

Status report on potato genetic resources in Germany

- towards a bio digital Resource Centre





Status report on potato genetic resources in Germany

Klaus J. Dehmer

Gross Luesewitz Potato Collections (GLKS)
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)

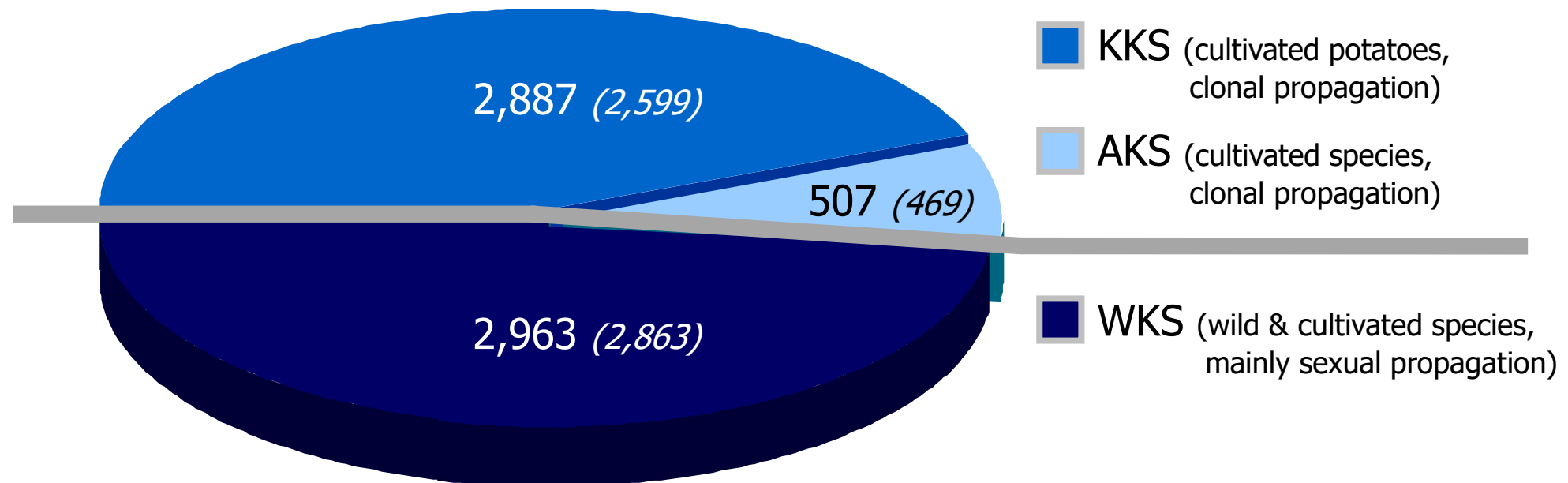
Klaus J. Dehmer - "Status report on potato genetic resources in Germany" - ECPGR,

Edinburgh, 05.12.2006

GLKS – the Gross Luesewitz Potato Collections

overview

- 140 tuber-bearing *Solanum* species (7 cultivated, 133 wild species), total 6,357 accessions (2006: 5,931 accs.)

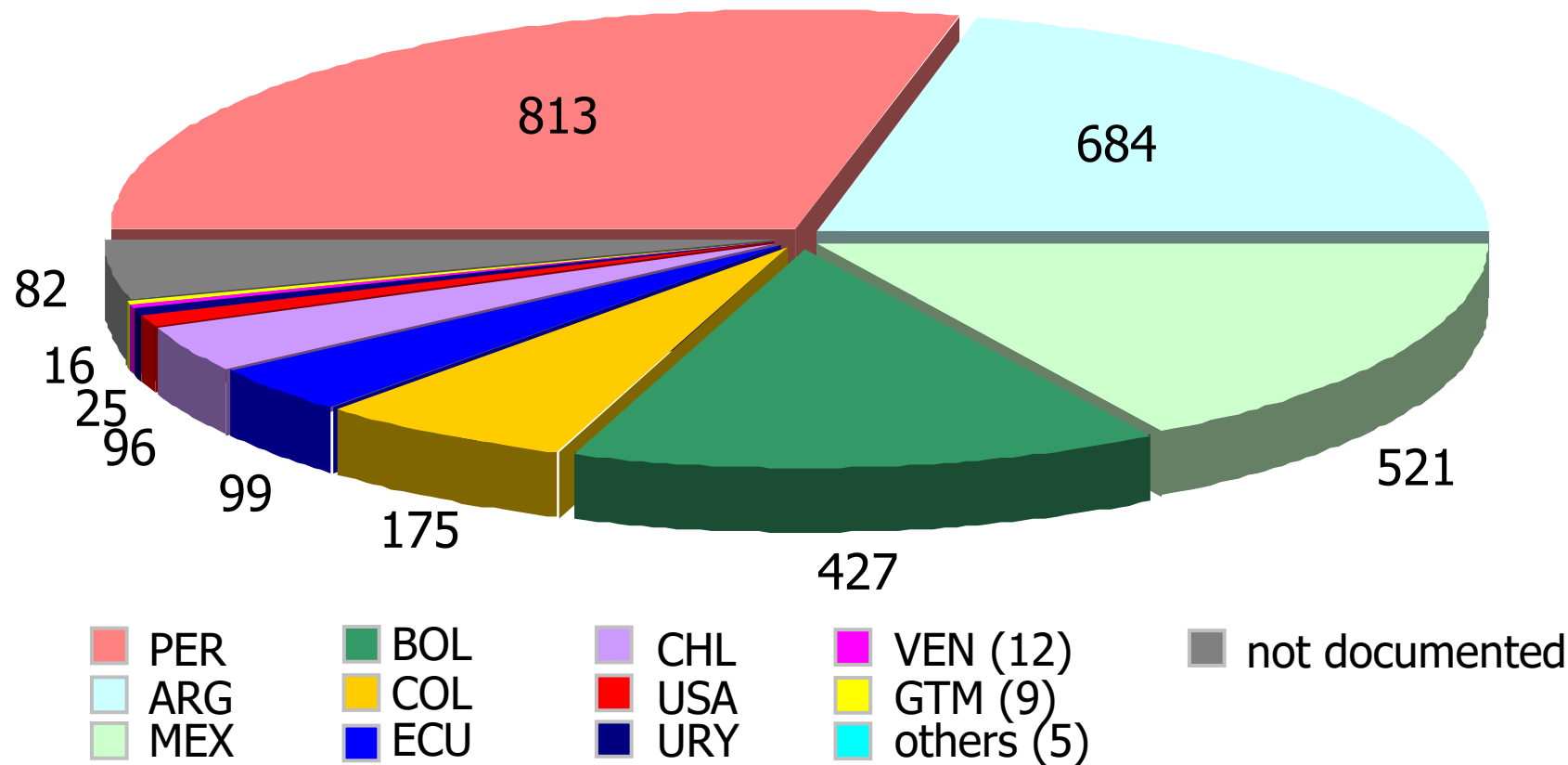


status: 03/2024

The Gross Luesewitz Wild Potato Collection

WKS; *Solanum spec.*

- countries of origin (*total: 15*)

