

# Documenting European Agrobiodiversity

EURISCO – The European Search Portal for Plant Genetic Resources

PPP Workshop, 7–9 June 2017, Bonn

Stephan Weise  
8 June 2017



# INTRODUCTION AND BACKGROUND

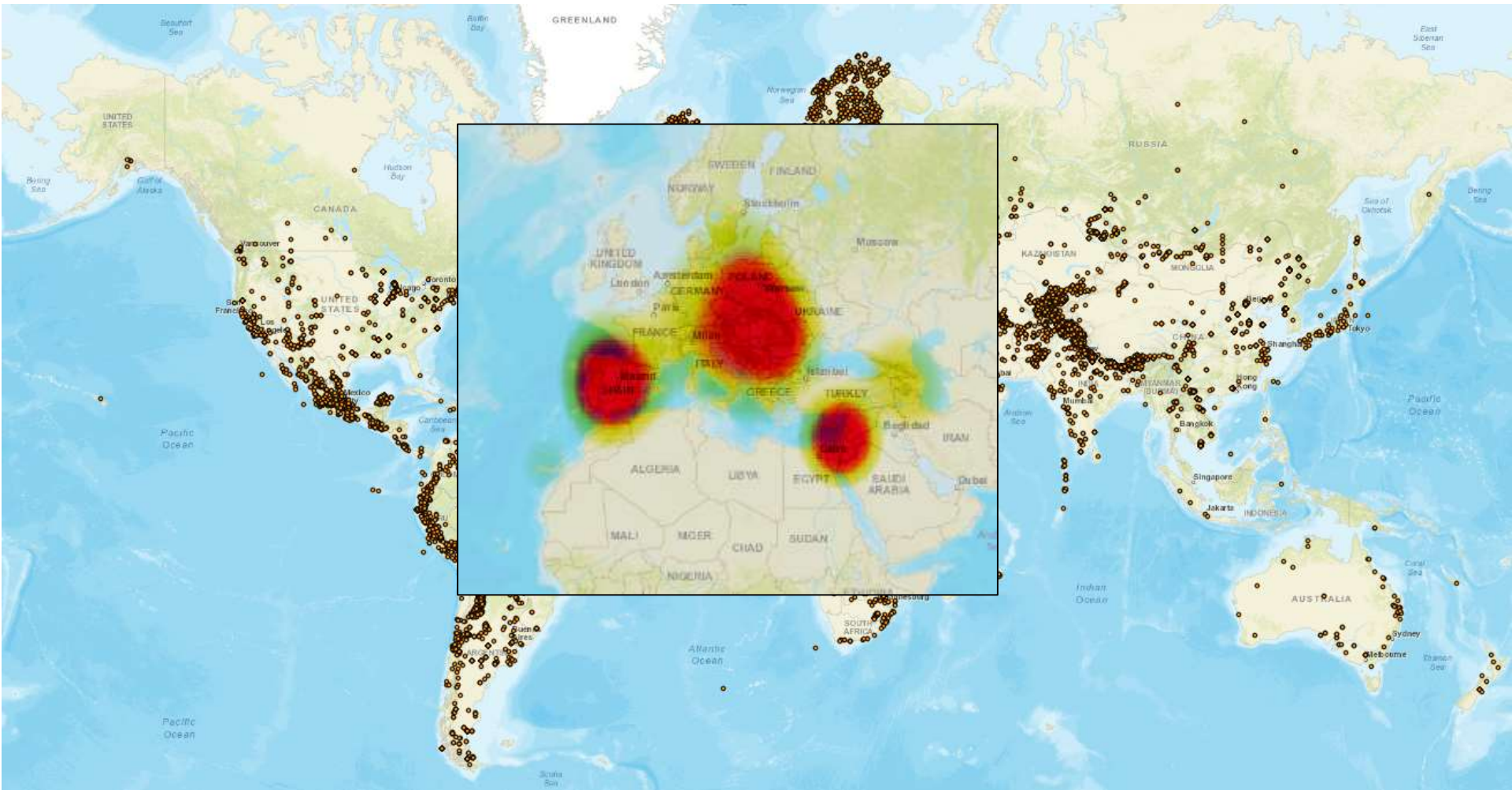
# Background

- What is EURISCO?
  - European information system for plant genetic resources
  - Search catalogue for *ex situ* collections
  - Accession-level information system
- Purpose
  - Provides passport data and phenotypic data about plant germplasm accessions maintained in Europe
  - Assists in meeting national obligations
    - Food and Agriculture Organization of the United Nations (FAO)
    - Convention on Biological Diversity (CBD)
    - International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)



[https://upload.wikimedia.org/wikipedia/commons/8/81/Europe\\_countries\\_map\\_2.png](https://upload.wikimedia.org/wikipedia/commons/8/81/Europe_countries_map_2.png)

