Julius Kühn-Institut
Bundesforschungsinstitut für Kulturpflanzen
Federal Research Centre for Cultivated Plants

Genetic resources of berries in Germany

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Fruit genetic resources in Germany

German Fruit Genebank

- A **decentralized gene bank network** for fruit genetic resources in Germany under central coordination of the JKI
- **Fruit species specific networks** for apple, cherry, **strawberry**, plum, ***Rubus***, pear and wild fruit species **cultivars**

Cultivar collections

Part of the German Fruit Genebank

- **Field collections**
  1,400 cultivars (apple, pear, **strawberry,** cherry, **raspberry,** plum, sea buckthorn, rowan)
- **Cryopreservation**
  strawberry cultivars

Wild species collections

- **Field collections**
  1,000 wild species accessions (*Malus, **Fragaria**, Prunus, Pyrus, Sorbus)*
- **Cryopreservation**
  Fragaria accessions
  Malus accessions

JKI Fruit Genebank

German Fruit Genebank –

Aim: to ensure an effective and long term conservation and utilization

International responsibilities

National responsibilities

international representation
interface to international databases

Federal Office of Agriculture and Food

Advisory function, national inventory PGRDEU

Advisory Board

Advising the coordination Centre national representation

ECPGR WG *Malus/Pyrus Prunus,* Berries documentation
International databases

Coordination Centre
Julius Kühn-Institute
Institute for Breeding Research on Fruit Crops Dresden- Pillnitz

coordinating the network, supervising the website and the database

Apple network — 13 collections

Cherry network — 8 collections

Strawberry network — 3 collections + Cryobank JKI

Collection, Material transfer

Collection, **Preservation,** characterization, evaluation, **documentation, material transfer**

Plum network — 9 collections

Pear network — 11 collections

Rubus network — 4 collections

Wild fruit species network — 2 collections

German Fruit Genebank 2020: **7 Networks**

24 Partners

51 Collections

Strawberry network of the German Fruit Genebank (coordinated by JKI)

JKI: Potted plants of the *ex situ* strawberry collection

JKI: Facility for cryopreservation

JKI: virus-free material maintained in an insect-protected screen house (141 cvs. – 9 viruses tested)

Federal Plant Variety Office, Wurzen: Field collection

Rubus network of the German Fruit Genebank (coordinated by Federal Plant Variety Office)

Federal Plant Variety Office: Field collection (5 plants / cvs.; Quelle: BSA)

Federal Plant Variety Office: virus-free material in an insect-protected screen house (22 cvs., 6 viruses tested; source: BSA)

Saxon State Office for Environment, Agriculture and Geology, Dresden (5 plants / cvs.)

JKI Dresden: potted plants e*x situ* (3 plants / cvs.)

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Deutsche Genbank Obst
Vielfalt bewahren

https://www.deutsche-genbank-obst.de/

botanische Bezeichnungen | Monika Höfer | Impressum

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Deutsche Genbank Obst

Sammlungen

neue Sammlung erstellen | Sammlungen importieren | Tabelle anpassen

Partner	Bezeichnung	Netzwerk
		Erdbeere
Bundessortenamt	Erdbeeren	Erdbeere
Julius-Kühn-Institut	Erdbeeren	Erdbeere
Julius-Kühn-Institut	Erdbeere Kryokonservierung	Erdbeere
Julius-Kühn-Institut	Erdbeere virusfreier Nukleus	Erdbeere

Partner	Bezeichnung	Netzwerk
		Rubus
Bundessortenamt	Himbeere	Rubus
Bundessortenamt	Brombeere	Rubus
Bundessortenamt	Himbeere virusfreier Nukleus	Rubus
Julius-Kühn-Institut	Himbeere	Rubus
Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie	Himbeere	Rubus

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Amazone

Art:	Gartenerdbeere
Abstammung:	unbekannt × unbekannt
Züchter:	Max Planck Institut; Köthen Göschke, G.
Ersterwähnung:	um 1930
Handelsjahr:	um 1930
Ursprungsland:	DEU
Ursprungsort:	Köthen