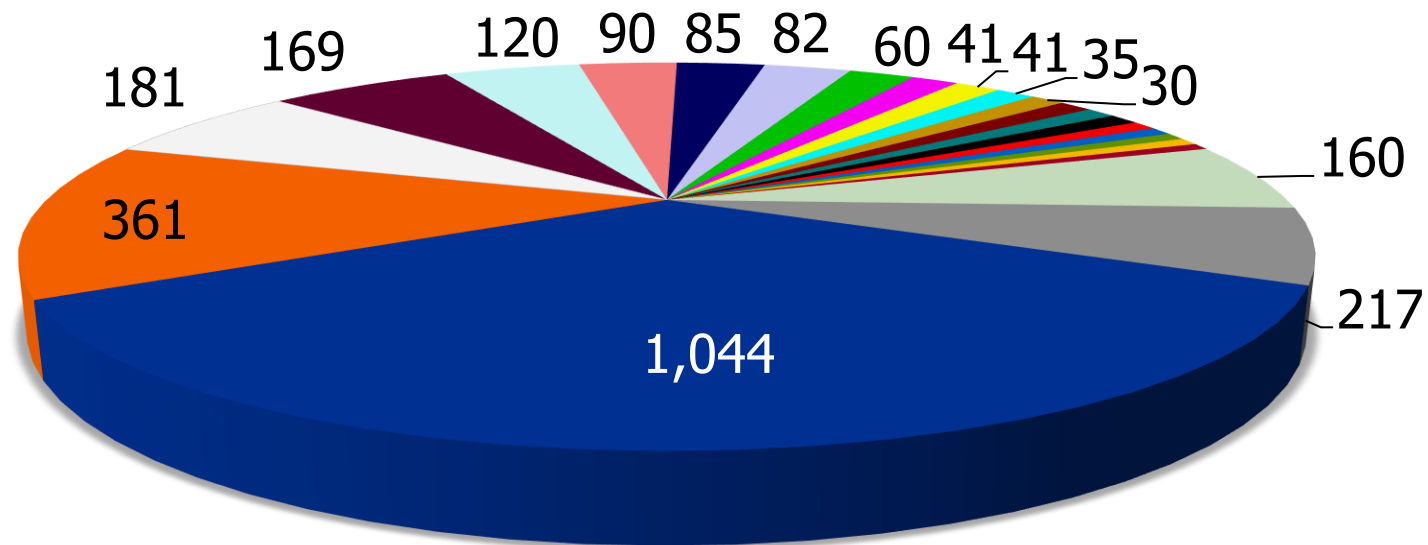


status: 03/2024

The Gross Luesewitz Cultivated Potato Collection

KKS; *Solanum tuberosum* subsp. *tuberosum* L.

- countries of origin (total: 52)

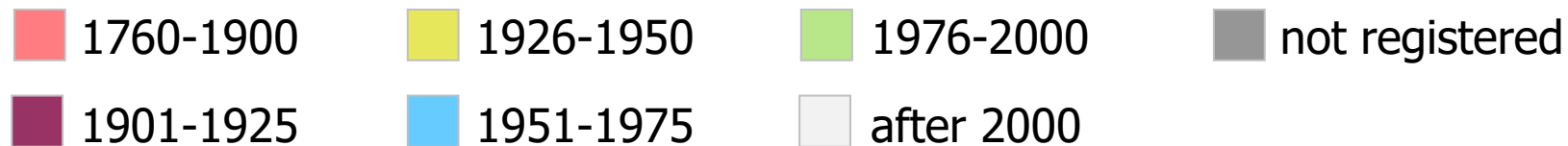
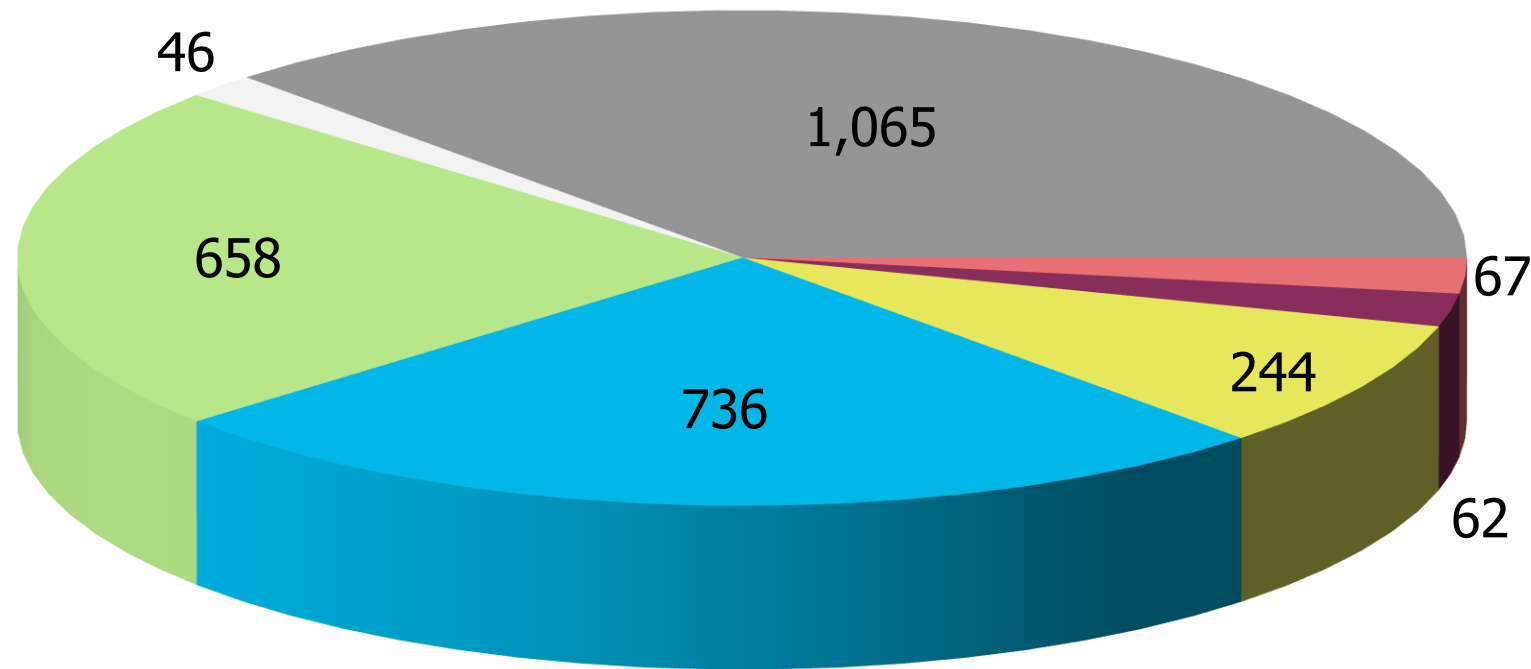


status: 03/2024

The Gross Luesewitz Cultivated Potato Collection

KKS; *Solanum tuberosum* subsp. *tuberosum* L.