# Collecting sites



as of 2017-05-31

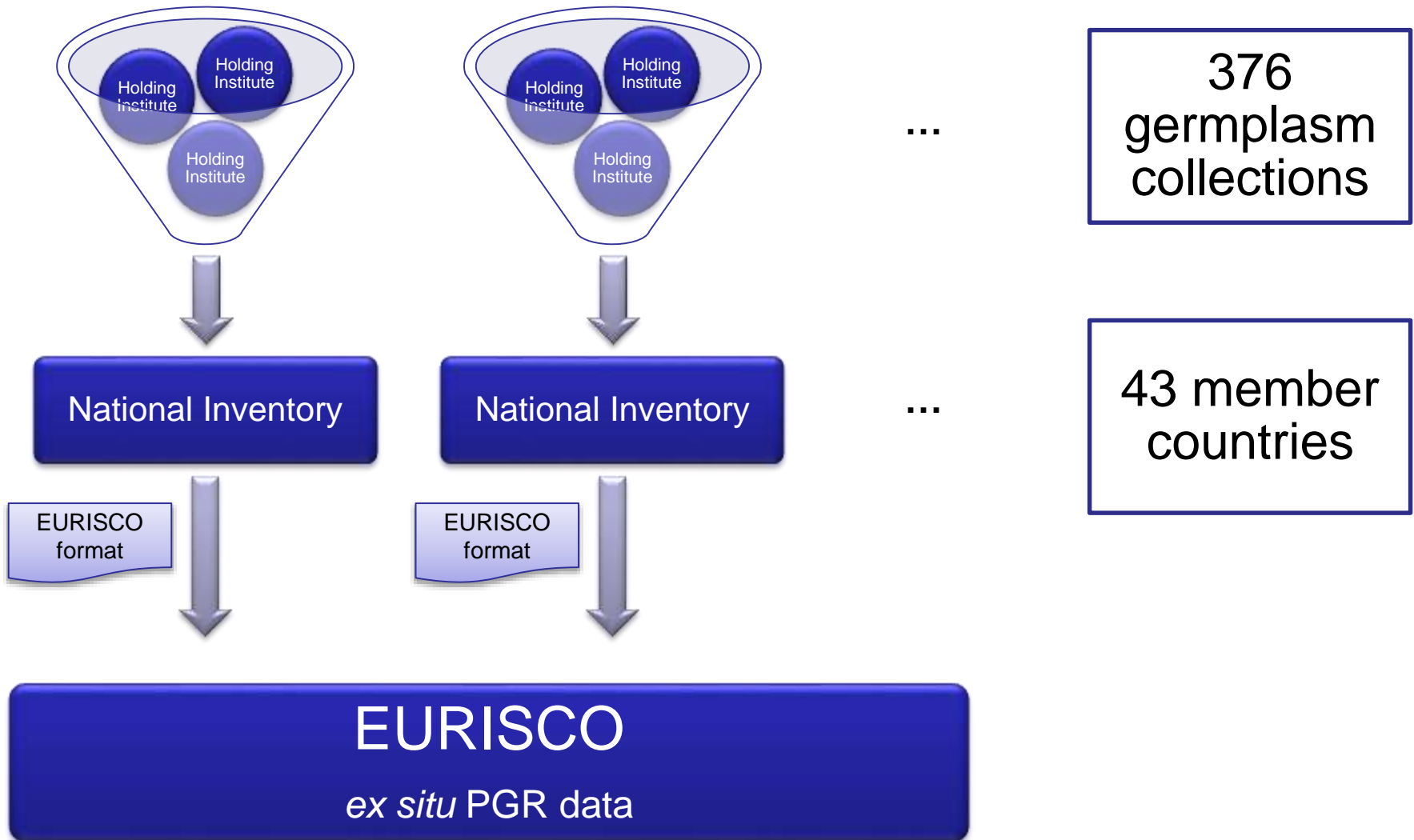
# Development

- Started in 1999 (EU project EPGRIS)
- 43 countries involved  
(Nordic Countries → NordGen)
- National collections represented by  
National Inventories (NIs)
- Network of National Focal Points (NFPs)  
links NIs ↔ EURISCO



[https://upload.wikimedia.org/wikipedia/commons/8/81/Europe\\_countries\\_map\\_2.png](https://upload.wikimedia.org/wikipedia/commons/8/81/Europe_countries_map_2.png)

# Data flow



# New EURISCO hosting

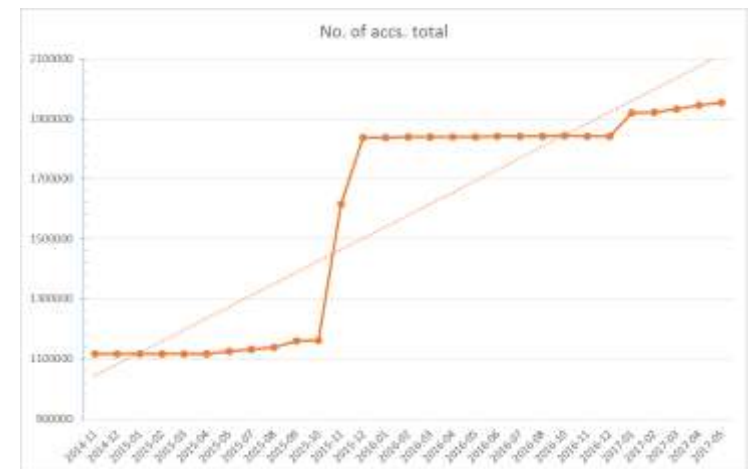
- On behalf of the European Cooperative Programme for Plant Genetic Resources (ECPGR)
  - Available online since 2003
    - Bioversity International, Rome, Italy
  - Since April 2014:
    - EURISCO hosted by IPK Gatersleben, Germany
    - New development from scratch



Weise et al. (2017) *Nucleic Acids Research*, 45(D1):D1003-D1008.

