EURISCO as central information system for data sharing

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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

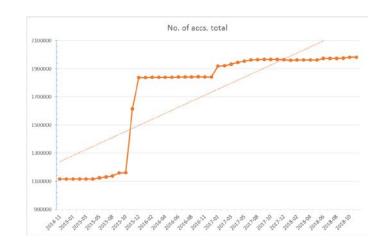




Development

- 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

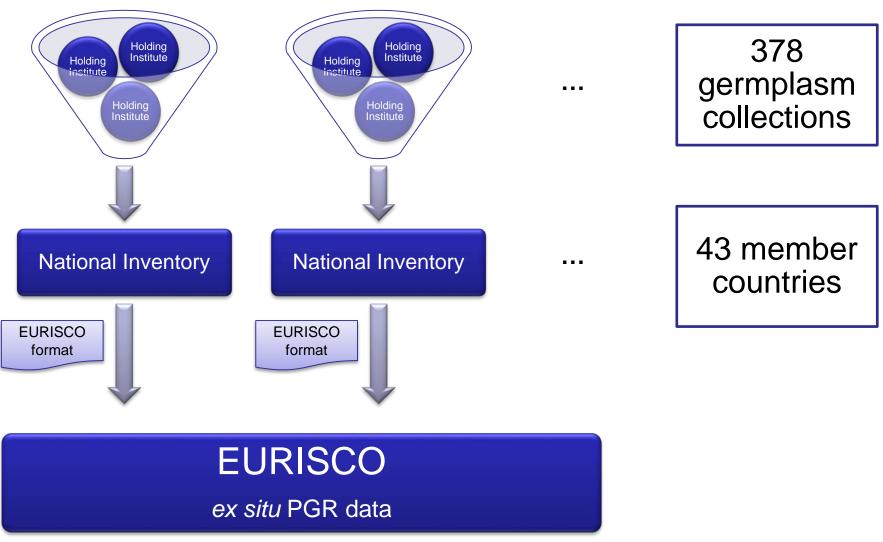
- 1,983,372 accessions
- 6,392 genera
- 43,445 species names
- 437,953 MLS accessions
- 47,049 AEGIS accessions
- 32,647 DOIs



as of 2018-11-19



Data flow







Passport data in EURISCO

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

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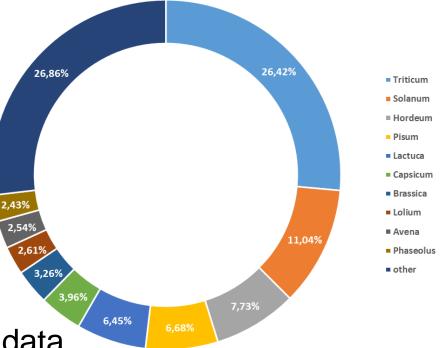
Weise et al. (2017) Nucleic Acids Research, 45(D1):D1003-D1008.





Phenotypic data in EURISCO

- Extension available since summer 2016
- Currently, 1,660,474 records of data from seven countries
 - Czech Republic
 - Germany
 - Latvia
 - The Netherlands
 - Poland
 - Romania
 - United Kingdom
- 68,926 accs. with phenotypic data