Charakterisierung

Frucht:	klein aber zahlreich, mittelrot bis schmutzigrot, Fleischfarbe kräftig rosa, weich, meist breitherz- oder nierenförmig, kleiner eingesenkter Kelch, Samen aufsitzend, Geschmack säuerlich, gutes Aroma
Verwendung:	Liebhabersorte
Standort:	braucht etwas besseren Boden
Besonderheiten:	während der Reifung verfärben sich zuerst die Samen, später die Früchte, 8 bis 10 Blütenblätter

Foto: Julius Kühn-Institut

Synonyme:

Amazonka
Laxton von Glanerbrug

Species		Number of cvs. belonging to the German Fruit Genebank
Fragaria	*×ananassa*	210
Fragaria	*×vescana*	3
Fragaria	*chiloensis*	2
Fragaria	*hybr.*	1
Fragaria	*moschata*	5
Fragaria	*vesca*	18
Fragaria	*virginiana*	1
		240
Rubus	*hybr.*	1
Rubus	*idaeus*	35
Rubus	*loganobaccus*	1
Rubus	*sectio Rubus*	8
		45

Next step: Building up a *Ribes* network (coordinated by Federal Plant Variety Office Data source BSA)

Federal Plant Variety Office:
Field collection (3 plants / cvs.):

Redcurrant	62 cvs.
Blackcurrant	79 cvs.
Gooseberry	63 cvs.
Jostaberry	7 cvs.

Federal Plant Variety Office:
virus-free material in an insect-protected screen house (10 cvs., 7 or 3 viruses tested)

In 2020: selecting possible cultivars; contacting possible partners; signing cooperation agreement

Federal Plant Variety Office, Wurzen: Field collection (source BSA)

Fruit genetic resources – Wild species accessions of various fruit species

- Held as **active collections** in the Fruit Genebank in Dresden
- *Malus* as well as *Fragaria* collections are one of the largest collections in Europe

***Fragaria*-wild species collection:** 297 accessions belonging to 22 diff. species

F. vesca f. semperflorens

F. nilgerensis

F. moschata

Cryopreservation of *Fragaria* – PVS2 vitrification

1. Preculture - improvement of dehydration tolerance

- Cold treatment of 2 week-old shoots for **14d (16h at -1°C darkness and 8h at 22°C light)**
- Dissection of **shoot tips** and cultivation for **48h on MS medium with 5% DMSO**

2. Selective dehydration

- Incubation in **Loading solution** (2 M glycerol + 0.5 M sucrose) for **15 min at 25°C in cryo vials**
- Vitrification: **PVS2 for 2.5 h on ice**