# Contents of EURISCO

- 1,961,729 accessions
- 6,334 genera  
(including synonyms, spelling variants)
- 44,938 species names  
(unique combinations genus + species, including synonyms)
- 412,819 MLS accessions
- 32,791 AEGIS accessions



as of 2017-05-31



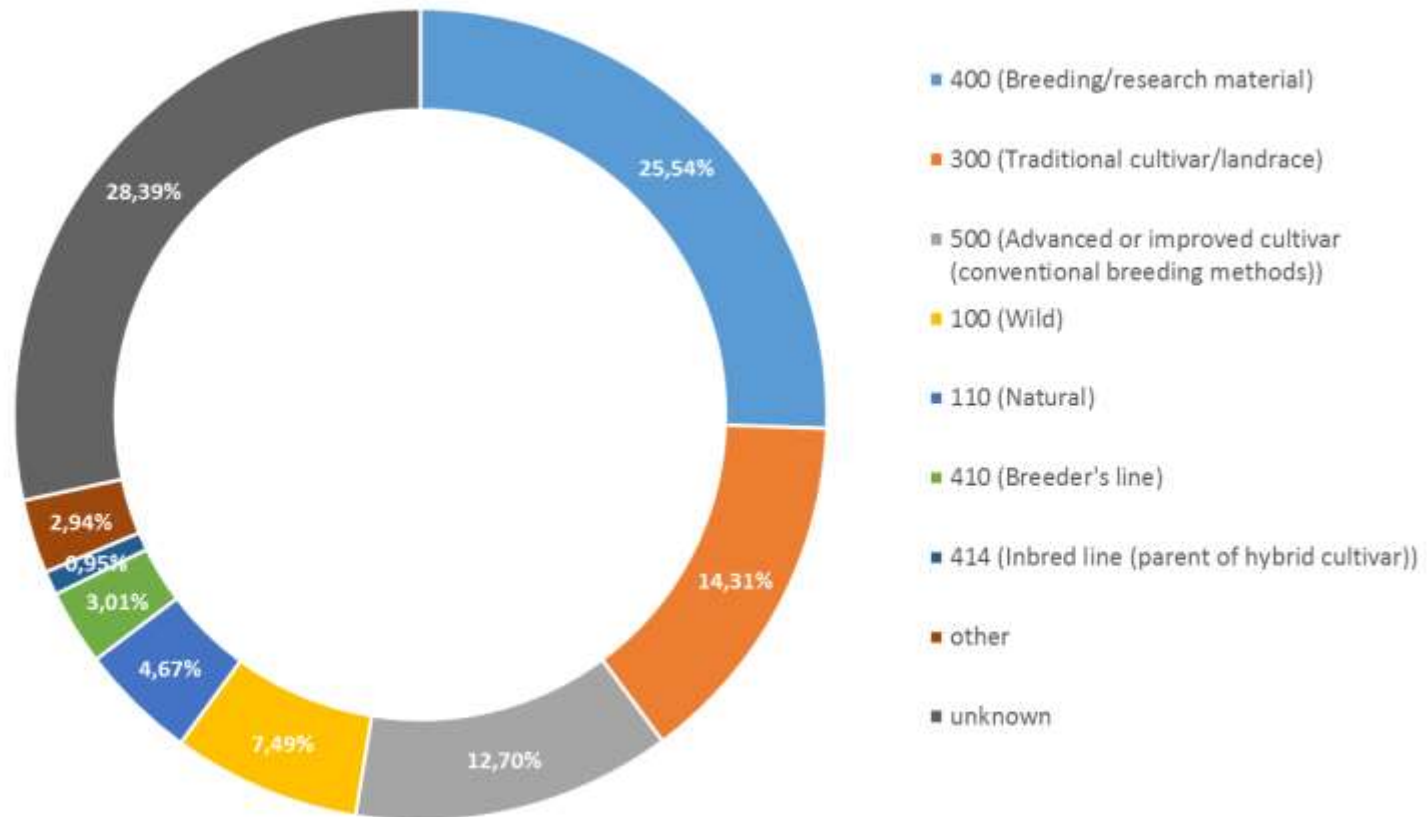
# Taxonomic composition

Genus	Species	No. accs.	Total
<i>Arabidopsis</i>	<i>thaliana</i>	681,983	682,191
	others	208	
<i>Triticum</i> (wheat)	<i>aestivum</i>	136,646	186,040
	<i>durum</i>	16,299	
	<i>turgidum</i>	9,073	
	<i>monococcum</i>	3,314	
	<i>spelta</i>	2,859	
	others	17,849	
<i>Hordeum</i> (barley)	<i>vulgare</i>	104,328	123,939
	<i>spontaneum</i>	8,336	
	others	11,275	
<i>Zea</i> (maize)	<i>mays</i>	62,437	62,570
	others	133	
<i>Phaseolus</i> (garden bean)	<i>vulgaris</i>	46,764	52,303
	<i>coccineus</i>	3,046	
	others	2,493	