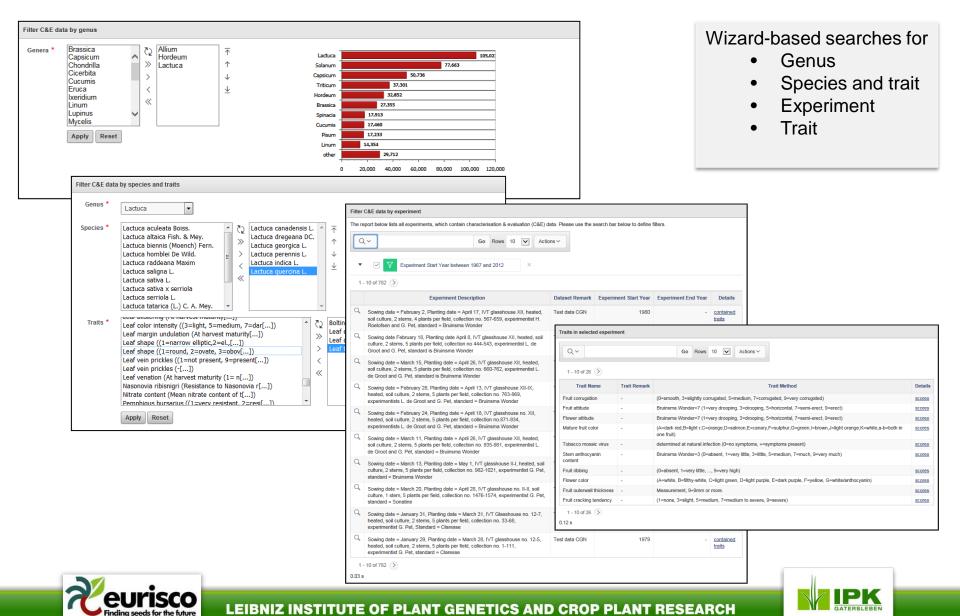




as of 2018-11-19



Search for phenotypic data



Example I – material selection

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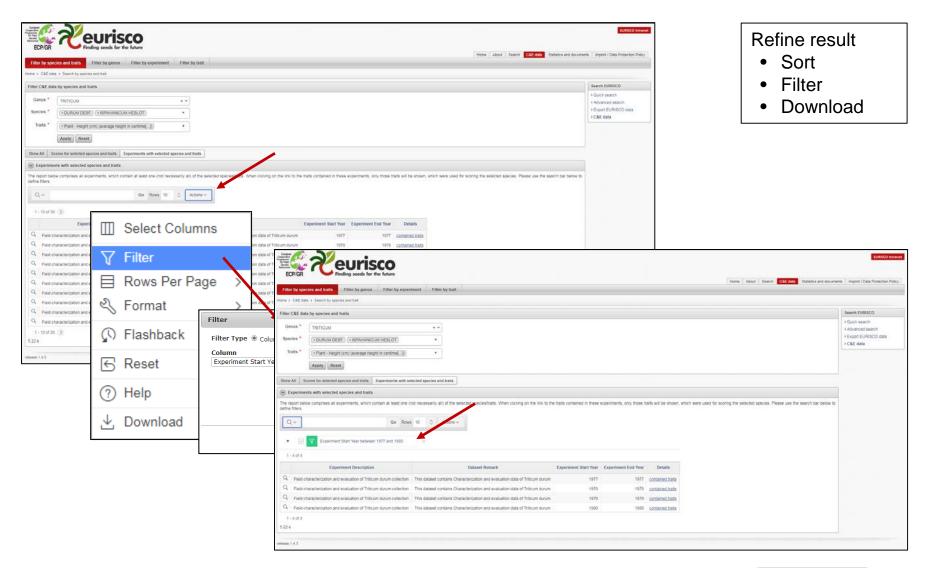
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Example I – report of experiments







Example I – scores

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Additional filters, e.g. origin country





Example I – scores

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POL	POL003	Triticum durum Desf.	27325	106.6	-	Advanced or improved cultivar (conventional breeding methods)	Accession details
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POL	POL003	Triticum durum Desf.	27237	110.6	-	Advanced or improved cultivar (conventional breeding methods)	Accession details
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POL	POL003	Triticum durum Desf.	27026	116.6	-	Traditional cultivar/landrace	Accession details
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POL	POL003	Triticum durum Desf.	27243	117	-	Breeder's line	Accession details

Group values





Example II – trait selection

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Example II – scores

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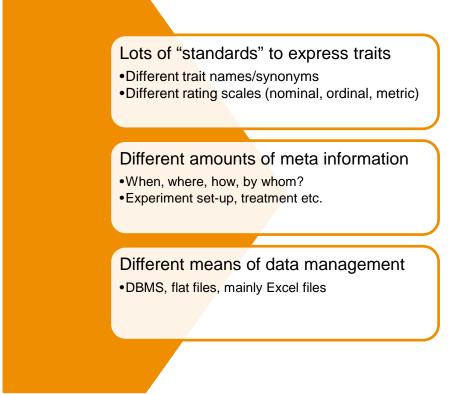
Example II – scores