- historic accessions



status: 03/2024

GLKS – the Gross Luesewitz Potato Collections

maintenance

- cultivated potatoes



field



in vitro



in cryo

GLKS – the Gross Luesewitz Potato Collections

maintenance

- cultivated potatoes - *field*



KKS 2023: 240 accessions
AKS 2023: 10 accessions



GLKS – the Gross Luesewitz Potato Collections

maintenance

- cultivated potatoes - *in vitro*

An *in vitro* potato cultivar collection: microtuberization and storage of microtubers

Ramona Thieme¹

Summary

A technique based on *in vitro* tuberization and storage of the microtubers in the dark at low temperature is described for maintaining an *in vitro* potato cultivar collection. It enables genotypes to be preserved for about two years without further manipulation. Storage of five to ten replications per genotype is sufficient. Maintenance of the collection is economical because energy and labour inputs are low. The material is easily propagated and the method can be adapted for a wide range of genotypes.

FAO/IBPGR Plant Genetic Resources Newsletter, 88/89:17-19

GLKS – the Gross Luesewitz Potato Collections maintenance

- cultivated potatoes - *in vitro*



GLKS – the Gross Luesewitz Potato Collections maintenance

- cultivated potatoes - *in cryo*
R.G. CSB (Gatersleben)



GLKS – the Gross Luesewitz Potato Collections

maintenance

- wild potatoes - *seeds*



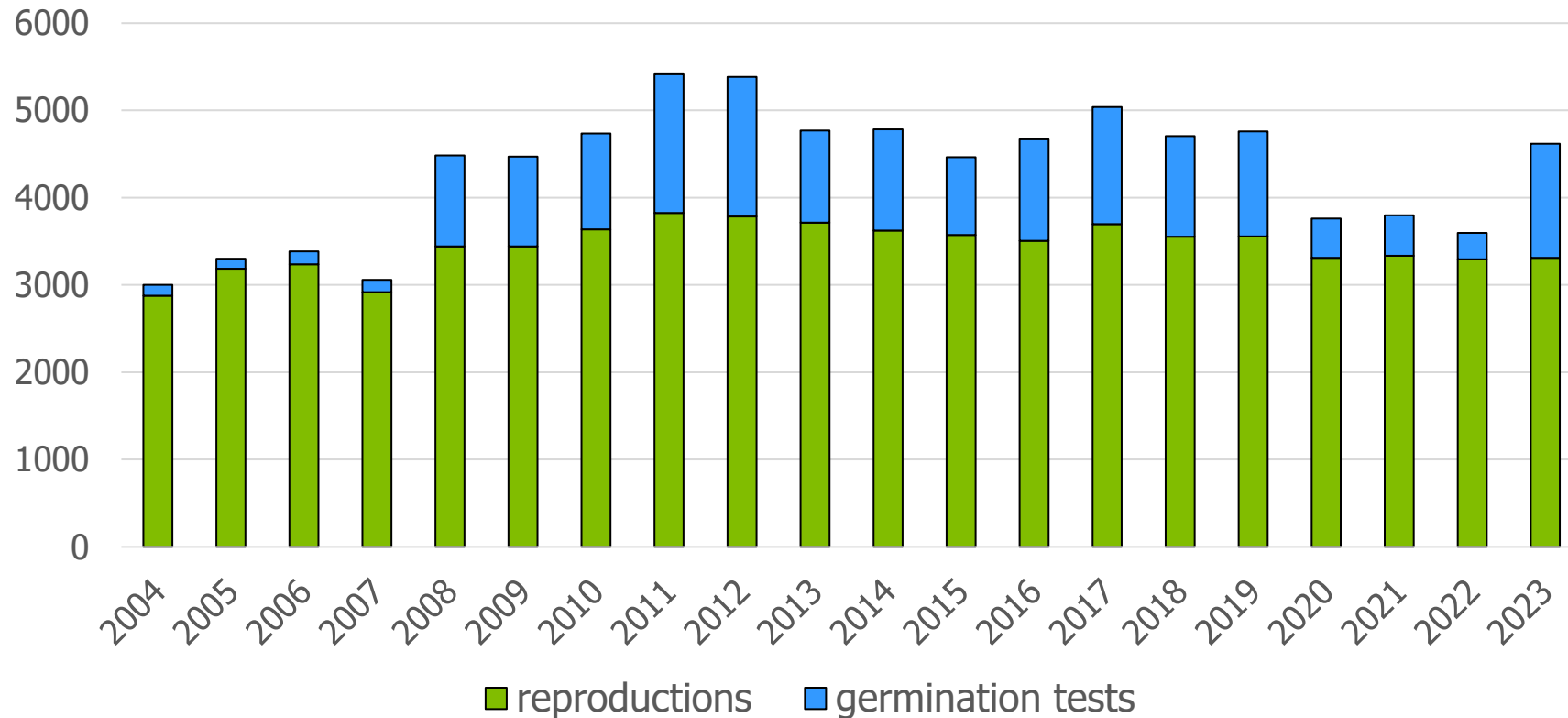
2023: Modernisation of GLKS greenhouse and building management system

accessions (JKI)