Genus	Species	No. accs.	Total
<i>Solanum</i> (tomato, potato, eggplant, etc.)	<i>lycopersicum</i>	18,766	50,928
	<i>tuberosum</i>	14,780	
	<i>andigenum</i>	2,814	
	<i>melongena</i>	1,989	
	others	12,579	
<i>Avena</i> (oat)	<i>sativa</i>	32,116	40,668
	<i>sterilis</i>	2,148	
	<i>byzantina</i>	1,955	
	others	4,449	
<i>Malus</i> (apple)	<i>domestica</i>	24,062	31,479
	others	7,417	
<i>Pisum</i> (pea)	<i>sativum</i>	27,275	30,320
	others	3,045	
<i>Vitis</i> (grape)	<i>vinifera</i>	25,165	29,084
	others	3,919	
others			672,207
	Total		1,961,729

as of 2017-05-31

# Biological status

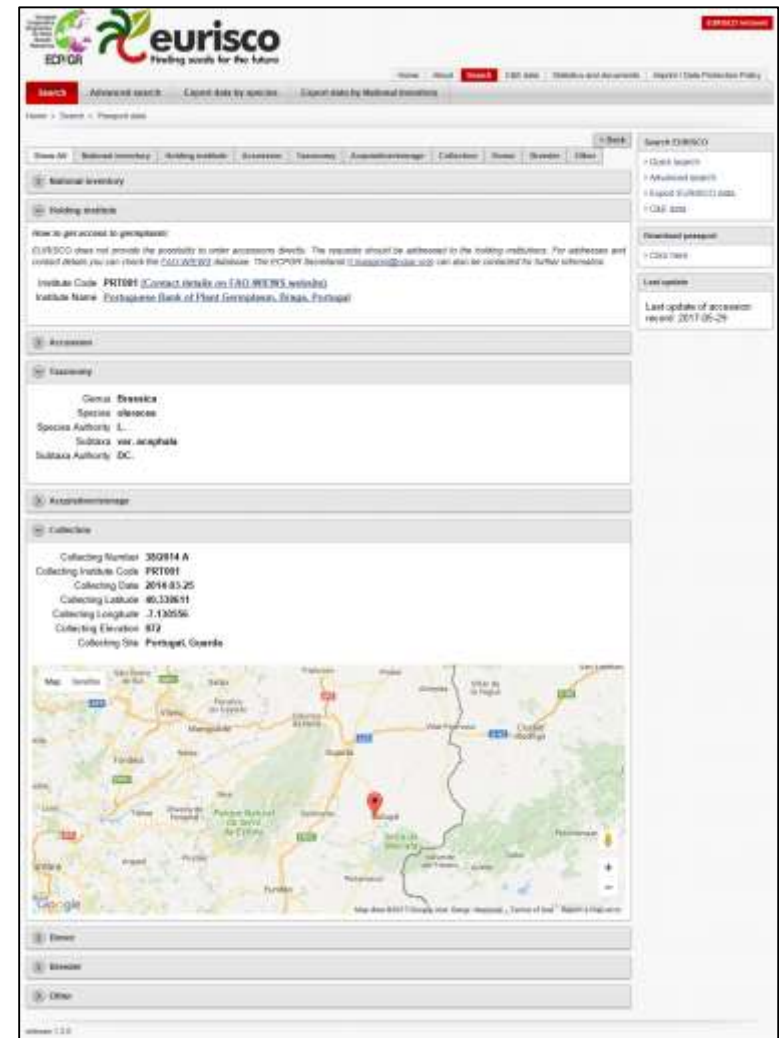


as of 2017-05-31

# PASSPORT DATA

# Passport data in EURISCO

- Four standard searches:
  - Taxonomy
  - Accession
  - Biological status
  - Collecting site
- Advanced search
- Different user-specific export features



The screenshot displays the EURISCO website interface. At the top, the EURISCO logo is visible with the tagline "Finding seeds for the future". The main navigation bar includes "Search" and "Advanced search". The page content is organized into several sections:

- National inventory:** A section for national inventory data.
- Holding entities:** A section for holding entities, including a note about accessions and contact information for the Portuguese Bank of Plant Germplasm, Braga, Portugal.
- Accession:** A section for accession details, including the accession code FRT091 and the name Portuguese Bank of Plant Germplasm, Braga, Portugal.
- Taxonomy:** A section for taxonomic information, including the genus *Brassica*, species *oleracea*, and subspecies *var. capitata*.
- Collecting site:** A section for collecting site details, including the collecting number 350814 A, collecting date 2014-03-25, and a map showing the location in Portugal, Guarda.

