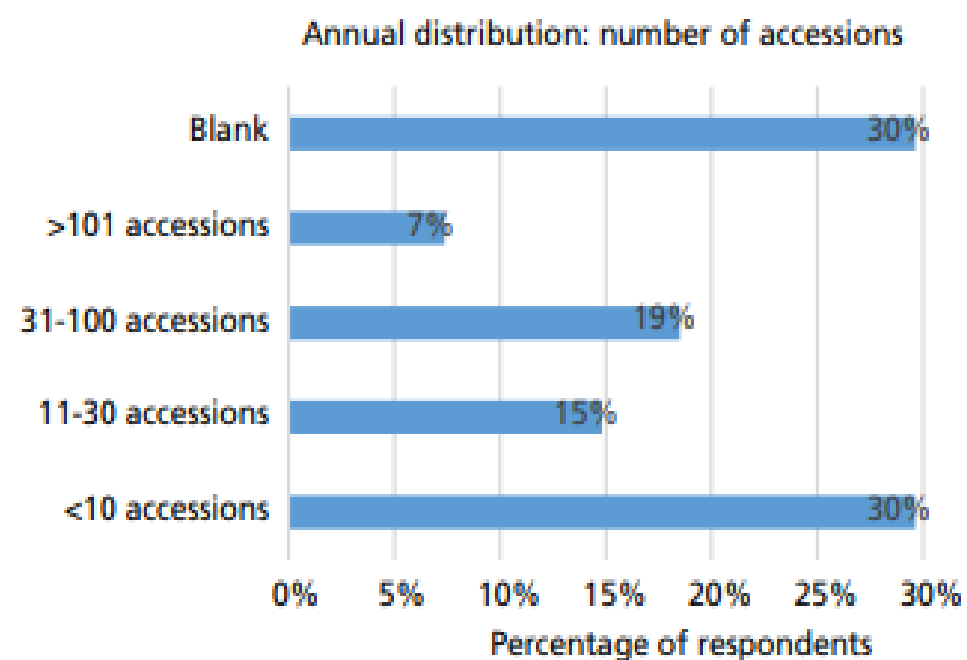


Figure 3.5. Annual numbers of distributed eggplant accessions and recipients, as specified by respondents.

KEY ISSUES FROM THE SURVEY (RELATED TO CONSERVATION)

- Funding
- Availability of accessions
 - Plant health
 - Information
- Collaboration





RECOMMENDATIONS

7 ACTIVITIES TO BE CONDUCTED

GLOBAL EGGPLANT WORKING GROUP AND KNOWLEDGE PLATFORM (ACTIVITY 1)

Coordination – collaboration - communication

GAP ANALYSIS AND DUPLICATE SCREENING (ACTIVITY 2)

Passport data – avoid too many accessions of the same material

PLANT HEALTH ISSUES (ACTIVITY 3)

Virus/viroids - distribution

REGENERATION AND SAFETY DUPLICATION (ACTIVITY 4)

Reduce backlogs – improve quality

COLLECTION MISSIONS (ACTIVITY 5)

Gap analysis

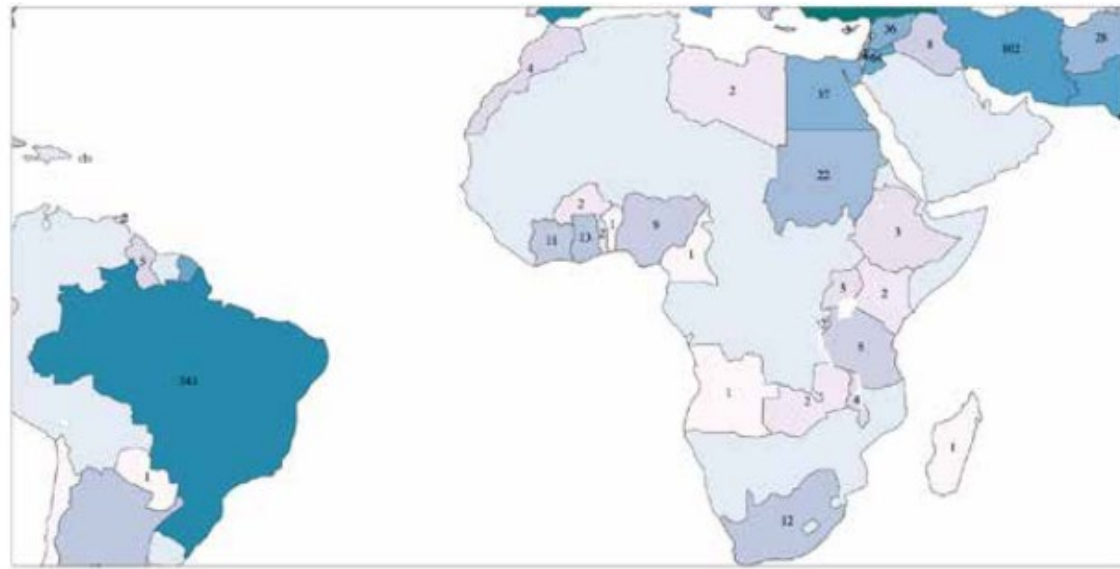
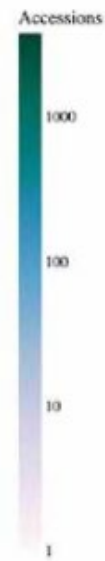