GLKS – the Gross Luesewitz Potato Collections

maintenance

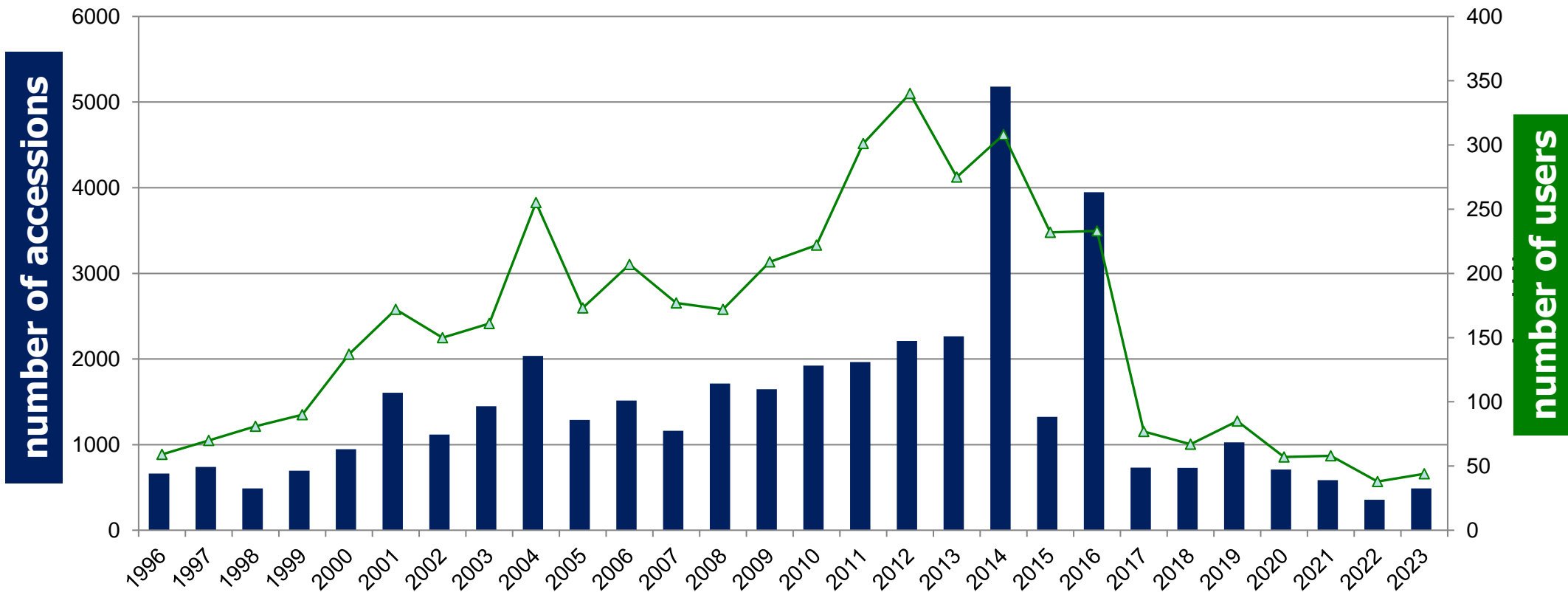
- summary



GLKS – the Gross Luesewitz Potato Collections

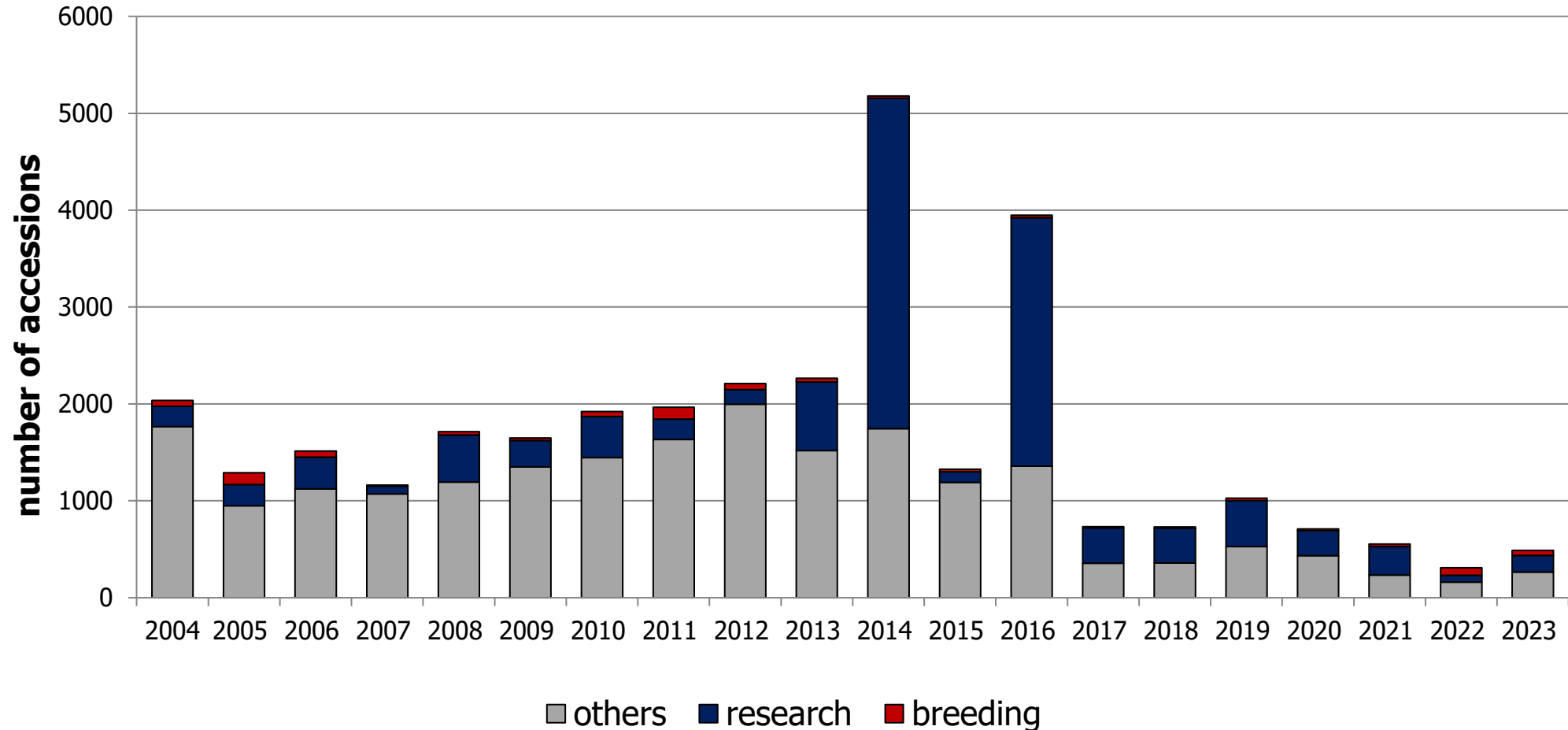
distribution

average annual distributions:
1,447 accessions to 159 users

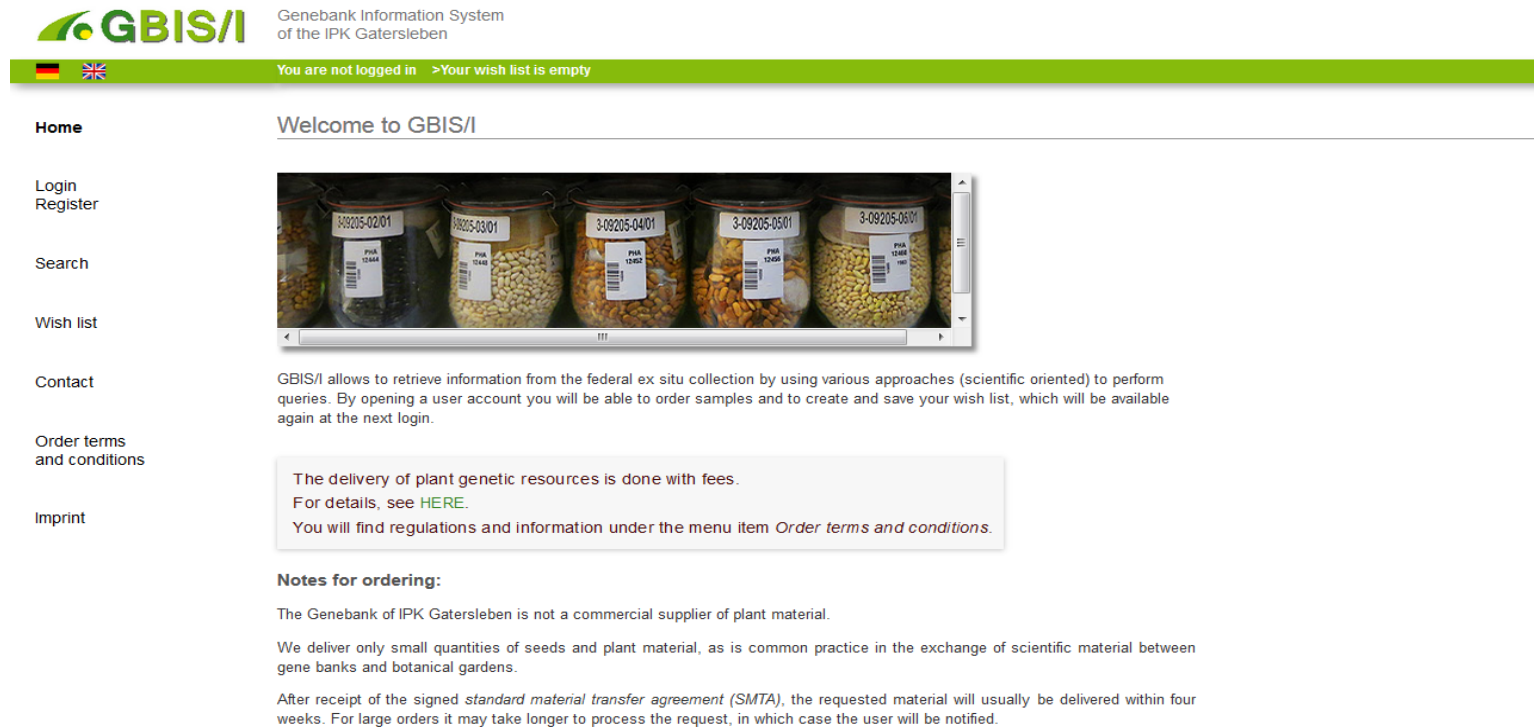


GLKS – the Gross Luesewitz Potato Collections

distribution



GLKS – the Gross Luesewitz Potato Collections documentation




GBIS/I Genebank Information System of the IPK Gatersleben

🇩🇪 🇬🇧 You are not logged in >Your wish list is empty

- Home
- Login Register
- Search
- Wish list
- Contact
- Order terms and conditions
- Imprint

Welcome to GBIS/I



GBIS/I allows to retrieve information from the federal ex situ collection by using various approaches (scientific oriented) to perform queries. By opening a user account you will be able to order samples and to create and save your wish list, which will be available again at the next login.