# CHARACTERISATION & EVALUATION DATA

# Background

- C&E data previously not available in EURISCO
- Of high importance to users of PGR data
  - Determines value of germplasm for breeding and research
- Difficult to handle due to lots of “standards”
  - Different descriptor names/synonyms
  - Different rating scales
    - Nominal, ordinal, metric scale
  - Different amounts of meta information
    - When, where, how, by whom?
    - Experiment set-up, treatment etc.

# Approach

- As simple as possible
- As few fields as possible
  - “minimum consensus”
- Pragmatic approach:
  - No standardisation of trait, scale or experimental design
  - Only standardisation of exchange format (as simple as possible)
  - Import of existing data as-is → reach critical mass

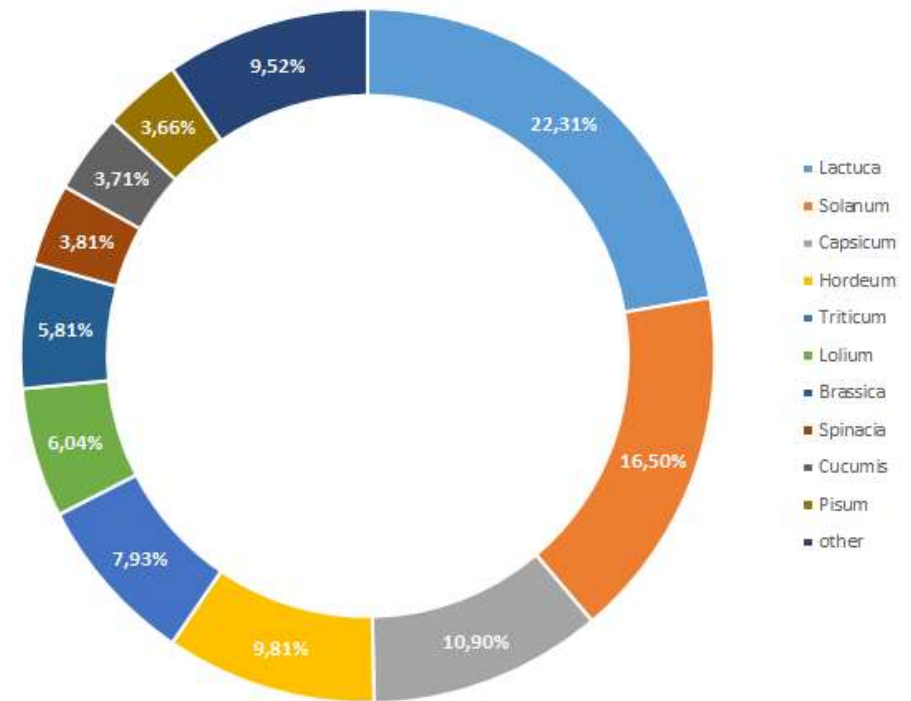
# Proceeding for data upload

- Prerequisite:
  - Only non-confidential C&E data
  - Only data of accessions listed in EURISCO
- Impact
  - NFPs responsible for data upload (Data Sharing Agreements)
    - May nominate users for (sub) accounts for data uploads
    - NFPs must approve data before publication
- Data formatting
  - According to exchange format in MS Excel (.xlsx) files
- Upload via EURISCO intranet



# C&E data in EURISCO

- Extension available since summer 2016
- Currently, 470,659 records of data from four countries
  - Germany
  - Latvia
  - The Netherlands
  - United Kingdom



# C&E data search: Genus

Wizard-based searches for

- Genus
- Species and trait
- Experiment
- Trait

Filter C&E data by genus

Genera \* Brassica, Capsicum, Chondrilla, Cicerbita, Cucumis, Eruca, Isoetidium, Linum, Lupinus, Mycel...

Allium, Hordeum, Lactuca

Lactuca: 195,022  
Solanum: 77,643  
Capsicum: 30,738  
Triticum: 37,306  
Hordeum: 32,452  
Brassica: 27,355

Show All | Scores for selected genera | Experiments with selected genera

Apply

▼ Scores for selected genera

The report below comprises all scores of the selected genera (from different experiments). Detailed passport information about the respective accessions are given by the provided link. Please search bar below to define filters.

Q  Go Actions

1 - 5 of 148367

Experiment Description	Trait Name	Trait Method	NICODE	INSTCODE	Species	ACCENUMB	Score	Score Link	Origin Country	Biological Status	Details
Evaluation (average of tw[...])	Pyrenophora graminea (Stripe)	De na									
Evaluation (average of tw[...])	Yield	pe m2									
Evaluation (average of tw[...])	Spike density	(3= 7=									
Evaluation (average of tw[...])	Growth height	Me inc [...]									
Evaluation (average of tw[...])	Row number	(1= 9= [...]									

▼ Experiments with selected genera

The report below comprises all experiments, which contain at least one (not necessarily all) of the selected genera. When clicking on the link to the traits contained in these experiments, only those traits will be shown, which were used for scoring the selected genera. Please use the search bar below to define filters.