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The Challenge: Diversity of data

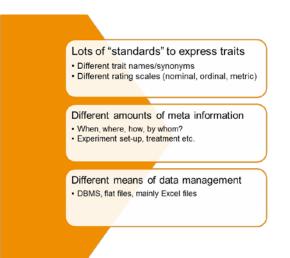






Challenges for EURISCO

- Use of phenotypic traits
 - Lots of different traits, methods, scales
 - About 600 germplasm collections in Europe, around 400 in EURISCO
 - \rightarrow Unlikely to get to a standardisation
- Information technology diversity
 - Different data management systems (DBMS, flat files, Excel)
 - Different level of IT support
 - Varying IT affinity
 → problem of acceptance of sophisticated solutions
- → But needed: one-size-fits-all method





Current approach

- Data standardisation
 - No standardisation of trait, scale or experimental design
 - Pragmatic approach: Import of existing data as-is to reach critical mass
- Data exchange
 - Only standardisation of exchange format
 - As simple as possible
 - As few fields as possible
 - → "minimum consensus"
- Data management
 - Highly abstracted, following the single-observation concept (van Hintum et al. 1992)
 - Omitting fine-grained metadata







Data upload in three steps

File parsing and upload via Java tool

• data owner

Data integrity checks • EURISCO management

🐮 EURISCO: Impor	: C&E Data	×
File Help		
DATASET: EXPERIMENT: TRAIT:	Tpl1_DATASET_DEU271.xlsx Tpl2_EXPERIMENT_DEU271.xlsx Tpl3_TRAIT_DEU271.xlsx	
GENOTYPE: SCORE:	TpI4_GENOTYPE_DEU271.xlsx	Cook In:
Notification email: Username: Password:	weise@lipk-qatersleben.de weise	Tpl2_EX Tpl3_TR Tpl3_TR Tpl3_TR Tpl4_GE
	Start import	File Name:

Approval / withdrawal of data for publishing on the EURISCO website

• data owner/NFP

Look in:	2016-09-23	
Tpl1_DAT	ASET_DEU271.xlsx	Tpl4_GENOTYPE_DEU271_mod_SW2.xlsx
Tpl2_EXF	ERIMENT_DEU271.xlsx	Tpl4_GENOTYPE_DEU271_mod_SW3.xlsx
TpI3_TRA	IT_DEU271.xlsx	TpI5_SCORE_DEU271.xlsx
Tpl3_TRA	IT_DEU271_mod_SW.xlsx	
Tpl4_GEN	IOTYPE_DEU271.xlsx	
Tpl4_GEN	VOTYPE_DEU271_mod_SW.xlsx	
File Name;	TpI5 SCORE DEU271.xlsx	
Files of Type:	MS-Excel	



Current limitations

- Only non-confidential phenotypic data
- Only data of accessions listed in EURISCO
- NFPs must approve data before publication
- No embargo periods
- Limited comparability





What could be improved?

- Through an EVA project, it could be possible to support:
 - Data harmonisation
 - Harmonisation of experiment set-up, treatment etc.
 - Start with minimum approach
 - » E.g. MIAPPE (Krajewski et al. 2015)
 - » Better description
 - Desirable: harmonised protocols
 - Better structuring of traits/methods/scales
 - Support for crop experts (ECPGR crop working groups)
 - Focus on most active groups at the beginning
 - Improve comparability
 - » Mapping onto ontology terms
 - » E.g. Crop Ontology (Arnaud et al. 2012)
 - Support the mapping process by tools, e.g. suggestion of ontology terms





What could be improved?

- Through an EVA project, it could be possible to:
 - Provide an intranet platform for project partners
 - Use existing infrastructure for project-specific phenotypic data (in a separate intranet)
 - Exchange format
 - Upload and check tools
 - Provide features for searching/filtering/downloading data
 - Based on users' requirements
 - Extension for privileged access (data embargo period)
 - Data could be published automatically after expiration
 - Also non-EURISCO material could be managed
 - Handling this data after embargo period needs to be discussed
 - Ensure a supportive documentation unit (providing templates, standards, facilitating data flow)







M. Grau / IPK

THANK YOU FOR YOUR ATTENTION