The delivery of plant genetic resources is done with fees.
For details, see [HERE](#).

You will find regulations and information under the menu item *Order terms and conditions*.

Notes for ordering:

The Genebank of IPK Gatersleben is not a commercial supplier of plant material.

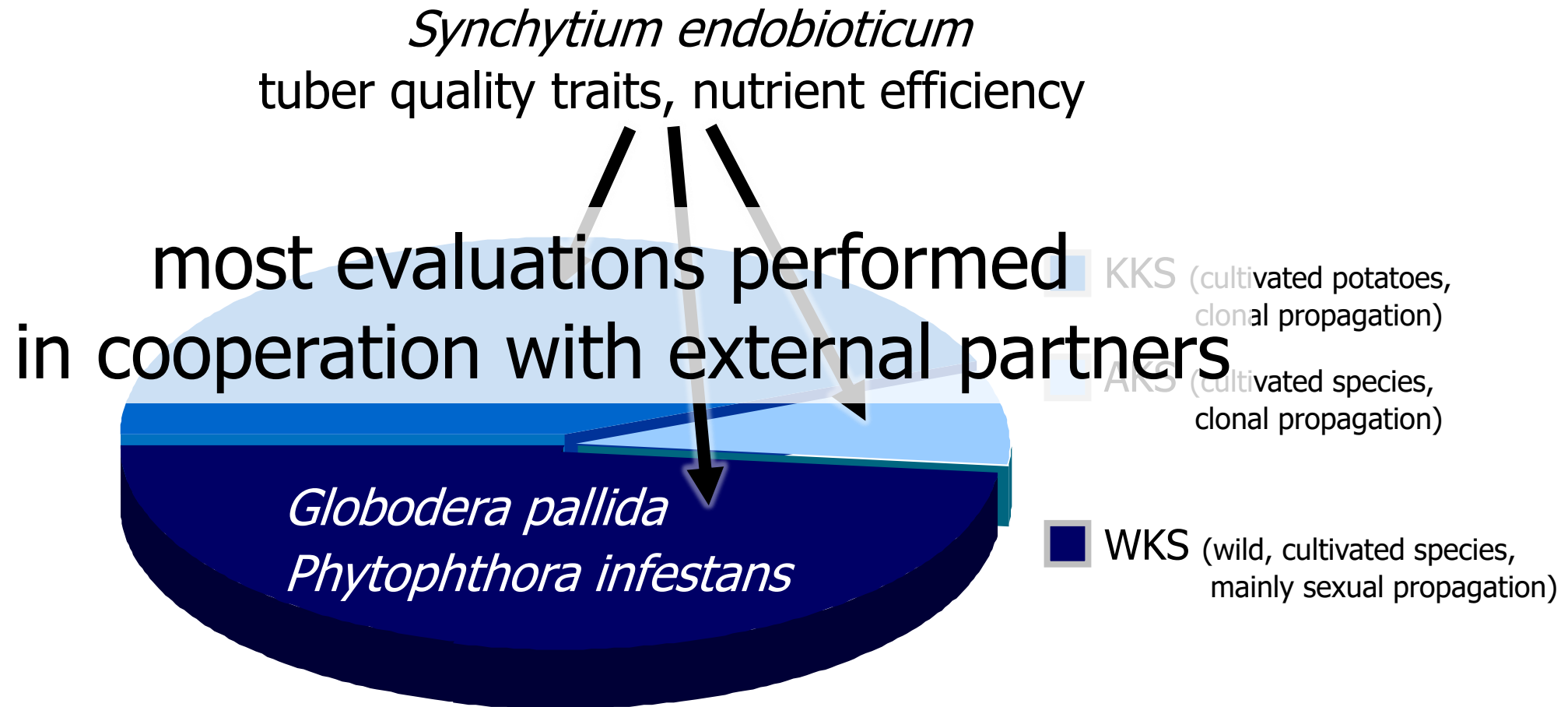
We deliver only small quantities of seeds and plant material, as is common practice in the exchange of scientific material between gene banks and botanical gardens.

After receipt of the signed *standard material transfer agreement (SMTA)*, the requested material will usually be delivered within four weeks. For large orders it may take longer to process the request, in which case the user will be notified.