Q  Go Rows 5  Actions

1 - 5 of 127

Experiment Description	Dataset Remark	Experiment Start Year	Experiment End Year	Details
Q Location: Born Wageningen, sandy soil. Sowing date: 12/3/85, harvested 9/8/85.	Phenotypic data CGN	1985	-	<a href="#">contained traits</a>
Q Location: Born Wageningen, sandy soil. Sowing date: 2/10/85, harvested from 28/7-1/8/1986.	Phenotypic data CGN	1986	-	<a href="#">contained traits</a>
Q Location: Born Wageningen, sandy soil. Sowing date: 8/4/86, harvested 4/8-15/8/1986.	Phenotypic data CGN	1986	-	<a href="#">contained traits</a>
Q Location: Emmeloord.	Phenotypic data CGN	1986	-	<a href="#">contained traits</a>
Q Location: Ulrum.	Phenotypic data CGN	1986	-	<a href="#">contained traits</a>

1 - 5 of 127

2.59 s

# C&E data search: Species and trait

Filter C&E data by species and traits

Genus \*

Species \*

Genus \*

Species \*

- Lactuca aculeata Boiss.
- Lactuca altaica Fish. & Mey.
- Lactuca biennis (Moench) Fern.
- Lactuca homblei De Wild.
- Lactuca raddeana Maxim
- Lactuca saligna L.
- Lactuca sativa L.
- Lactuca sativa x serriola
- Lactuca serriola L.
- Lactuca tatarica (L.) C. A. Mey.

- Lactuca canadensis L.
- Lactuca dregeana DC.
- Lactuca georgica L.
- Lactuca perennis L.
- Lactuca indica L.
- Lactuca quercina L.**

Traits \*

- Leaf blistering (At harvest maturity[...])
- Leaf color intensity ((3=light, 5=medium, 7=dar[...])
- Leaf margin undulation (At harvest maturity[...])
- Leaf shape ((1=narrow elliptic,2=el.,[...])
- Leaf shape ((1=round, 2=ovate, 3=obov[...])**
- Leaf vein prickles ((1=not present, 9=present[...])
- Leaf vein prickles (-[...])
- Leaf venation (At harvest maturity (1= n[...])
- Nasonovia ribisnigri (Resistance to Nasonovia r[...])
- Nitrate content (Mean nitrate content of t[...])
- Pemphigus hursarius ((1=very resistant, 2=resi[...])

- Bolting time (Days from planting to 50%[...])
- Leaf color ((1=yellow, 2=green, 3=gra[...])
- Leaf division (At harvest maturity (1=0,[...])
- Leaf tip shape ((3=rounded, 5=medium roun[...])**

Apply Reset

# C&E data search: Experiment

**Filter C&E data by experiment**

The report below lists all experiments, which contain characterisation & evaluation (C&E) data.

Q  Go Rows 10

Experiment Start Year between 1967 and 2012

1 - 10 of 782

Experiment Description
Sowing date = February 2, Planting date = April 17, IVT glasshouse XII, heated soil culture, 2 stems, 4 plants per field, collection no. 567-659, experimentist H. Roelofs and G. Pet, standard = Bruinsma Wonder
Sowing date February 18, Planting date April 8, IVT glasshouse XII, heated, soil culture, 2 stems, 5 plants per field, collection no 444-543, experimentist L. de Groot and G. Pet, standard is Bruinsma Wonder
Sowing date = March 15, Planting date = April 26, IVT glasshouse XII, heated soil culture, 2 stems, 5 plants per field, collection no. 660-762, experimentist L. de Groot and G. Pet, standard is Bruinsma Wonder
Sowing date = February 28, Planting date = April 13, IVT glasshouse XII-IX, heated, soil culture, 2 stems, 5 plants per field, collection no. 763-869, experimentists L. de Groot and G. Pet, standard = Bruinsma Wonder
Sowing date = February 24, Planting date = April 18, IVT glasshouse no. XII, heated, soil culture, 2 stems, 5 plants per field, collection no 871-934, experimentists L. de Groot and G. Pet, standard = Bruinsma Wonder
Sowing date = March 11, Planting date = April 26, IVT glasshouse XII, heated soil culture, 2 stems, 5 plants per field, collection no. 935-981, experimentist L. de Groot and G. Pet, standard = Bruinsma Wonder
Sowing date = March 13, Planting date = May 1, IVT glasshouse II-I, heated, culture, 2 stems, 5 plants per field, collection no. 982-1021, experimentist G. Pet, standard = Bruinsma Wonder
Sowing date = March 20, Planting date = April 28, IVT glasshouse no. II-II, soil culture, 1 stem, 5 plants per field, collection no. 1476-1574, experimentist G. Pet, standard = Sonatine
Sowing date = January 31, Planting date = March 31, IVT Glasshouse no. 12, heated, soil culture, 2 stems, 5 plants per field, collection no. 33-68, experimentist G. Pet, Standard = Claessee
Sowing date = January 29, Planting date = March 28, IVT glasshouse no. 12, heated, soil culture, 2 stems, 5 plants per field, collection no. 1-111, experimentist G. Pet, standard = Claessee

0.02 s

**Filter C&E data by experiment**

The report below lists all experiments, which contain characterisation & evaluation (C&E) data. Please use the search bar below to define filters.