Figure 2.3. Choropleth map of Africa showing number of *S. melongena* accessions recorded as landraces or with unknown biological status by country of origin based on the data recorded in Genesys and WIEWS.



BRINJAL EGGPLANT

Landraces, old cultivars, or unknown biological status

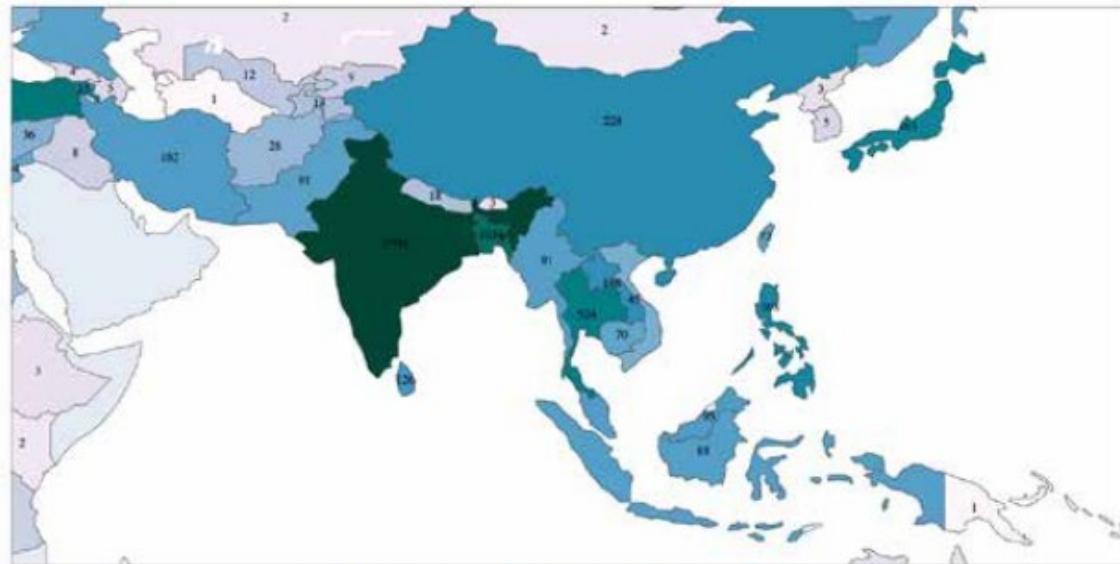
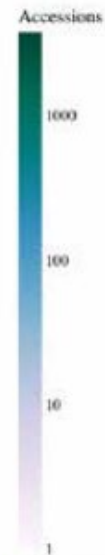


Figure 2.4. Choropleth map of South Asia, Southeast Asia and East Asia showing number of *S. melongena* accessions recorded as landraces or with unknown biological status by country of origin based on the data recorded in Genesys and WIEWS.