<https://gbis.ipk-gatersleben.de/>

GLKS – the Gross Luesewitz Potato Collections

characterisations & evaluations



GLKS – the Gross Luesewitz Potato Collections

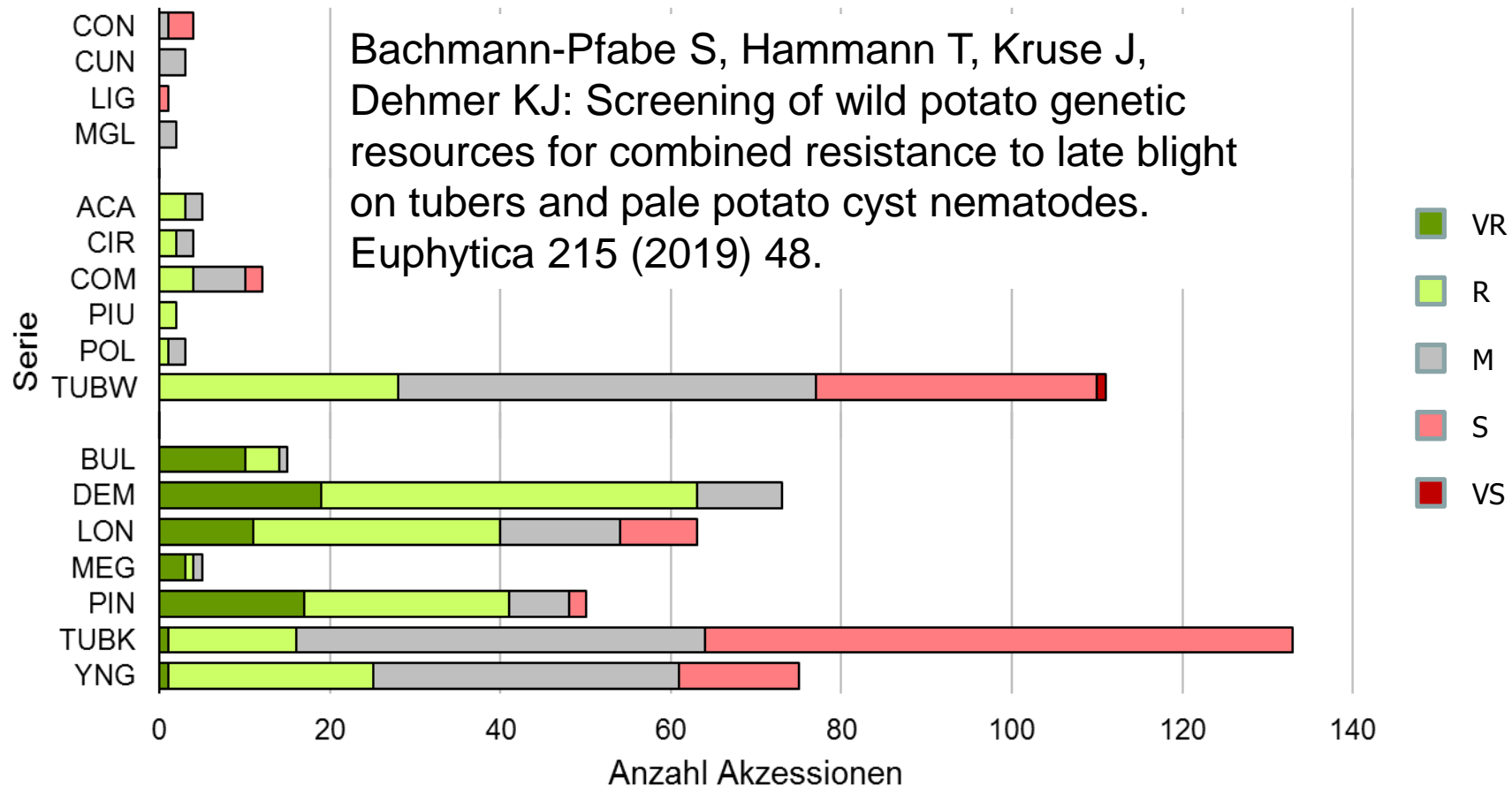
characterisations & evaluations

GLKS trait	no. accs.	no. resistant
<i>G. pallida</i> resistance	742	98
<i>P. infestans</i> resistance	1,065	316
<i>S. endobioticum</i> resistance	276	20



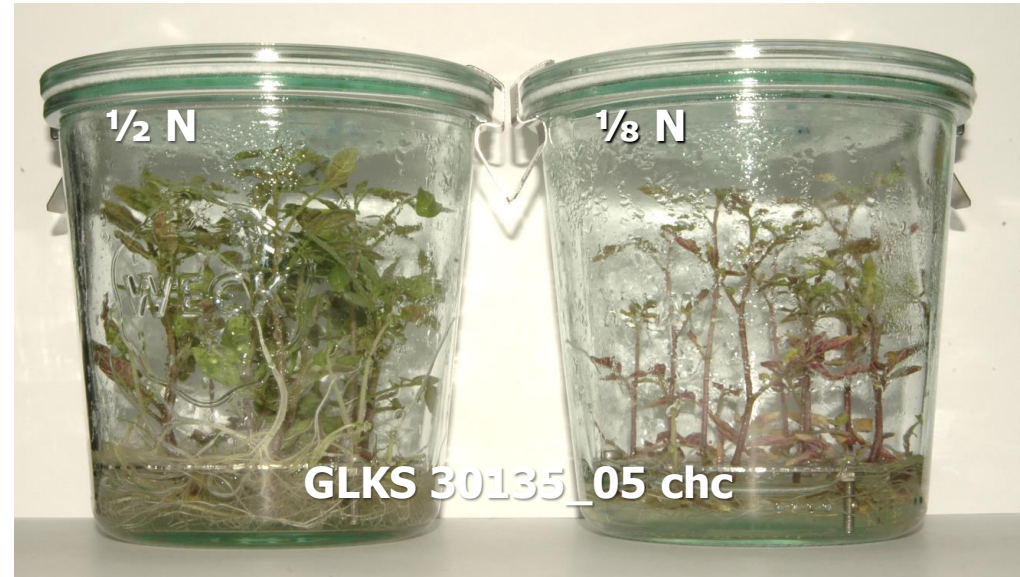
GLKS – the Gross Luesewitz Potato Collections