< Report View  Exclude Null Values < Row 5 of 782 >

Uploader Code	wise
Dataset Remark	Test data CGN
Uploaded At	2015-10-20
Experiment Description	Sowing date = February 24, Planting date = April 18, IVT glasshouse no. XII, heated, soil culture, 2 stems, 5 plants per field, collection no 871-934, experimentists L. de Groot and G. Pet, standard = Bruinsma Wonder
Experiment Start Year	1984
Details	<a href="#">contained traits</a>
Rpt File	<a href="#">Download report file</a>

0.02 s

**Traits in selected experiment**

Q  Go Rows 10 Actions

1 - 10 of 26

Trait Name	Trait Remark	Trait Method	Details
Fruit corrugation	-	(0=smooth, 3=slightly corrugated, 5=medium, 7=corrugated, 9=very corrugated)	<a href="#">scores</a>
Fruit attitude	-	Bruinsma Wonder=7 (1=very drooping, 3=drooping, 5=horizontal, 7=semi-erect, 9=erect)	<a href="#">scores</a>
Flower attitude	-	Bruinsma Wonder=7 (1=very drooping, 3=drooping, 5=horizontal, 7=semi-erect, 9=erect)	<a href="#">scores</a>
Mature fruit color	-	(A=dark red, B=light r, C=orange, D=salmon, E=canary, F=sulphur, G=green, I=brown, J=light orange, K=white, a-b=both in one fruit)	<a href="#">scores</a>
Tobacco mosaic virus	-	determined at natural infection (0=no symptoms, +=symptoms present)	<a href="#">scores</a>
Stem anthocyanin content	-	Bruinsma Wonder=3 (0=absent, 1=very little, 3=little, 5=medium, 7=much, 9=very much)	<a href="#">scores</a>
Fruit ribbing	-	(0=absent, 1=very little, ..., 9=very high)	<a href="#">scores</a>
Flower color	-	(A=white, B=filthy-white, C=light green, D=light purple, E=dark purple, F=yellow, G=white/anthocyanin)	<a href="#">scores</a>
Fruit outerwall thickness	-	Measurement, 9=9mm or more.	<a href="#">scores</a>
Fruit cracking tendency	-	(1=none, 3=slight, 5=medium, 7=medium to severe, 9=severe)	<a href="#">scores</a>

1 - 10 of 26

0.12 s

# C&E data search: Trait

Filter C&E data by trait

The report below lists the definitions of all phenotypic traits, which are currently available in EURISCO. Please use the search bar below to define filters.