AFRICAN EGGPLANT

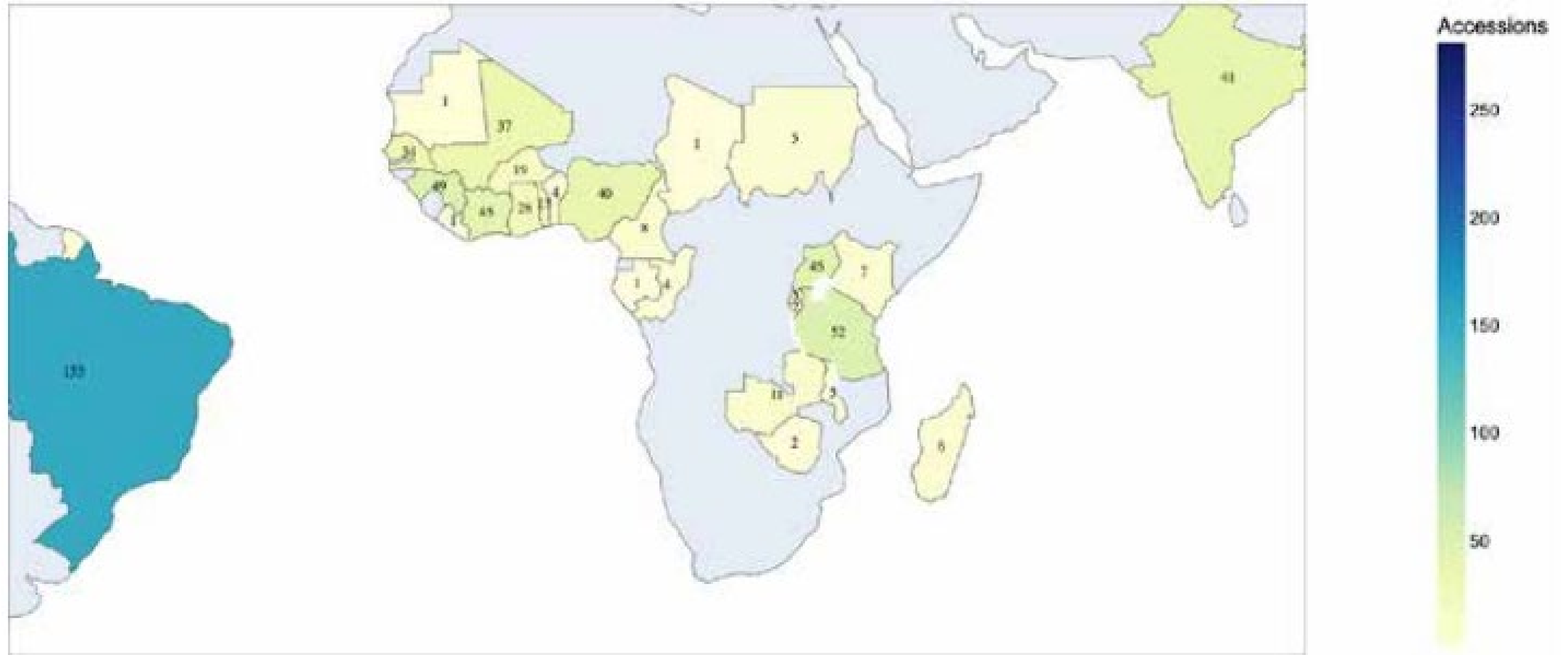


Figure 2.5 Choropleth map showing number of *S. aethiopicum* accessions recorded as landraces or with unknown biological status by country of origin based on the data recorded in Genesys and WIEWS.

MORPHOLOGICAL AND GENOMIC CHARACTERIZATIONS (ACTIVITY 6)

Improve knowledge on the material – enhancing use

PROMOTE THE USE OF CWR IN BREEDING THROUGH PUBLIC-PRIVATE PARTNERSHIPS (ACTIVITY 7)

Abiotic & biotic stress tolerance

TENTATIVE BUDGET FOR IMPLEMENTING THE STRATEGY

Table 4.2. Tentative budget for implementing the global strategy for the conservation and use of eggplant genetic resources (in EUR). In-kind contribution comes in addition.

Activity and items	Year 1	Year 2	Year 3	Year 4	Total
Establishment of a global eggplant working group and knowledge platform, and attraction of funds for a global eggplant collection (Activity 1)	50,000	25,000	25,000	25,000	125,000
Data uploading, gap analysis and duplicate screening (Activity 2)	20,000	20,000	20,000	20,000	80,000
Plant health issues (Activity 3)	35,000	35,000	35,000	35,000	120,000
Regeneration and safety duplication (Activity 4)	187,500	187,500	187,500	187,500	750,000
Morphological and molecular characterization of accessions (Activity 5)	50,000	50,000	50,000	50,000	200,000
Targeted collection missions to fill collection gaps (Activity 6)		75,000	75,000		
Use of CWR in breeding, consultation with users to identify important traits (resistance, quality, nutrition) and establishment of public-private partnerships (Activity 7)	40,000	40,000	20,000	20,000	120,000
Total	327,500	402,500	382,500	307,500	1,420,000

THANK YOU!



Svein Ø. Solberg



+46 735401516



svein.solberg@inn.no

University of Inland Norway