characterisations & evaluations – *Phytophthora infestans*



GLKS – the Gross Luesewitz Potato Collections

characterisations & evaluations – *nutrient uptake efficiency*



GLKS – the Gross Luesewitz Potato Collections

characterisations & evaluations – *nutrient uptake efficiency*



GLKS – the Gross Luesewitz Potato Collections

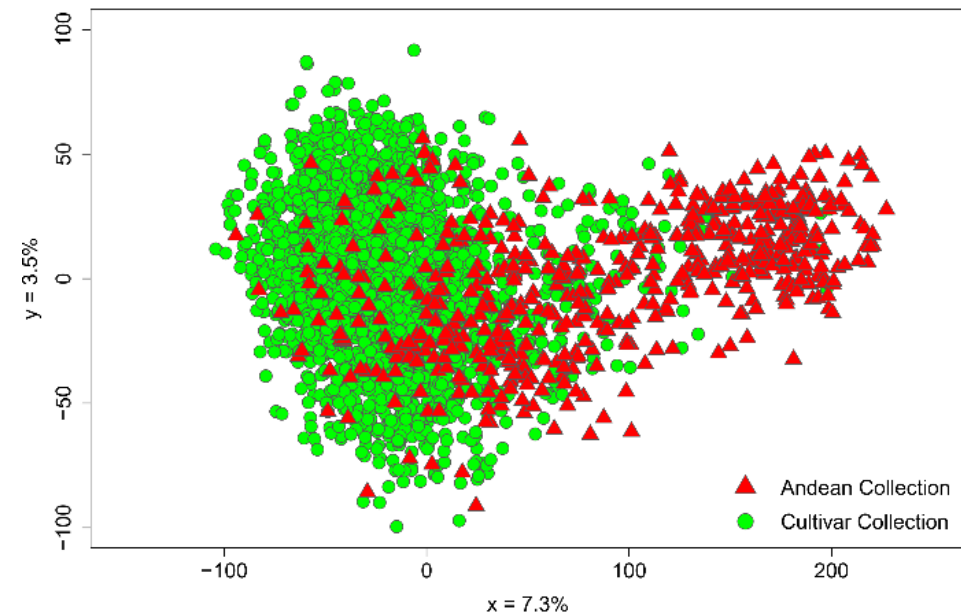
characterisations & evaluations

GLKS trait	no. accs.
<i>G. pallida</i> resistance	742
<i>P. infestans</i> resistance	1,065
<i>S. endobioticum</i> resistance	276
taste	703
starch/dry matter content	1,262
dormancy	773
water deficit tolerance	28
nitrogen uptake efficiency	273
phosphorus uptake efficiency	477
SSR genotyping	3,163

GLKS – the Gross Luesewitz Potato Collections

research – *SSR genotyping*

- entire clonal potato material (3,400 accs.) fingerprinted by 12 SSR and three plastid markers
- higher diversity present in the Andean sub-collection
- 5% of accessions identified as potential duplicates
- detection of mislabeling in *in vitro* material (up to 8%)



GLKS – the Gross Luesewitz Potato Collections

research – *SSR duplicates*

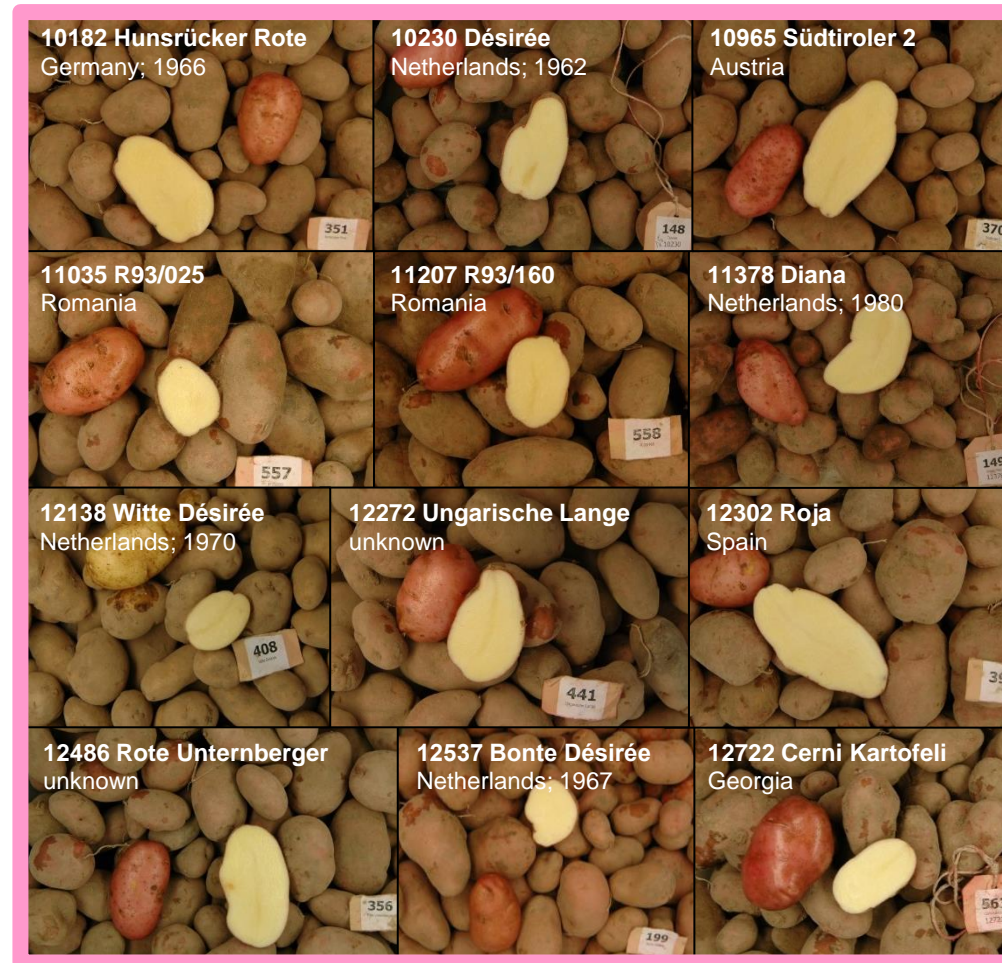
10230 Desiree
 10296 Rote Lungauer
 10299 St. Jakob
 10925 St. Surduc
 10965 Südtiroler 2
 11035 R 93/025
 11204 R 93/102
 11207 R 93/160^Z
 11214 Kartoffili žibiani rosaschalig
 11378 Diana (1980)
 12045 P 94/196
 12047 P 94/176
 12053 P 94/159
 12096 Ägyptische Rote
 12138 Witte Desiree
 12148 Bogdan Voda
 12156 Blochinger
 12182 Hunsrücker Rote
 12272 Ungarische Lange
 12274 Ungarn II Rosa
 12302 Roja
 12486 Rote Unternberger
 12537 Bonte Desiree
 12684 Ronda (?)
 12722 Cerni Kartoffeli
 16284 Desital

10089 Michas Blau-Rote
 10923 Shetland Blue Original
 10959 Viola
 10968 Blaue Trüffelkartoffel
 11032 Blaue Schweden
 12006 Mesabi Purple
 12009 British Columbia Blue
 12025 Blaue Zimmerli
 12033 Kefermarkter Blaue
 12039 Blaue Suti
 12041 Alaska Blue
 12166 Blaue Kongo
 12171 Etoile du Nord
 12186 Königsblau
 12202 Salad Blue
 12211 Viola (Sonnemann)
 12303 Hermanns Blaue
 12314 Kongo
 12318 Blaue Emmensteg
 12319 Blaue Fankhaus
 12321 Blaue Uttwil
 12324 Bleu
 12477 Blue Marker
 12484 Purple
 12738 Bla Kartoffler

10247 AN "rot"
 10265 K2
 10924 St. Poiana Stampai 176
 10944 Trondl Rose
 11597 Linzer Rose
 11824 Salinka
 12021 Rote aus Timelkam
 12165 Bergauer Rot
 12176 Große Rote
 12185 Kolm Runde Rote
 12187 König von Preußen 1
 12271 Teresa
 12275 Weinberger Rote
 12490 Weinling
 12600 Liro