Rows

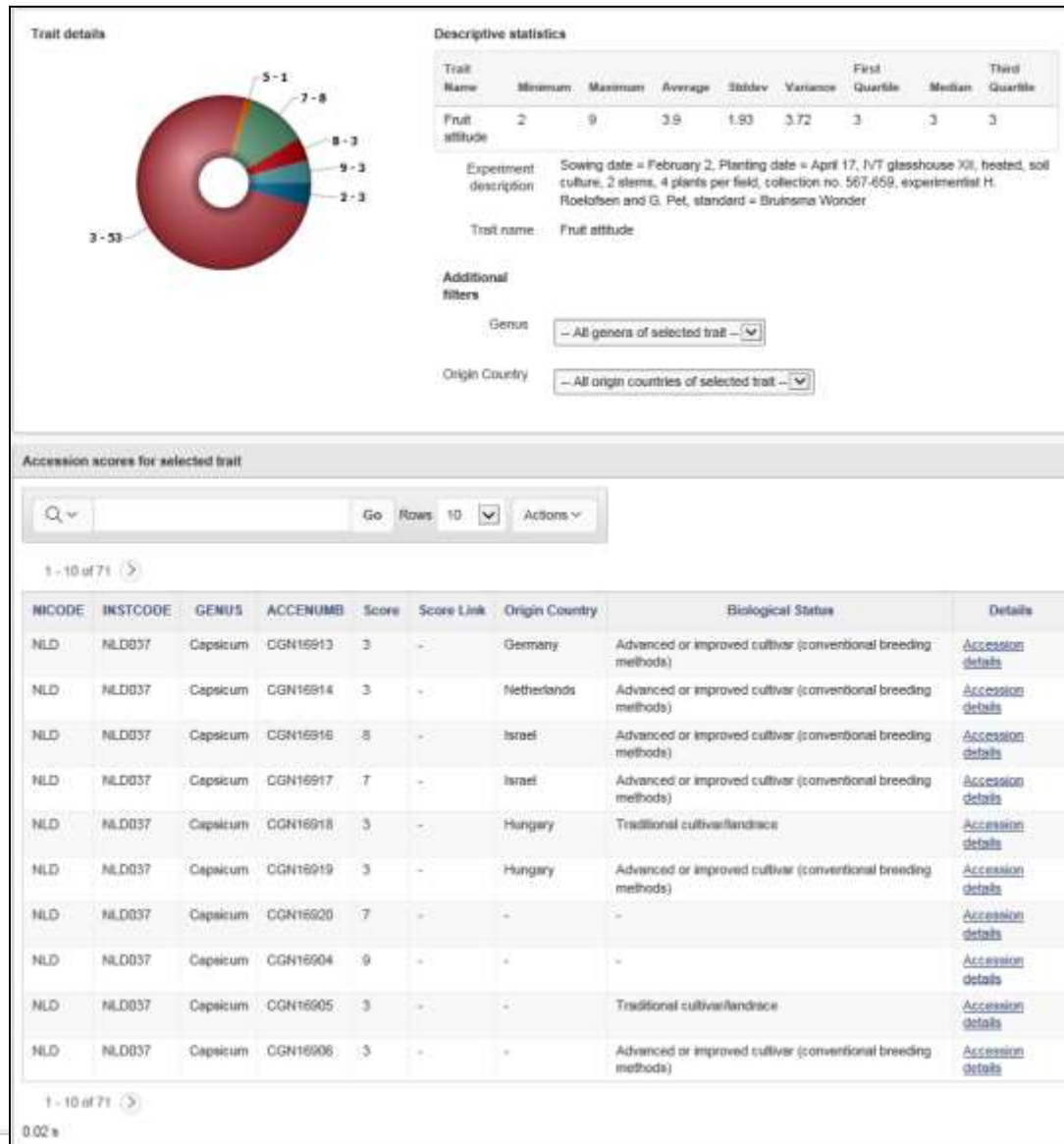
1 - 10 of 1214 >

Trait Name	Trait Remark	Trait Method	Trait Group	Details
Petiole and/or midvein enlargement	-	3=narrow, 5=intermediate,7=enlarged (See IPGRI descriptors Brassica and Raphanus 1990 4.2.27)	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Siliqua angle	-	1=0°; 2=0-22.5°; 3=22.5°; 4=22.5-45°; 5=45°; 6.45-67.5°; 7=67.5°	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Leaf anthocyanin content	-	1 = very weak, 3 = weak, 5 = medium, 7 = strong, 9 = very strong	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Time period until marketable maturity	-	(1=very early, ..., 9=very late)	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Bremia lactucae	-	Resistance to B. lactucae race BI 5, scale:1 = susceptible, 9 = resistant	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Bremia lactucae	-	Resistance to B. lactucae race BI 11, scale:1 = susceptible, 9 = resistant	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Bremia lactucae	-	Resistance to B. lactucae race BI 12, scale:1 = susceptible, 9 = resistant	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Bremia lactucae	-	Resistance to B. lactucae race BI 14, scale:1 = susceptible, 9 = resistant	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Leaf anthocyanin distribution	-	1 = localised, 2 = entire	C&E data (not further specified)	<a href="#">used by experiment(s)</a>
Bremia lactucae	-	Resistance to B. lactucae race BI 25, scale:1 = susceptible, 9 = resistant	C&E data (not further specified)	<a href="#">used by experiment(s)</a>

1 - 10 of 1214 >

0.03 s

# C&E data search: C&E scores



# FUTURE OF EURISCO

# More data

- Inclusion of additional passport data
  - Support and encouragement of National Focal Points
  - Participation in project proposals
  
- Inclusion of additional C&E data
  - Currently in prototype phase
  - Request to all National Focal Points to provide available C&E data to EURISCO
  - Participation in ECPGR-funded activities, which foresee the provision of C&E data to EURISCO



# Better data

- Increase frequency of updates
- Increase completeness of passport data
- Reduction of “sea food”
- Improvement of taxonomic data

▼ Taxonomy


Genus **Medicago**  
Species **murex**

▼ Acquisition/storage

Acquisition Source **Roadside**

▼ Collection

Collecting Institute Code   
Collecting Date **1987**  
Collecting Latitude **41.4264**  
Collecting Longitude **-9.0831**  
Collecting Elevation **635**



The map displays a coastal region in Brazil, with a red pin marker indicating the collection site. The location is identified as Barcelos, near the city of Manaus. The map shows major roads and surrounding areas like Forjões, Arcozelo, and Vila Nova de Farnalicao.

# Functionality

- Improve the public web interface
- Improve the taxonomic backbone of EURISCO
- Implement additional use-cases for C&E data
- Extend EURISCO for *in situ* data

# Support

- Support a European evaluation project
  - Provide a supporting documentation unit
    - Templates,
    - Standards and
    - Training for data upload
  - Provide an intranet platform for project partners (could be merged with EURISCO later)

# Acknowledgements

- ECPGR
  - Theo van Hintum (Doc&Info group)
  - Lorenzo Maggioni, Elinor Lipman, Lidwina Koop, Jan Engels, Imke Thormann (ECPGR Secretariat)
  - ECPGR Executive Committee
  - EURISCO Advisory Committee
- IPK Gatersleben
  - Andreas Graner
  - Helmut Knüpfper
  - Markus Oppermann
  - Uwe Scholz
  - Matthias Lange
  - Stefanie Kreide
- Global Crop Diversity Trust
  - Matija Obreza