3. Cryo storage

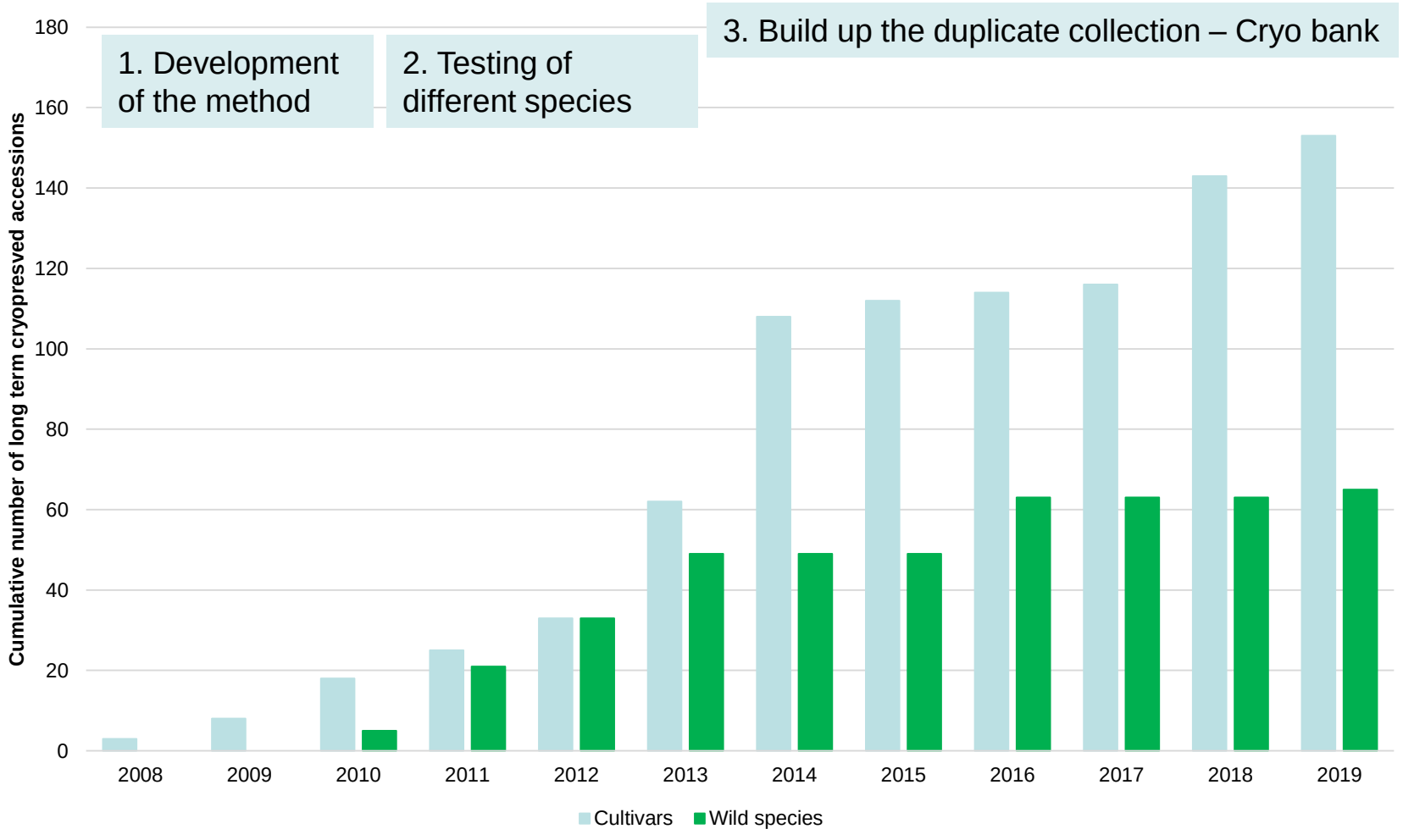
- Rapid transfer directly into liquid nitrogen

4. Rehydration

- Rewarming by plunging in water bath at **40°C for 1-2 minutes**.
- Removing the PVS2 and treating with **Unloading 1.2 M sucrose for 20 min**

5. Recovery

- Incubation **in dark at 23°C for 7 days**
- Incubation in light at 23°C.



- The method is **effective (average recovery 86 %)** to build up a duplicate collection.
- The method will be applied for the **strawberry cultivars belonging to the German Fruit Genebank** and for the **297 accessions of *Fragaria* wild species of the fruit genebank** in Dresden-Pillnitz.
- **Present stock: 153 cvs. and 65 *Fragaria* - accessions**

Characterization / evaluation projects of genetic resources of berries

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2004 - 2007	Characterization of strawberry cultivars with **morphological descriptors**
2005 - 2008	Evaluation of strawberry cultivars and German apple cultivars with regard to **fruit quality determining traits**
2007 - 2010	European small berries genetic resources - **EU project GENEBERRY**
2011 - 2014	Characterization of strawberry cvs. regarding **resistance** to *Xanthomonas fragariae* and *Botrytis cinerea* in strawberry germplasm
2012 - 2013	**Pomological characterization of trueness-to-type** of the cvs. belonging to the German Fruit Genebank (by external experts)
2016 - 2018	**Molecular characterization of trueness-to-type** of the cvs. belonging to the German Fruit Genebank (by ecogenics)
2016 - 2020	Evaluation of a **virus elimination approach by cryopreservation** of strawberry genetic resources
2018 - 2020	**Flowcytometrical analysis** in the *Fragaria* collection of the fruit gene bank
2012 - 2015	**Evaluation of *Rubus* genetic resources** on their resistance to cane disease

Use for breeding

Many thanks for your attention!