GLKS – the Gross Luesewitz Potato Collections

research – *SSR duplicates*



GLKS – the Gross Luesewitz Potato Collections

research – *SNP duplicates (22 K Infinium SNP Chip)*

- 'Desiree' group

30 12096	Agyptische Rote
30 11035	R 93/025
30 10230	Desiree
30 12272	Ungarische Lange
30 11378	Diana (1980)
30 10925	St. Surduc
30 12199-H10	Roter Kuß
30 11217	Kartopili Tekali (P 2009/222)
30 10296	Rote Lungauer
30 12053	P 94/159
30 12148	Bogdan Voda
30 12302	Roja
30 12740	Rosenkartofler
30 12199-C06	Roter Kuß
30 11203	R 93/049
30 12047	P 94/176
30 16284	Desital

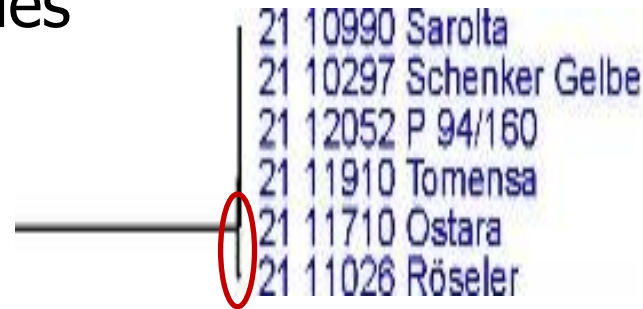
➔ **15 entries identical (0-9 SNPs different), two (rather) similar!**

GLKS-DB: Desital = Desiree mutant

GLKS – the Gross Luesewitz Potato Collections

research – *SNP duplicates*

- landraces & varieties



DG 21	11026	11910	Röseler	Tomensa	53	15033	3.526
DG 21	10297	11026	Schenker Gelbe	Röseler	50	15033	3.326
DG 21	10990	11026	Sarolta	Röseler	50	15034	3.326
DG 21	11026	11710	Röseler	Ostara	49	15025	3.261
DG 21	11026	12052	Röseler	P 94/160	49	15041	3.258
DG 21	11710	11910	Ostara	Tomensa	3	15163	0.198
DG 21	11710	12052	Ostara	P 94/160	2	15168	0.132
DG 21	11910	12052	Tomensa	P 94/160	2	15181	0.132
DG 21	10297	11710	Schenker Gelbe	Ostara	1	15162	0.066
DG 21	10990	11710	Sarolta	Ostara	1	15162	0.066

➔ **five accessions identical, 'Röseler' similar!**

GLKS – the Gross Luesewitz Potato Collections

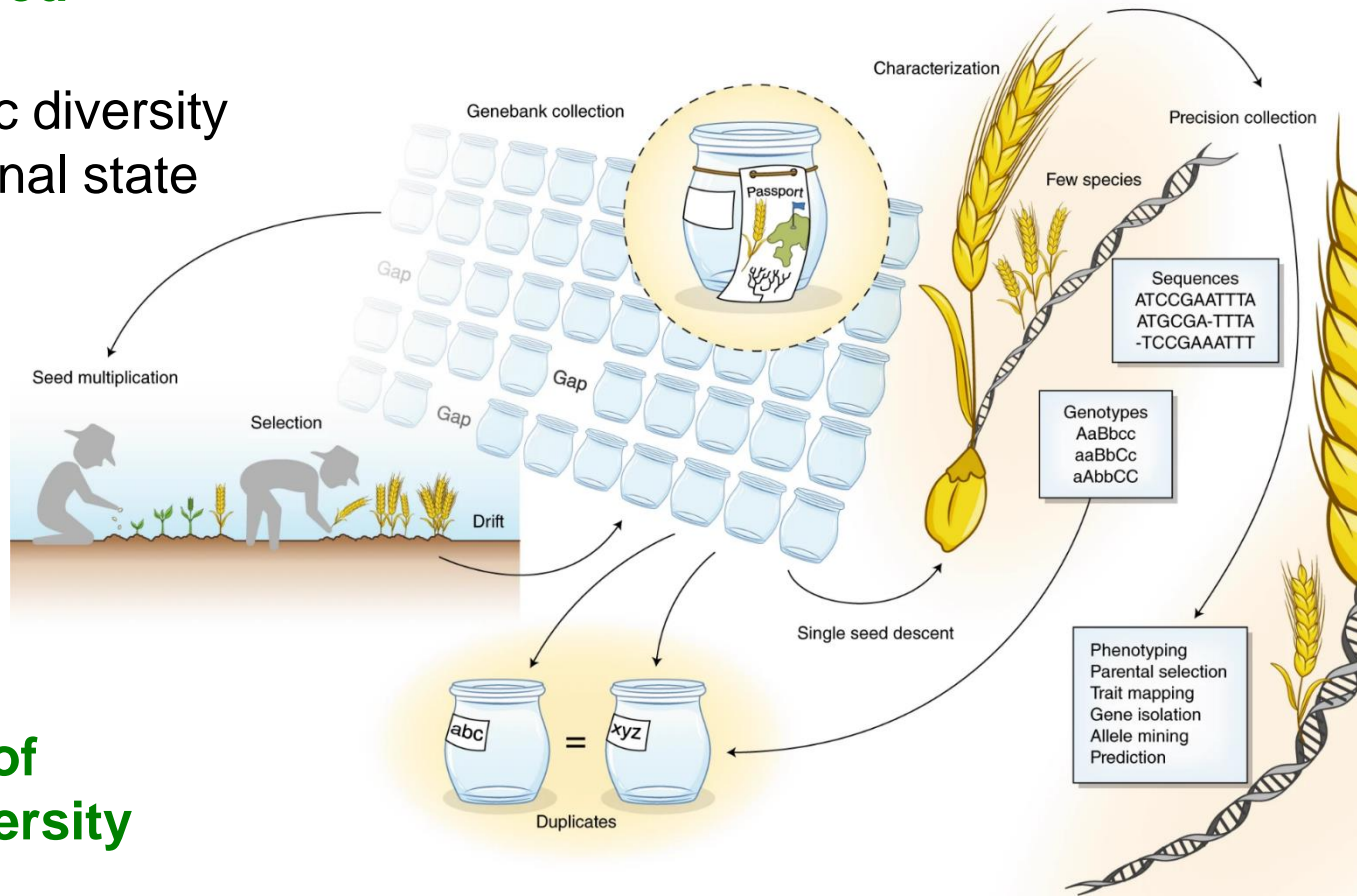
perspectives

- continuation of classical genebank work, transfer of entire clonal collection into cryo storage
- intensified phenotyping for traits of interest/agronomic relevance
- supplementation by more extensive genotypic data (GBS)
- by combining phenotypic and genotypic data – and storing them in a comprehensive database system, we want to set up a **bio digital Resource Centre**, supplying both biological material and digital information (phenotypic & genotypic) on this material

Classical genebank collections

accession based

Capture genetic diversity in its most original state



Aim:
conservation of
crop plant diversity

„Precision collections“

genotype based

Subsets to capture neutral genotypic diversity for phenotyping

Trait customised subsets for genetic analysis

Allow for genotype-to-phenotype mapping

Aim:
informed utilisation of
crop plant diversity



Thank you for your attention !

